# Appendix F

Noise and Vibration Technical Assessment

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# MEMORANDUM

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| To: | City of Los Angeles Department of City Planning |
| From: | Cole Martin, INCE (Dudek); Mike Greene, INCE Bd. Cert. (Dudek) |
| Subject: | **21101 Ventura Boulevard JDA Woodland Hills Self Storage Project – Noise and Vibration Technical Memorandum** |
| Date: | February 2, 2024 |
| cc: | Ronelle Candia, Project Manager (Dudek)<br>Brian Kearny, Senior Development Manager (Johnson Development Associates) |
| Attachment(s): | Figure 1 – Noise Measurement Locations<br>Figure 2 – Aggregate Stationary Sources Operational Noise Level Prediction<br>Attachment A – Field Noise Measurement Data Sheets<br>Attachment B – Construction Noise Prediction Model Worksheets |

The City of Los Angeles (the "City") has received a development application from Johnson Development Associates, Inc. (the "Applicant") requesting approval of a Conditional Use Permit and Site Plan Review to construct and operate a self-storage project consisting of a six-story, approximately 112,204 square foot self-storage facility (the "Project").

This memorandum estimates potential noise and vibration impacts from construction and operation of the Project in accordance with the California Environmental Quality Act (CEQA) Guidelines.

The contents and organization of this memorandum are as follows: Project Description, Environmental Setting, Regulatory Setting, Noise and Vibration Impacts Assessment, Conclusions, and References Cited.

# 1 Project Description

## Project Location

The Project is located at 21101 Ventura Boulevard in the Woodland Hills neighborhood of the City (the "Project Site"). The Project Site is bounded by existing commercial land uses to the west, Alhama Drive to the east, Clarendon Street to the north, and an existing commercial land use (Courtyard by Marriott) to the south. The Project Site comprises a parcel totaling approximately 2.5 acres and is currently occupied by a commercial land use.

## Project Description

The Project proposes minor improvements to an existing hotel on the site, which would include the configuration of hotel parking areas, demolition of the existing hotel swimming pool, and construction, use, maintenance of a new pool and ancillary structures to the eastern portion of the hotel project site. The Project would construct a six-story, 112,204-square foot self-storage facility with loading areas, and surface parking. The above grade self-storage building would include a total of approximately 111,400 square feet of self-storage for household goods with an 804-square foot associated office and support space. The Project would include 99 vehicle parking spaces for the hotel site and 29 parking spaces for the self-storage building site to be provided in surface parking lots located in the Project Site. Additionally, the Project would include 16 short-term bicycle parking spaces and 16 long-term bicycle parking spaces. A loading area in the self-storage building site would be located under of the building.

# 2 Environmental Setting

## 2.1 Noise and Vibration Characteristics

### 2.1.1 Noise

Sound may be described in terms of level or amplitude (measured in decibels (dB)), frequency or pitch (measured in hertz (Hz) or cycles per second), and duration (measured in seconds or minutes). The standard unit of measurement of the amplitude of sound is the decibel. Because the human ear is not equally sensitive to sound at all frequencies, a special frequency-dependent rating scale is used to relate noise to human sensitivity. The A-weighted decibel scale (dBA) performs this compensation by discriminating against low and very high frequencies in a manner approximating the sensitivity of the human ear. Several descriptors of noise (noise metrics) exist to help predict average community reactions to the adverse effects of environmental noise, including traffic-generated noise, on a community. These descriptors include the equivalent noise level over a given period ($L_{eq}$), the statistical sound level ($L_n$), the day–night average noise level ($L_{dn}$), and the community noise equivalent level (CNEL). Each of these descriptors uses units of dBA. Table 1 provides examples of A-weighted noise levels from common sounds. In general, human sound perception is such that a change in sound level of 3 dB is barely noticeable; a change of 5 dB is clearly noticeable; and a change of 10 dB is perceived as doubling or halving of the sound level.

### Table 1. Typical Sound Levels in the Environment and Industry

| Common Outdoor Activities | Noise Level (dBA) | Common Indoor Activities |
|---|---|---|
| — | 110 | Rock band |
| Jet flyover at 300 meters (1,000 feet) | 100 | — |
| Gas lawn mower at 1 meter (3 feet) | 90 | — |
| Diesel truck at 15 meters (50 feet), at 80 kph (50mph) | 80 | Food blender at 1 meter (3 feet)<br>Garbage disposal at 1 meter (3 feet) |
| Noisy urban area, daytime<br>gas lawn mower at 30 meters (100 feet) | 70 | Vacuum cleaner at 3 meters (10 feet) |
| Commercial area<br>Heavy traffic at 90 meters (300 feet) | 60 | Normal speech at 1 meter (3 feet) |
| Quiet urban daytime | 50 | Large business office<br>Dishwasher, next room |
| Quiet urban nighttime | 40 | Theater, large conference room (background) |
| Quiet suburban nighttime | 30 | Library |
| Quiet rural night time | 20 | Bedroom at night, concert hall (background) |
| — | 10 | Broadcast/recording studio |
| Lowest threshold of human hearing | 0 | Lowest threshold of human hearing |

**Notes:** dBA = A-weighted decibels; kph = kilometers per hour; mph = miles per hour
Source: Caltrans 2013a..

$L_{eq}$ is a sound energy level averaged over a specified period (typically no less than 15 minutes for environmental studies). $L_{eq}$ is a single numerical value that represents the amount of variable sound energy received by a receptor during a time interval. For example, a 1-hour $L_{eq}$ measurement would represent the average amount of energy contained in all the noise that occurred in that hour. $L_{eq}$ is an effective noise descriptor because of its ability to assess the total time-varying effects of noise on sensitive receptors (see Section 2.2). $L_{max}$ is the greatest sound level measured during a designated time interval or event.

Unlike the $L_{eq}$ metrics, $L_{dn}$ and CNEL metrics always represent 24-hour periods, usually on an annualized basis. $L_{dn}$ and CNEL also differ from $L_{eq}$ because they apply a time-weighted factor designed to emphasize noise events that occur during the evening and nighttime hours (when speech and sleep disturbance is of more concern). "Time weighted" refers to the fact that $L_{dn}$ and CNEL penalize noise that occurs during certain sensitive periods. In the case of CNEL, noise occurring during the daytime (7:00 a.m.–7:00 p.m.) receives no penalty. Noise during the evening (7:00 p.m.–10:00 p.m.) is penalized by adding 5 dB, while nighttime (10:00 p.m.–7:00 a.m.) noise is penalized by adding 10 dB. $L_{dn}$ differs from CNEL in that the daytime period is defined as 7:00 a.m.–10:00 p.m., thus eliminating the evening period. $L_{dn}$ and CNEL are the predominant criteria used to measure roadway noise affecting residential receptors. These two metrics generally differ from one another by no more than 0.5 dB to 1 dB, and as such are often treated as equivalent to one another.

### 2.1.2 Vibration

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Vibration can be a serious concern, causing buildings to shake and rumbling sounds to be heard. In contrast to noise, vibration is not a common environmental problem. It is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads. Some common sources of vibration are trains, buses on rough roads, and construction activities, such as blasting, pile driving, and heavy earthmoving equipment.

Several different methods are used to quantify vibration. Peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. PPV is most frequently used to describe vibration impacts to buildings and is usually measured in inches per second. The root mean square (RMS) amplitude is most frequently used to describe the effect of vibration on the human body and is defined as the average of the squared amplitude of the signal. Decibel notation (VdB) is commonly used to measure RMS. The decibel notation acts to compress the range of numbers required to describe vibration.

High levels of vibration may cause physical personal injury or damage to buildings. However, vibration levels rarely affect human health. Instead, most people consider vibration to be an annoyance that can affect concentration or disturb sleep. In addition, high levels of vibration can damage fragile buildings or interfere with equipment that is highly sensitive to vibration (e.g., electron microscopes). Most perceptible indoor vibration is caused by sources within buildings, such as operation of mechanical equipment, movement of people, or slamming of doors. Typical outdoor sources of perceptible vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If the roadway is smooth, the vibration from traffic is rarely perceptible.

## 2.2 Sensitive Receptors

Noise- and vibration-sensitive land uses are locations where people reside or where the presence of unwanted sound could adversely affect the use of the land. Residences, schools, hospitals, guest lodging, libraries, and some passive recreation areas would be considered noise and vibration sensitive and may warrant unique measures for protection from intruding noise.

Sensitive receptors near the Project Site include the Courtyard by Marriott hotel directly south and adjacent to the project site, a limited number of existing single-family residential uses to the south, and the Park Ventura Senior Living facility to the southwest. These sensitive receptors represent the nearest noise sensitive land uses with the potential to be impacted by construction and operation of the Project. Additional noise sensitive receptors are located farther from the Project Site in the surrounding community and would be less impacted by noise and vibration levels than the above-listed sensitive receptors.

## 2.3 Existing Noise Conditions

Noise measurements were conducted on and near the Project Site on December 1, 2022, to characterize the existing noise levels. Table 2 provides the location, date, and time the noise measurements were taken. The noise measurements were taken using a Soft-DB Piccolo sound level meter equipped with a 0.5-inch, pre-polarized condenser microphone with pre-amplifier. The sound level meter meets the current American National Standards

Institute standard for a Type 2 (General Purpose) sound level meter. The accuracy of the sound level meter was verified using a field calibrator before and after the measurements, and the measurements were conducted with the microphone positioned approximately five feet above the ground. Attachment A contains the field noise measurement data sheets generated for the project, which include photographs and measured levels at each measurement location.

**Table 2. Measured Outdoor Ambient Noise Levels**

| Receptors | Location | Date | Measurement Start and End Times | $L_{eq}$ (dBA) | $L_{max}$ (dBA) |
|---|---|---|---|---|---|
| ST1 | South of Project Site, at the northern façade of the Courtyard by Marriott hotel (21101 Ventura Blvd.) | 12/1/2022 | 11:12 a.m. – 11:27 a.m. | 67.0 | 72.7 |
| ST2 | Southwest of Project Site, adjacent to the Park Ventura Senior Living facility (21200 Ventura Blvd) | 12/1/2022 | 10:49 a.m. – 11:04 a.m. | 72.7 | 87.9 |
| ST3 | South of Project Site, south of the residence at 21115 Costanso St. | 12/1/2022 | 10:29 a.m. – 10:44 a.m. | 54.8 | 71.8 |

**Notes:** $L_{eq}$ = equivalent continuous sound level (time-averaged sound level); $L_{max}$ = maximum sound level during the measurement interval; dBA = A-weighted decibels.

Three short-term noise measurement locations (ST) that represent existing sensitive receivers were selected on and near the Project Site. These locations are depicted as receivers ST1–ST3 on Figure 1, Noise Measurement Locations. The measured energy-averaged ($L_{eq}$) and maximum ($L_{max}$) noise levels are provided in Table 2. The primary noise sources at the sites identified in Table 2 consisted of traffic along adjacent roadways, birds, distant aircraft, distant landscaping, distant conversations and yelling, and distant industrial noise. As shown in Table 2, the measured noise levels ranged from approximately 54.8 dBA $L_{eq}$ at ST3 to 72.7 dBA $L_{eq}$ at ST2.

# 3 Regulatory Setting

## 3.1 City of Los Angeles Noise Ordinance

The City of Los Angeles regulates noise through several sections of its municipal code. These include Section 41.40 (Noise Due to Construction, Excavation Work – When Prohibited), which establishes time prohibitions on noise generated by construction activity; Section 112.04 (Powered Equipment Intended for Repetitive Use in Residential Areas and Other Machinery, Equipment and Devices), which prohibits the use of loud machinery and/or equipment within 500 feet of residences and prohibits noise from machinery, equipment, or other devices that would result in an increase of more than 5 dB above the ambient noise level at residences; and Section 112.05 (Maximum Noise Level of Powered Equipment or Powered Hand Tools), which establishes maximum noise levels for powered equipment and powered hand tools (i.e., 75 dBA at a distance of 50 feet for construction, industrial, and agricultural equipment between the hours of 7:00 a.m. and 10:00 p.m.). According to Section 41.40, no construction activity that might create loud noises in or near residential areas or buildings shall be conducted between the hours of 9:00 p.m. and 7:00 a.m. on weekdays, before 8:00 a.m. or after 6:00 p.m. on Saturdays, or at any time on Sundays or federal holidays.

# 4 Noise and Vibration Impacts Assessment

## 4.1 Thresholds of Significance

The State of California has developed guidelines to address the significance of noise and vibration impacts based on Appendix G of the CEQA Guidelines (14 CCR 15000 et seq.). Based on the criteria identified in Appendix G of the CEQA Guidelines, the Project would have a significant impact on noise if it would result in:

a) 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.
b) Generation of excessive groundborne vibration or groundborne noise levels.
c) 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, a project may have a significant impact if it would expose people residing or working in the project area to excessive noise levels.

For this analysis, the Appendix G Thresholds and City of Los Angeles noise standards are relied upon to assess potential noise impacts. Because the City does not have vibration standards, thresholds of perception and risk of structural damage from the California Department of Transportation (Caltrans 2013b) and the U.S. Department of Transportation's Federal Transit Administration (DOT 2006) are used.

## 4.2 Impact Analysis

### 4.2.1 Would the project result in the exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Noise-generated by the Project would include short-term, on-site construction noise; off-site traffic noise along local roadways in the Project Area; and on-site mechanical noise from heating, ventilation, and air conditioning (HVAC) equipment.

#### Short-Term Construction Impacts

Construction noise and vibration are temporary phenomena. Construction noise and vibration levels vary from hour to hour and day to day, depending on the equipment in use, the operations being performed, and the distance between the source and receptor.

Equipment that would be in use during construction would include, in part, graders, backhoes, concrete saws, rubber-tired dozers, loaders, cranes, forklifts, cement mixers, pavers, rollers, and air compressors. The typical maximum noise levels for various pieces of construction equipment at a distance of 50 feet are presented in Table 3. Note that the equipment noise levels presented in Table 3 are maximum noise levels. Typically, construction equipment operates in alternating cycles of full power and low power, producing average noise levels less than the maximum noise level. The average sound level of construction activity also depends on the amount of time that the equipment operates and the intensity of construction activities during that time.

### Table 3. Construction Equipment Maximum Noise Levels

| Equipment Type | Typical Equipment (dBA at 50 Feet) |
|---|---|
| Air compressor | 81 |
| Backhoe | 85 |
| Concrete pump | 82 |
| Concrete vibrator | 76 |
| Crane | 83 |
| Truck | 88 |
| Dozer | 87 |
| Generator | 78 |
| Loader | 84 |
| Paver | 88 |
| Pneumatic tools | 85 |
| Water pump | 76 |
| Power hand saw | 78 |
| Shovel | 82 |

**Source:** FHWA 2006.
**Notes:** dBA = A-weighted decibels.

The maximum noise levels at 50 feet for typical construction equipment would be 88 dBA for the equipment typically used for this type of development project, although the hourly noise levels would vary. Construction noise in a well-defined area typically attenuates at approximately 6 dB per doubling of distance. Project construction would take place both near and far from adjacent, existing noise-sensitive uses. For example, construction near the southern Project boundary would take place within approximately 30 to 40 feet of the Courtyard by Marriott property line, but during construction of other Project components, construction would be further away from noise-sensitive receptors. Most construction activities associated with the Project would occur at distances of approximately 100 feet or more from existing noise-sensitive land uses, which represents activities both near and far from any one receiver, as is typical for construction projects.

The Federal Highway Administration's (FHWA) Roadway Construction Noise Model (RCNM) (FHWA 2008) was used to estimate construction noise levels at the nearest occupied noise-sensitive land use. Input variables for the RCNM consist of the receiver/land use types, the equipment type and number of each (e.g., two graders, a loader, a tractor), the duty cycle for each piece of equipment (e.g., percentage of hours the equipment typically works per day), and the distance from the noise-sensitive receiver. No topographical or structural shielding was assumed in the modeling. The RCNM has default duty-cycle values for the various pieces of equipment, which were derived from an extensive study of typical construction activity patterns. Those default duty-cycle values were used for this noise analysis.

Using the FHWA RCNM and construction information, prediction results are summarized in Table 4 at the nearest noise-sensitive receiver (the hotel property line to the south of the project site). An “acoustic centroid” approach akin to the FTA general assessment technique for estimating construction noise was utilized, whereby all listed equipment for a construction phase is represented by a common location at the geographic center (with successive pieces of equipment further afield) of the studied construction zone or area with the exception of a single loudest operating piece of equipment associated with the studied construction phase to be as close as the aforementioned 30 feet nearest distance to the nearest noise sensitive receptor for no more than a single hour during the 8-hour work shift over which the $L_{eq}$ value for the entire phase is quantified.

This approach conservatively considers a “worst-case” scenario, where the loudest equipment piece for the phase is much closer to the nearest noise sensitive receptor than its distance to the acoustic centroid. An example of such a scenario would be during the Project’s site grading phase, where a grader might make several passes at this nearest perpendicular distance to the sensitive receptor location, but is otherwise very distant. For purposes of this construction noise assessment, such moments when this nearest equipment proximity occurs up to a cumulative time not greater than one hour per 8-hour period.

Attachment B displays the construction noise model worksheets used in the analysis. Although the quantities and types of equipment per construction phase are the same in each of the two approaches, due primarily to the differences in source-to-receptor distance variables, predicted levels for the acoustic centroid methodology is lower.

### Table 4. Predicted Construction Noise Levels

| Construction Phase | Construction Noise Level at Nearest Receptor (~30 ft to property line) ($L_{eq}$ dBA) | Construction Noise Level at 50’ ($L_{eq}$ dBA) per LAMC Section 112.05 | Compliant with LAMC Section 112.05? |
|---|---|---|---|
| Demolition | 75.4 | 74.8 | Yes |
| Site Preparation | 75.2 | 73.0 | Yes |
| Grading | 75.1 | 73.8 | Yes |
| Building Construction | 73.3 | 71.2 | Yes |
| Paving | 75.2 | 73.4 | Yes |
| Architectural Coatings | 64.1 | 61.9 | Yes |

**Notes:** $L_{eq}$ = equivalent continuous sound level (time-averaged sound level); dBA = A-weighted decibel.

As presented in Table 4, the construction noise levels are predicted to be as high as 75 dBA $L_{eq}$ at the nearest noise sensitive land use when construction activities take place near the southernmost Project boundary, approximately 30 feet away. Note that these estimated noise levels would only occur as heavy equipment is operated along the southern Project boundary, which will take place for a relatively short portion of the overall construction period. On an average construction workday, heavy equipment will be operating sporadically throughout the Project Site and more frequently away from the southernmost edge of the site.

As also shown in Table 4, at a reference distance of 50 feet, noise levels from construction equipment would not exceed a noise level of 75 dBA $L_{eq}$ and thus would be in compliance with LAMC Section 112.05.

Although nearby off-site noise sensitive receptors would be exposed to elevated construction noise levels, the increased noise levels would typically be relatively short term. It is anticipated that construction activities associated with the Project would take place primarily within the allowable hours of the City of Los Angeles (7:00 a.m. and 9:00 p.m. Monday through Friday, 8:00 a.m. and 6:00 p.m. on Saturday), and would not occur at any time on Sunday or on federal holidays. In the event that construction is required to extend beyond these times, an extended hours permit would be required and would be obtained by the Applicant.

Without an adequate barrier between the construction equipment operating on the Project Site and the nearby residential uses, construction noise levels would be substantially higher than existing ambient daytime noise levels, particularly for the construction activities in proximity to the nearest adjacent noise-sensitive receivers (as shown in Table 4). In addition to the City's established requirement mandating that no construction activity that might create loud noises in or near residential areas or buildings shall be conducted between the hours of 9:00 p.m. and 7:00 a.m. on weekdays, before 8:00 a.m. or after 6:00 p.m. on Saturdays, or at any time on Sundays or federal holidays, the Project Applicant has committed to adhere to the following and implement the following standard construction Best Management Practices (BMPs) to minimize temporary increases in noise levels due to the intermittent operation of construction equipment:

1. Prior to commencement of construction activities involving heavy equipment, temporary construction noise barriers will be constructed at the Project Site's southern property boundary. The noise barriers will be a minimum of eight feet in height, have a surface density of at least four pounds per square foot, and be free of openings and cracks (with the exception of expansion joints gaps and other construction techniques, which could create an opening or crack).
2. Residences surrounding the construction site will be notified of the construction schedule in writing at least five calendar days prior to construction. The construction contractor will designate a point of contact who will be responsible for responding to complaints regarding construction noise. The point of contact will determine the cause of the complaint and ensure that reasonable measures are implemented to correct the problem. A contact number for the noise disturbance point of contact will be conspicuously placed on construction site fences and written into the construction notification schedule sent to nearby residences.
3. Staging of construction equipment shall not occur within 50 feet of any noise- or vibration-sensitive land uses.
4. All noise-producing equipment and vehicles using internal combustion engines should be equipped with mufflers; air-inlet silencers, where appropriate; and any other shrouds, shields, or other noise-reducing features in good operating condition that meet or exceed original factory specification. Mobile or fixed "package" equipment (e.g., arc-welders, air compressors) should be equipped with shrouds and noise control features that are readily available for that type of equipment.
5. All mobile or fixed noise-producing equipment used on the Project facilities that are regulated for noise output by a local, state, or federal agency should comply with such regulation while in the course of Project activity.
6. Idling equipment should be kept to a minimum and moved as far as practicable from noise-sensitive land uses.
7. Electrically powered equipment should be used instead of pneumatic or internal-combustion-powered equipment, where feasible.

8. Material stockpiles and mobile equipment staging, parking, and maintenance areas should be located as far as practicable from noise-sensitive receptors.
9. The use of noise-producing signals, including horns, whistles, alarms, and bells, should be for safety warning purposes only.

Installation of a noise barrier, for example, would vary in effectiveness depending upon the degree to which the line-of-sight between the source and receiver is broken, but for the nearest sensitive receivers analyzed is estimated to provide as much as 13 decibels of noise reduction. Installation of more effective silencers could range from several decibels to well over 10 decibels. Reduction of idling equipment could reduce overall noise levels from barely any reduction to several decibels. Cumulatively, these measures would result in substantial decreases in the noise from construction and would reduce noise levels at nearby residences to the west and to the east to less than significant levels. Also as shown in Table 5, with implementation of the BMPs listed above, construction equipment noise would not exceed 75 dBA $L_{eq}$ at 50 feet, and therefore would comply with the LAMC Section 112.05 restrictions on construction equipment noise levels. Therefore, noise from on-site construction activities would be less than significant.

**Table 5. Predicted Construction Noise Levels with and without Implemented BMPs**

| Construction Phase | Construction Noise Level at 50' ($L_{eq}$ dBA) per LAMC Section 112.05 without BMPs | Construction Noise Level at 50' ($L_{eq}$ dBA) per LAMC Section 112.05 with BMPs |
|---|---|---|
| Demolition | 74.8 | 64.8 |
| Site Preparation | 73.0 | 63.0 |
| Grading | 73.8 | 63.8 |
| Building Construction | 71.2 | 61.2 |
| Paving | 73.4 | 63.4 |
| Architectural Coatings | 61.9 | 51.9 |

**Notes:** $L_{eq}$ = equivalent continuous sound level (time-averaged sound level); dBA = A-weighted decibel.

## Long-Term Operational Impacts

Long-term operational noise associated with the Project includes noise from Project-generated traffic and from HVAC equipment associated with the Project's leasing office. Each of these is addressed below.

### *Off-Site Traffic Noise Levels*

As further discussed in the traffic generation memorandum prepared for the Project, the Project is expected to generate only a modest number of daily vehicle trips, primarily limited to cars and small trucks intermittently throughout daytime and evening hours as the self-storage facility's customers transport household goods to and from the Project Site. According to the traffic study, the Project will generate an estimated 163 net new[1] daily trips, ten net new a.m. peak hour trips, and 17 net new p.m. peak hour trips. Under the existing conditions, roadway segments in the Project's study area (specifically Ventura Blvd.) carry up to an estimated 1,742 trips during the a.m. peak hour (8 a.m. to 9 a.m.) and an estimated 2,458 trips during the p.m. peak hour (5 p.m. to 6 p.m.) (LADOT 2022). Thus, the Project-related vehicle trips would represent a nominal incremental increase in traffic volumes in the Project area.

Typically, a doubling of the energy of a noise source, such as a doubling of traffic volume, would increase noise levels by 3 dBA.[2] Given that it would result in only a modest increase in traffic volumes on local roadways, the Project is not expected to result in an increase of 3 dBA or greater on roadways in the study area. The change in noise levels due to the Project would not be audible. Therefore, impacts associated with Project-generated traffic noise would be less than significant.

### *On-Site Mechanical Noise Levels*

#### Rooftop HVAC

Based on the available architectural plans and other design information for the proposed Project, there are a number of HVAC units expected on the roof of the Project building. Rooftop HVAC reference sound levels were calculated from a combination of inputs that include the gross square footage values for the Project commercial land uses, Project applicant response to data requests, and manufacturer sound power level data.

### *Sound Propagation Prediction*

The aggregate noise emission from these outdoor-exposed HVAC sound sources has been predicted with the Datakustik CadnaA sound propagation program. CadnaA is a commercially available software program for the calculation, presentation, assessment, and prediction of environmental noise based on algorithms and reference data per International Organization of Standardization (ISO) Standard 9613-2, "Attenuation of Sound During Propagation Outdoors, Part 2: General Method of Calculation" (ISO 1996). The CadnaA computer software allows one to position sources of sound emission in a simulated three-dimensional (3-D) space atop rendered "blocks" of Project building masses having heights and footprints consistent with Project architectural plans and elevations. In addition to the above-mentioned sound source inputs and building-block structures that define the three-dimensional sound propagation model space, the following assumptions and parameters are included in this CadnaA-supported stationary noise source assessment:

- Ground effect acoustical absorption coefficient equal to 0.1, which intends to represent an average or blending of ground covers that are characterized largely by hard reflective pavements and existing building surfaces across the Project site and the surroundings;

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1 Net new trips refers to the difference between the trips generated by the project and the trips generated by the existing uses on-site.
2 Under normal circumstances (non-laboratory settings), a 3-dBA increase in noise levels is considered to be to smallest increase that is audible to the human ear; whereas a less than 3-dBA increase in noise levels is considered to be a barely or non-audible increase.

- Reflection order of 1, which allows for a single reflection of sound paths on encountered structural surfaces such as the modeled building masses;
- Calm meteorological conditions (i.e., no wind) with 68 degrees Fahrenheit and 50% relative humidity; and
- For purposes of impact assessment as evaluated herein, all of the modeled HVAC equipment are operating concurrently and continuously for a minimum period of 1 hour.

Table 6 presents the predicted aggregate noise level exposures from these operating HVAC systems at each of three (3) nearby offsite noise-sensitive receptors (i.e., existing hotel outdoor land uses, at positions akin to those studied for roadway traffic noise in the preceding narrative). Predicted levels shown in Table 6 range between 3 to 20 dBA hourly $L_{eq}$, below the City's noise ordinance, which prohibits an increase of greater than 5 dBA over ambient measured levels (as shown in Table 2). The reason for these low predicted HVAC noise levels is due to the high rooftop positions of the equipment surrounded by a tall and solid parapet that occludes both sight and sound. Figure 2 displays the location of the studied noise-sensitive receptors and noise contours.

### Table 6. Stationary Operations Noise Modeling Results

| Studied Noise Sensitive Receptor | Location | Predicted Project Attributed HVAC Noise Exposure Level (dBA $L_{eq}$) |
|---|---|---|
| R1 | Courtyard by Marriott facade | 19.7 |
| R2 | Adjacent to the Park Ventura Senior Living facility | 10.7 |
| R3 | Adjacent to the residence at 21115 Costanso St. | 3.1 |

**Source:** Dudek 2022

**Notes:** Leq = equivalent continuous sound level (time-averaged sound level); dBA = A-weighted decibels.

Therefore, stationary operations related to rooftop HVAC noise would be considered a less than significant impact.

### 4.2.2 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 County General Plan or noise ordinance (Los Angeles County Code, Title 12, Chapter 12.08), or applicable standards of other agencies?

As addressed in Section 4.2.1, Project construction would not result in a substantial permanent, temporary, or periodic increase in ambient noise levels in the Project vicinity above levels existing without the Project. Construction of the Project would include implementation of standard construction practices to minimize a temporary increase in noise levels due to the intermittent use of construction equipment. These standard practices would result in a substantial decrease in construction noise. Therefore, impacts associated with a substantial temporary or periodic increase in ambient noise levels would be less than significant.

### 4.2.3 Would the project result in the generation of excessive groundborne vibration or groundborne noise levels?

Construction activities may expose persons to excessive groundborne vibration or groundborne noise, causing a potentially significant impact. Caltrans has collected groundborne vibration information related to construction activities (Caltrans 2013). Information from Caltrans indicates that continuous vibrations with a peak particle velocity of approximately 0.1 inch/second begin to cause annoyance. Heavier pieces of construction equipment, such as bulldozers, have peak particle velocities of approximately 0.089 inch/second or less at a distance of 25 feet (DOT 2006).

Groundborne vibration typically attenuates over short distances. At the distance from the nearest noise sensitive land use (the Courtyard by Marriott) to the southern Project boundary (approximately thirty feet) and with the anticipated construction equipment, the peak particle velocity would be approximately 0.35 inch/second. At the closest sensitive receptors, vibration levels could temporarily approach the vibration threshold of potential annoyance of 0.1 inch/second; however, these vibration impacts would only occur intermittently during construction activities right on the southern property line. Under real-world conditions, equipment would operate throughout the construction site using different power levels, which minimize the vibration-induced annoyance experienced at the nearest residential receivers.

Construction can also affect nearby buildings by inflicting damage from vibration. However, construction vibration associated with this Project would not result in structural building damage. Building damage typically occurs at vibration levels of 0.5 inch/second or greater for buildings of reinforced-concrete, steel, or timber construction. The heavier pieces of construction equipment used for this Project would include backhoes, front-end loaders, and flat-bed trucks. Pile driving, blasting, or other special construction techniques would not be used for construction of the Project; therefore, excessive groundborne vibration and groundborne noise with the potential to adversely affect nearby buildings would not be generated. Once operational, the Project would not generate groundborne vibration. As such, no building damage would be expected to occur as a result of Project-related vibration during construction or operation and impacts would be less than significant.

### 4.2.4 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 not located within an airport land use planning area or within two miles of a public airport or public use airport (Los Angeles County Department of Regional Planning 2009). There are no general aviation airports or airstrips in the vicinity of the Project Site. The closest airport is Van Nuys Airport, which is located over six miles northeast of the Project Site. Any overhead air traffic noise above the Project Site would occur at heights where there is little possibility to expose construction workers or employees and customers of the self-storage facility to excessive aircraft noise levels. Therefore, no impacts associated with public airport noise would occur. No private airstrips are located within ten miles of the City (AirNav.com 2019). Therefore, no impacts associated with private airstrip noise would occur.

# 5 Conclusions

In summary, with implementation of standard construction and design techniques and practices, the Project's short- and long-term noise and vibration impacts would be less than significant.

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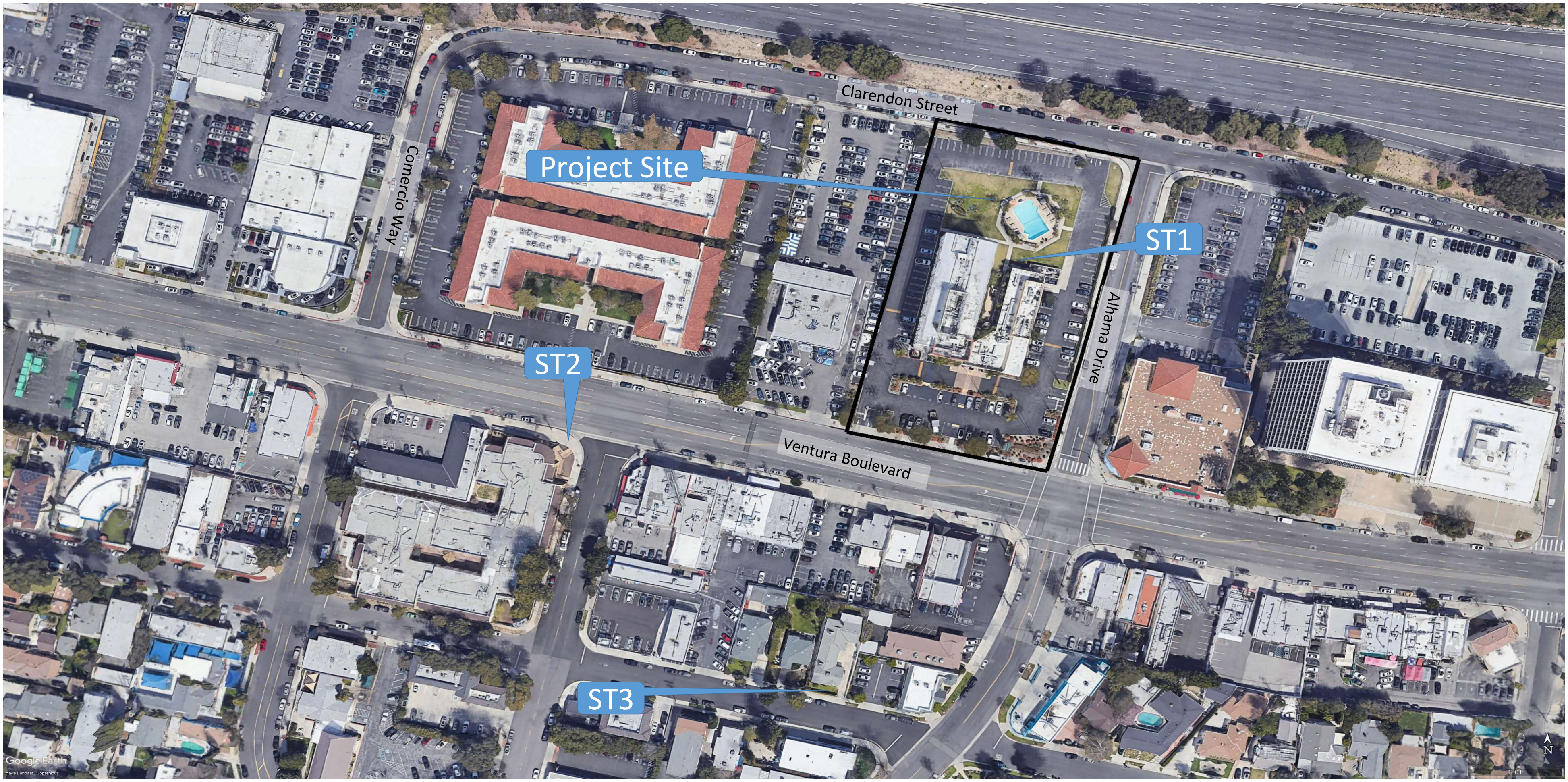


SOURCE: Google 2022; Dudek 2022

DUDEK

0 73 146 Feet

**FIGURE 1**

**Noise Measurement Locations**

21101 Ventura Boulevard - JDA Woodland Hills Self Storage Project


SOURCE: Google 2022; Dudek 2022

DUDEK

0 58.5 117 Feet

**FIGURE 2**

**Aggregate Stationary Sources Operational Noise Level Prediction**

21101 Ventura Boulevard - JDA Woodland Hills Self Storage Project

# Attachment A

## Field Noise Measurement Data Sheets

FORMS DUDEK FIELD DATA REPORT

# Field Noise Measurement Data

## Record: 1543

| | |
|---|---|
| **Project Name** | *Woodland Hills* |
| **Project #** | *14914* |
| **Observer(s)** | |
| **Date** | *2022-12-01* |

## Meteorological Conditions

| | |
|---|---|
| **Temp (F)** | *53.7* |
| **Humidity % (R.H.)** | *78* |
| **Wind** | *Calm* |
| **Wind Speed (MPH)** | *1* |
| **Wind Direction** | *East* |
| **Sky** | *Overcast* |

## Instrument and Calibrator Information

| | |
|---|---|
| **Instrument Name List** | *Piccolo #1897* |
| **Instrument Name** | *Piccolo #1897* |
| **Instrument Name Lookup Key** | *Piccolo #1897* |
| **Manufacturer** | *Soft dB inc.* |
| **Model** | *Piccolo* |
| **Serial Number** | *P0222050202* |
| **Calibration Date** | *05/02/2022* |
| **Calibrator Name** | *(SB) LD CAL200* |
| **Calibrator Name** | *(SB) LD CAL200* |
| **Calibrator Name Lookup Key** | *(SB) LD CAL200* |
| **Calibrator Manufacturer** | *Larson Davis* |
| **Calibrator Model** | *LD CAL200* |
| **Calibrator Serial #** | *4496* |
| **GPS Assistance Used** | *No* |
| **Pre-Test (dBA SPL)** | *93.6* |
| **Post-Test (dBA SPL)** | *94* |
| **Windscreen** | *Yes* |
| **Weighting?** | *A-WTD* |
| **Slow/Fast?** | *Slow* |
| **ANSI?** | *Yes* |

## Monitoring

| | |
|---|---|
| **Record #** | *1* |
| **Site ID** | *ST3* |
| **Site Location Lat/Long** | *34.166219, -118.593756* |
| **Begin (Time)** | *10:29:00* |
| **End (Time)** | *10:44:00* |
| **Other Lx (Specify Metric)** | *L* |
| **Primary Noise Source** | *Traffic* |
| **Other Noise Sources (Background)** | *Birds, Distant Aircraft, Distant Gardener / Landscape Noise, Distant Traffic* |
| **Is the same instrument and calibrator being used as previously noted?** | *Yes* |
| **Are the meteorological conditions the same as previously noted?** | *Yes* |

FORMS DUDEK FIELD DATA REPORT

## Source Info and Traffic Counts

| | |
|---|---|
| **Number of Lanes** | *2* |
| **Lane Width (feet)** | *10* |
| **Roadway Width (feet)** | *40* |
| **Roadway Width (m)** | *12.2* |
| **Distance to Roadway (feet)** | *0.4* |
| **Distance to Roadway (m)** | *0.1* |
| **Distance Measured to Centerline or Edge of Pavement?** | *Edge of Pavement* |
| **Roadway Type** | *Street* |
| **Estimated Vehicle Speed (MPH)** | *25* |
| **Speeds Estimated by:** | *Driving the Pace* |
| **Posted Speed Limit Sign (MPH)** | *25* |

## Traffic Counts

| | |
|---|---|
| **Vehicle Count Summary** | *A 5, MT 0, HT 0, B 0, MC 1* |
| **Select Method for Recording Count Duration** | *Enter Manually* |
| **Counting Both Directions?** | *Yes* |
| **Count Duration (minutes)** | *15* |
| **Vehicle Count Tally** | |
| **Select Method for Vehicle Counts** | *Use Counter (+/-)* |
| **Number of Vehicles - Autos** | *5* |
| **Number of Vehicles - Medium Trucks** | *0* |
| **Number of Vehicles - Heavy Trucks** | *0* |
| **Number of Vehicles - Buses** | *0* |
| **Number of Vehicles - Motorcyles** | *1* |

## Description / Photos

| | |
|---|---|
| **Terrain** | *Hard* |

## Site Photos

**Photo**

| | |
|---|---|
| **Comments / Description** | *ST3 South* |

FIELD DATA REPORT

| Site Photos | |
| --- | --- |
| Photo |  |
| Comments / Description | *ST3 North* |

| Site Photos | |
| --- | --- |
| Photo |  |
| Comments / Description | *ST3 West* |

# FORMS FIELD DATA REPORT

## Site Photos

| | |
|---|---|
| **Photo** |  |
| **Comments / Description** | *ST3 East* |

## Monitoring

| | |
|---|---|
| **Record #** | *2* |
| **Site ID** | *ST2* |
| **Site Location Lat/Long** | *34.167228, -118.594781* |
| **Begin (Time)** | *10:49:00* |
| **End (Time)** | *11:04:00* |
| **Other Lx (Specify Metric)** | *L* |
| **Primary Noise Source** | *Traffic* |
| **Other Noise Sources (Background)** | *Distant Conversations / Yelling, Distant Industrial, Distant Traffic* |
| **Is the same instrument and calibrator being used as previously noted?** | *Yes* |
| **Are the meteorological conditions the same as previously noted?** | *Yes* |

## Source Info and Traffic Counts

| | |
|---|---|
| **Number of Lanes** | *5* |
| **Lane Width (feet)** | *10* |
| **Roadway Width (feet)** | *70* |
| **Roadway Width (m)** | *21.3* |
| **Distance to Roadway (feet)** | *2* |
| **Distance to Roadway (m)** | *0.6* |
| **Distance Measured to Centerline or Edge of Pavement?** | *Edge of Pavement* |
| **Roadway Type** | *Boulevard* |
| **Estimated Vehicle Speed (MPH)** | *45* |
| **Speeds Estimated by:** | *Driving the Pace* |
| **Posted Speed Limit Sign (MPH)** | *35* |

# FORMS FIELD DATA REPORT

## Traffic Counts

| | |
|---|---|
| **Vehicle Count Summary** | *A 459, MT 2, HT 0, B 3, MC 0* |
| **Select Method for Recording Count Duration** | *Enter Manually* |
| **Counting Both Directions?** | *Yes* |
| **Count Duration (minutes)** | *15* |
| **Vehicle Count Tally** | |
| **Select Method for Vehicle Counts** | *Enter Manually* |
| **Number of Vehicles - Autos** | *459* |
| **Number of Vehicles - Medium Trucks** | *2* |
| **Number of Vehicles - Heavy Trucks** | *0* |
| **Number of Vehicles - Buses** | *3* |
| **Number of Vehicles - Motorcyles** | *0* |

## Description / Photos

| | |
|---|---|
| **Terrain** | *Hard* |

## Site Photos

**Photo**


| | |
|---|---|
| **Comments / Description** | *ST2 South* |

## Site Photos

| Photo |  |
|---|---|
| Comments / Description | *ST2 East* |

## Site Photos

| Photo |  |
|---|---|
| Comments / Description | *ST2 West* |

FORMS DUDEK FIELD DATA REPORT

## Site Photos

| | |
|---|---|
| Photo |  |
| Comments / Description | *ST2 North* |

## Monitoring

| | |
|---|---|
| Record # | *3* |
| Site ID | *ST1* |
| Site Location Lat/Long | *34.167895, -118.593041* |
| Begin (Time) | *11:12:00* |
| End (Time) | *11:27:00* |
| Other Lx (Specify Metric) | *L* |
| Primary Noise Source | *Traffic* |
| Other Noise Sources (Background) | *Distant Traffic* |
| Is the same instrument and calibrator being used as previously noted? | *Yes* |
| Are the meteorological conditions the same as previously noted? | *Yes* |

## Description / Photos

| | |
|---|---|
| Terrain | *Mixed* |

## Site Photos

| Photo |  |
|---|---|
| Comments / Description | *ST1 North* |

## Site Photos

| Photo |  |
|---|---|
| Comments / Description | *ST1 West* |

FORMS DUDEK FIELD DATA REPORT

| Site Photos | |
|---|---|
| Photo |  |
| Comments / Description | *ST1 South* |

| Site Photos | |
|---|---|
| Photo |  |
| Comments / Description | *ST1 East* |

# Attachment B

## Construction Noise Prediction Model Worksheets

*To User: bordered cells are inputs, unbordered cells have formulae*

noise level limit for construction phase at residential land use, per County guidance = N/A
allowable hours over which Leq is to be averaged = 1

= temporary barrier (TB) of input height inserted between source and receptor

| Construction Activity | Equipment | Total Equipment Qty | AUF % (from FHWA RCNM) | Reference Lmax @ 50 ft. from FHWA RCNM | Client Equipment Description, Data Source and/or Notes | Source to NSR Distance (ft.) | *Temporary Barrier Insertion Loss (dB)* | *Additional Noise Reduction* | Distance-Adjusted Lmax | Allowable Operation Time (hours) | Allowable Operation Time (minutes) | Predicted 1-hour Leq |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | Concrete saw | 1 | 20 | 90 | Concrete/Industrial Saws | 30 | 12.8 | | 81.6 | 1 | 60 | 75 |
| | Tractor | 1 | 40 | 84 | Tractors/Loaders/Backhoes | 65 | 11.8 | | 69.9 | 1 | 60 | 66 |
| | Dozer | 3 | 40 | 82 | Rubber Tired Dozers | 100 | 11.4 | | 62.4 | 1 | 60 | 63 |
| | | | | | | | | | Total for Demolition Phase: | | | **75.4** |
| Site Preparation | Grader | 1 | 40 | 85 | Graders | 30 | 12.8 | | 76.6 | 1 | 60 | 73 |
| | Tractor | 1 | 40 | 84 | Tractors/Loaders/Backhoes | 40 | 12.4 | | 73.5 | 1 | 60 | 70 |
| | Scraper | 1 | 40 | 84 | Scrapers | 50 | 12.1 | | 71.9 | 1 | 60 | 68 |
| | | | | | | | | | Total for Site Preparation Phase: | | | **75.2** |
| Grading | Tractor | 2 | 40 | 84 | Tractors/Loaders/Backhoes | 50 | 12.1 | | 71.9 | 1 | 60 | 71 |
| | Grader | 1 | 40 | 85 | Graders | 30 | 12.8 | | 76.6 | 1 | 60 | 73 |
| | Dozer | 1 | 40 | 82 | Rubber Tired Dozers | 70 | 11.7 | | 66.9 | 1 | 60 | 63 |
| | | | | | | | | | Total for Grading Phase: | | | **75.1** |
| Building Construction | Crane | 1 | 16 | 81 | Cranes | 40 | 12.4 | | 70.5 | 1 | 60 | 63 |
| | front end loader | 2 | 40 | 79 | Forklifts | 50 | 12.1 | | 66.9 | 1 | 60 | 66 |
| | Generator | 1 | 50 | 72 | Generator Sets | 60 | 11.9 | | 58.5 | 1 | 60 | 55 |
| | tractor | 1 | 40 | 84 | Tractors/Loaders/Backhoes | 30 | 12.8 | | 75.6 | 1 | 60 | 72 |
| | Welder / Torch | 3 | 40 | 73 | Welders | 70 | 11.7 | | 57.9 | 1 | 60 | 59 |
| | | | | | | | | | Total for Building Construction Phase: | | | **73.3** |
| Paving | Paver | 1 | 50 | 77 | Pavers | 90 | 11.5 | | 58.7 | 1 | 60 | 56 |
| | Concrete Mixer Truck | 1 | 40 | 79 | Cement and Mortar Mixers | 75 | 11.6 | | 63.0 | 1 | 60 | 59 |
| | All Other Equipment > 5 HP | 1 | 50 | 85 | Paving Equipment | 30 | 12.8 | | 76.6 | 1 | 60 | 74 |
| | Roller | 2 | 20 | 80 | Rollers | 60 | 11.9 | | 66.5 | 1 | 60 | 63 |
| | Tractor | 1 | 40 | 84 | Tractors/Loaders/Backhoes | 45 | 12.2 | | 72.7 | 1 | 60 | 69 |
| | | | | | | | | | Total for Paving Phase: | | | **75.2** |
| Architectural Coating | Compressor (Air) | 1 | 40 | 78 | Air Compressors | 37 | 12.5 | | 68.1 | 1 | 60 | 64 |
| | | | | | | | | | Total for Architectural Coating Phase: | | | **64.1** |

| Equipment | Source Elevation (ft) | Receiver Elevation (ft) | Barrier Height (ft) | Source to Barr. ("A") Horiz. (ft) | Rcvr. to Barr. ("B") Horiz. (ft) | Source to Rcvr. ("C") Horiz. (ft) | "A" (ft) | "B" (ft) | "C" (ft) | Path Length Diff. "P" (ft) | Abarr (dB) | Heff (with barrier) | Heff (wout barrier) | G (with barrier) | G (without barrier) | ILbarr (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Concrete saw | 5 | 5 | 8 | 24 | 6 | 30 | 24.2 | 6.7 | 30.0 | 0.89 | 12.5 | 13.0 | 5.0 | 0.5 | 0.7 | 12.8 | |
| Tractor | 5 | 5 | 8 | 59 | 6 | 65 | 59.1 | 6.7 | 65.0 | 0.78 | 11.9 | 13.0 | 5.0 | 0.5 | 0.7 | 11.8 | |
| Dozer | 5 | 5 | 8 | 94 | 6 | 100 | 94.0 | 6.7 | 100.0 | 0.76 | 11.8 | 13.0 | 5.0 | 0.5 | 0.7 | 11.4 | |
| Grader | 5 | 5 | 8 | 24 | 6 | 30 | 24.2 | 6.7 | 30.0 | 0.89 | 12.5 | 13.0 | 5.0 | 0.5 | 0.7 | 12.8 | |
| Tractor | 5 | 5 | 8 | 34 | 6 | 40 | 34.1 | 6.7 | 40.0 | 0.84 | 12.2 | 13.0 | 5.0 | 0.5 | 0.7 | 12.4 | |
| Scraper | 5 | 5 | 8 | 44 | 6 | 50 | 44.1 | 6.7 | 50.0 | 0.81 | 12.1 | 13.0 | 5.0 | 0.5 | 0.7 | 12.1 | |
| Tractor | 5 | 5 | 8 | 44 | 6 | 50 | 44.1 | 6.7 | 50.0 | 0.81 | 12.1 | 13.0 | 5.0 | 0.5 | 0.7 | 12.1 | |
| Grader | 5 | 5 | 8 | 24 | 6 | 30 | 24.2 | 6.7 | 30.0 | 0.89 | 12.5 | 13.0 | 5.0 | 0.5 | 0.7 | 12.8 | |
| Dozer | 5 | 5 | 8 | 64 | 6 | 70 | 64.1 | 6.7 | 70.0 | 0.78 | 11.9 | 13.0 | 5.0 | 0.5 | 0.7 | 11.7 | |
| Crane | 5 | 5 | 8 | 34 | 6 | 40 | 34.1 | 6.7 | 40.0 | 0.84 | 12.2 | 13.0 | 5.0 | 0.5 | 0.7 | 12.4 | |
| front end loader | 5 | 5 | 8 | 44 | 6 | 50 | 44.1 | 6.7 | 50.0 | 0.81 | 12.1 | 13.0 | 5.0 | 0.5 | 0.7 | 12.1 | |
| Generator | 5 | 5 | 8 | 54 | 6 | 60 | 54.1 | 6.7 | 60.0 | 0.79 | 12.0 | 13.0 | 5.0 | 0.5 | 0.7 | 11.9 | |
| tractor | 5 | 5 | 8 | 24 | 6 | 30 | 24.2 | 6.7 | 30.0 | 0.89 | 12.5 | 13.0 | 5.0 | 0.5 | 0.7 | 12.8 | |
| Welder / Torch | 5 | 5 | 8 | 64 | 6 | 70 | 64.1 | 6.7 | 70.0 | 0.78 | 11.9 | 13.0 | 5.0 | 0.5 | 0.7 | 11.7 | |
| Paver | 5 | 5 | 8 | 84 | 6 | 90 | 84.1 | 6.7 | 90.0 | 0.76 | 11.8 | 13.0 | 5.0 | 0.5 | 0.7 | 11.5 | |
| Concrete Mixer Truck | 5 | 5 | 8 | 69 | 6 | 75 | 69.1 | 6.7 | 75.0 | 0.77 | 11.9 | 13.0 | 5.0 | 0.5 | 0.7 | 11.6 | |
| All Other Equipment > 5 HP | 5 | 5 | 8 | 24 | 6 | 30 | 24.2 | 6.7 | 30.0 | 0.89 | 12.5 | 13.0 | 5.0 | 0.5 | 0.7 | 12.8 | |
| Roller | 5 | 5 | 8 | 54 | 6 | 60 | 54.1 | 6.7 | 60.0 | 0.79 | 12.0 | 13.0 | 5.0 | 0.5 | 0.7 | 11.9 | |
| Tractor | 5 | 5 | 8 | 39 | 6 | 45 | 39.1 | 6.7 | 45.0 | 0.82 | 12.2 | 13.0 | 5.0 | 0.5 | 0.7 | 12.2 | |
| Compressor (Air) | 5 | 5 | 8 | 31 | 6 | 37 | 31.1 | 6.7 | 37.0 | 0.85 | 12.3 | 13.0 | 5.0 | 0.5 | 0.7 | 12.5 | |

*To User: bordered cells are inputs, unbordered cells have formulae*

noise level limit for construction phase at residential land use, per County guidance = N/A
allowable hours over which Leq is to be averaged = 1

= temporary barrier (TB) of input height inserted between source and receptor

| Construction Activity | Equipment | Total Equipment Qty | AUF % (from FHWA RCNM) | Reference Lmax @ 50 ft. from FHWA RCNM | Client Equipment Description, Data Source and/or Notes | Source to NSR Distance (ft.) | *Temporary Barrier Insertion Loss (dB)* | *Additional Noise Reduction* | Distance-Adjusted Lmax | Allowable Operation Time (hours) | Allowable Operation Time (minutes) | Predicted 1-hour Leq |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | Concrete saw | 1 | 20 | 90 | Concrete/Industrial Saws | 50 | 12.1 | | 77.9 | 1 | 60 | 71 |
| | Tractor | 1 | 40 | 84 | Tractors/Loaders/Backhoes | 50 | 12.1 | | 71.9 | 1 | 60 | 68 |
| | Dozer | 3 | 40 | 82 | Rubber Tired Dozers | 50 | 12.1 | | 69.9 | 1 | 60 | 71 |
| | | | | | | | | | Total for Demolition Phase: | | | **74.8** |
| Site Preparation | Grader | 1 | 40 | 85 | Graders | 50 | 12.1 | | 72.9 | 1 | 60 | 69 |
| | Tractor | 1 | 40 | 84 | Tractors/Loaders/Backhoes | 50 | 12.1 | | 71.9 | 1 | 60 | 68 |
| | Scraper | 1 | 40 | 84 | Scrapers | 50 | 12.1 | | 71.9 | 1 | 60 | 68 |
| | | | | | | | | | Total for Site Preparation Phase: | | | **73.0** |
| Grading | Tractor | 2 | 40 | 84 | Tractors/Loaders/Backhoes | 50 | 12.1 | | 71.9 | 1 | 60 | 71 |
| | Grader | 1 | 40 | 85 | Graders | 50 | 12.1 | | 72.9 | 1 | 60 | 69 |
| | Dozer | 1 | 40 | 82 | Rubber Tired Dozers | 50 | 12.1 | | 69.9 | 1 | 60 | 66 |
| | | | | | | | | | Total for Grading Phase: | | | **73.8** |
| Building Construction | Crane | 1 | 16 | 81 | Cranes | 50 | 12.1 | | 68.9 | 1 | 60 | 61 |
| | front end loader | 2 | 40 | 79 | Forklifts | 50 | 12.1 | | 66.9 | 1 | 60 | 66 |
| | Generator | 1 | 50 | 72 | Generator Sets | 50 | 12.1 | | 59.9 | 1 | 60 | 57 |
| | tractor | 1 | 40 | 84 | Tractors/Loaders/Backhoes | 50 | 12.1 | | 71.9 | 1 | 60 | 68 |
| | Welder / Torch | 3 | 40 | 73 | Welders | 50 | 12.1 | | 60.9 | 1 | 60 | 62 |
| | | | | | | | | | Total for Building Construction Phase: | | | **71.2** |
| Paving | Paver | 1 | 50 | 77 | Pavers | 50 | 12.1 | | 64.9 | 1 | 60 | 62 |
| | Concrete Mixer Truck | 1 | 40 | 79 | Cement and Mortar Mixers | 50 | 12.1 | | 66.9 | 1 | 60 | 63 |
| | All Other Equipment > 5 HP | 1 | 50 | 85 | Paving Equipment | 50 | 12.1 | | 72.9 | 1 | 60 | 70 |
| | Roller | 2 | 20 | 80 | Rollers | 50 | 12.1 | | 67.9 | 1 | 60 | 64 |
| | Tractor | 1 | 40 | 84 | Tractors/Loaders/Backhoes | 50 | 12.1 | | 71.9 | 1 | 60 | 68 |
| | | | | | | | | | Total for Paving Phase: | | | **73.4** |
| Architectural Coating | Compressor (Air) | 1 | 40 | 78 | Air Compressors | 50 | 12.1 | | 65.9 | 1 | 60 | 62 |
| | | | | | | | | | Total for Architectural Coating Phase: | | | **61.9** |

| Construction Activity | Equipment | Source Elevation (ft) | Receiver Elevation (ft) | Barrier Height (ft) | Source to Barr. ("A") Horiz. (ft) | Rcvr. to Barr. ("B") Horiz. (ft) | Source to Rcvr. ("C") Horiz. (ft) | "A" (ft) | "B" (ft) | "C" (ft) | Path Length Diff. "P" (ft) | Abarr (dB) | Heff (with barrier) | Heff (wout barrier) | G (with barrier) | G (without barrier) | ILbarr (dB) | Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Demolition | Concrete saw | 5 | 5 | 8 | 44 | 6 | 50 | 44.1 | 6.7 | 50.0 | 0.81 | 12.1 | 13.0 | 5.0 | 0.5 | 0.7 | 12.1 | |
| | Tractor | 5 | 5 | 8 | 44 | 6 | 50 | 44.1 | 6.7 | 50.0 | 0.81 | 12.1 | 13.0 | 5.0 | 0.5 | 0.7 | 12.1 | |
| | Dozer | 5 | 5 | 8 | 44 | 6 | 50 | 44.1 | 6.7 | 50.0 | 0.81 | 12.1 | 13.0 | 5.0 | 0.5 | 0.7 | 12.1 | |
| Site Preparation | Grader | 5 | 5 | 8 | 44 | 6 | 50 | 44.1 | 6.7 | 50.0 | 0.81 | 12.1 | 13.0 | 5.0 | 0.5 | 0.7 | 12.1 | |
| | Tractor | 5 | 5 | 8 | 44 | 6 | 50 | 44.1 | 6.7 | 50.0 | 0.81 | 12.1 | 13.0 | 5.0 | 0.5 | 0.7 | 12.1 | |
| | Scraper | 5 | 5 | 8 | 44 | 6 | 50 | 44.1 | 6.7 | 50.0 | 0.81 | 12.1 | 13.0 | 5.0 | 0.5 | 0.7 | 12.1 | |
| Grading | Tractor | 5 | 5 | 8 | 44 | 6 | 50 | 44.1 | 6.7 | 50.0 | 0.81 | 12.1 | 13.0 | 5.0 | 0.5 | 0.7 | 12.1 | |
| | Grader | 5 | 5 | 8 | 44 | 6 | 50 | 44.1 | 6.7 | 50.0 | 0.81 | 12.1 | 13.0 | 5.0 | 0.5 | 0.7 | 12.1 | |
| | Dozer | 5 | 5 | 8 | 44 | 6 | 50 | 44.1 | 6.7 | 50.0 | 0.81 | 12.1 | 13.0 | 5.0 | 0.5 | 0.7 | 12.1 | |
| Building Construction | Crane | 5 | 5 | 8 | 44 | 6 | 50 | 44.1 | 6.7 | 50.0 | 0.81 | 12.1 | 13.0 | 5.0 | 0.5 | 0.7 | 12.1 | |
| | front end loader | 5 | 5 | 8 | 44 | 6 | 50 | 44.1 | 6.7 | 50.0 | 0.81 | 12.1 | 13.0 | 5.0 | 0.5 | 0.7 | 12.1 | |
| | Generator | 5 | 5 | 8 | 44 | 6 | 50 | 44.1 | 6.7 | 50.0 | 0.81 | 12.1 | 13.0 | 5.0 | 0.5 | 0.7 | 12.1 | |
| | tractor | 5 | 5 | 8 | 44 | 6 | 50 | 44.1 | 6.7 | 50.0 | 0.81 | 12.1 | 13.0 | 5.0 | 0.5 | 0.7 | 12.1 | |
| | Welder / Torch | 5 | 5 | 8 | 44 | 6 | 50 | 44.1 | 6.7 | 50.0 | 0.81 | 12.1 | 13.0 | 5.0 | 0.5 | 0.7 | 12.1 | |
| Paving | Paver | 5 | 5 | 8 | 44 | 6 | 50 | 44.1 | 6.7 | 50.0 | 0.81 | 12.1 | 13.0 | 5.0 | 0.5 | 0.7 | 12.1 | |
| | Concrete Mixer Truck | 5 | 5 | 8 | 44 | 6 | 50 | 44.1 | 6.7 | 50.0 | 0.81 | 12.1 | 13.0 | 5.0 | 0.5 | 0.7 | 12.1 | |
| | All Other Equipment > 5 HP | 5 | 5 | 8 | 44 | 6 | 50 | 44.1 | 6.7 | 50.0 | 0.81 | 12.1 | 13.0 | 5.0 | 0.5 | 0.7 | 12.1 | |
| | Roller | 5 | 5 | 8 | 44 | 6 | 50 | 44.1 | 6.7 | 50.0 | 0.81 | 12.1 | 13.0 | 5.0 | 0.5 | 0.7 | 12.1 | |
| | Tractor | 5 | 5 | 8 | 44 | 6 | 50 | 44.1 | 6.7 | 50.0 | 0.81 | 12.1 | 13.0 | 5.0 | 0.5 | 0.7 | 12.1 | |
| Architectural Coating | Compressor (Air) | 5 | 5 | 8 | 44 | 6 | 50 | 44.1 | 6.7 | 50.0 | 0.81 | 12.1 | 13.0 | 5.0 | 0.5 | 0.7 | 12.1 | |