MILPITAS STRATFORD SCHOOL DEVELOPMENT PROJECT

Noise & Vibration Technical Study

Prepared for:

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IMPACT SCIENCES

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NOISE & VIBRATION TECHNICAL ASSESSMENT

1.0 INTRODUCTION

This study describes the existing noise and vibration environment of the proposed Stratford School Project site located at 125 N. Milpitas Blvd. and evaluates the potential noise and vibration impacts of the proposed Project. This report has been prepared by Impact Sciences, Inc., in support of the environmental documentation being prepared pursuant to the California Environmental Quality Act (CEQA). This analysis considers both the temporary noise impacts that would result from Project construction and the long-term impacts associated with the operation of the Project.

1.1 Project Location

The Stratford School Project site is located on a 5.94-acre site within the northern portion of an existing commercial retail complex located at 125 N. Milpitas Blvd. in Milpitas, California. The Project site is on the west side of North Milpitas Boulevard between Beresford Ct. and Shadow Lake Ct. The transit facility closest to the proposed Project site is the N. Milpitas Blvd. & Town Center Dr. bus stop for AC Transit Bus Line 217 Mission San Jose - Milpitas.

1.2 Project Description

The proposed Project would redevelop an existing 44,087.9 square-foot single floor vacant commercial building at 125 N. Milpitas Boulevard to the Stratford School that would accommodate 480 students in pre-school through first-grade school classes. The facility would include 20 classrooms and accessory spaces such as a multi-purpose hall, administrative offices, conference room, and a break room for teachers. The proposed Project will demolish and redo the interiors of the existing building with new paint, install new doors and windows on the existing exterior wall on the west side; and replace exterior glazing in existing openings, in addition to converting an existing dock to create outdoor space, and adding sidewalks and new trees within existing landscaped areas. The existing commercial retail complex will dedicate 57 existing parking spaces to the school and accommodate electric vehicle (EV) charging facilities. The Project site is surrounded by single-family residences to the north, east, and west as well as commercial land uses to the south.

The on-site parking lot circulation is proposed to create a one-way traffic flow, coming from Beresford Court and exiting on N. Milpitas Boulevard. This will utilize the common parking lot between the proposed school and rear of the commercial complex and allow for a queue of up to 63 cars during pick-up and drop-off for the students.

2.0 ENVIRONMENTAL SETTING

2.1 Fundamentals of Noise and Vibration

Noise

Noise is usually defined as unwanted sound that is an undesirable byproduct of society's normal day-to-day activities. Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm, and/or when it has adverse effects on health. Noise is measured on a logarithmic scale of sound pressure level known as a decibel (dB). The human ear does not respond uniformly to sounds at all frequencies. For example, the human ear is less sensitive to low and high frequencies than medium frequencies, which more closely correspond with human speech. In response to the sensitivity of the human ear to different frequencies, the A-weighted noise level (or scale), which corresponds better with people's subjective judgment of sound levels, has been developed. This A-weighted sound level, referenced in units of dB(A), is measured on a logarithmic scale such that a doubling of sound energy results in a 3 dB(A) increase in noise level. Typically, changes in a community noise level of less than 3 dB(A) are not noticed by the human ear.[1] Changes from 3 to 5 dB(A) may be noticed by some individuals who are sensitive to changes in noise. A greater than 5 dB(A) increase is readily noticeable, while the human ear perceives a 10 dB(A) increase in sound level to be a doubling of sound.

On the A-weighted scale, the range of human hearing extends from approximately 3 to 140 dB(A). **Table 1, A-Weighted Decibel Scale**, provides examples of A-weighted noise levels from common sources. Noise sources occur in two forms: (1) point sources, such as stationary equipment or individual motor vehicles; and (2) line sources, such as a roadway with a large number of point sources (motor vehicles). Sound generated by a point source typically diminishes (attenuates) at a rate of 6 dB(A) for each doubling of distance from the source to the receptor at acoustically "hard" sites and 7.5 dB(A) at acoustically "soft" sites.[2] For example, if a noise source produces a noise level of 89 dB(A) at a reference distance of 50 feet, the noise level would be 83 dB(A) at a distance of 100 feet from the noise source, 77 dB(A) at a distance of 200 feet, and so on. Noise generated by a mobile source will decrease by approximately 3 dB(A) over hard surfaces and 4.5 dB(A) over soft surfaces for each doubling of distance.

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1 California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, 2013.

2 Federal Highway Administration, *Highway Noise Fundamentals*, (1980) 97. Examples of "hard" or reflective sites include asphalt, concrete, and hard and sparsely vegetated soils. Examples of acoustically "soft" or absorptive sites include soft, sand, plowed farmland, grass, crops, heavy ground cover, etc.

Table 1
A-Weighted Decibel Scale

Typical A-Weighted Sound Levels	Sound Level (dB(A), Leq)
Threshold of Pain	140
Jet Takeoff at 100 Meters	125
Jackhammer at 15 Meters	95
Heavy Diesel Truck at 15 Meters	85
Conversation at 1 Meter	60
Soft Whisper at 2 Meters	35

Source: United States Occupational Safety & Health Administration, Noise and Hearing Conservation Technical Manual, 1999.

Sound levels also can be attenuated by man-made or natural barriers (e.g., sound walls, berms, ridges), as well as elevational differences. Noise is most audible when traveling by direct line-of-sight, an interrupted visual path between the noise source and noise receptor. Barriers, such as walls or buildings that break the line-of-sight between the source and the receiver, can greatly reduce noise levels from the source since sound can only reach the receiver by diffraction. Sound barriers can reduce sound levels by up to 20 dB(A) or more. However, if a barrier is not high or long enough to break the line-of-sight from the source to the receiver, its effectiveness is greatly reduced.

Solid walls and berms may reduce noise levels by 5 to 10 dB(A) depending on their height and distance relative to the noise source and the noise receptor.[3] Sound levels may also be attenuated 3 dB(A) by a first row of houses and 1.5 dB(A) for each additional row of houses.[4] The minimum noise attenuation provided by typical structures in California is provided in **Table 2, Building Noise Reduction Factors**.

3 Federal Highway Administration, *Highway Noise Mitigation*, (1980) 18.

4 California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, 2013.

Table 2
Building Noise Reduction Factors

Building Type	Window Condition	Noise Reduction Due to Exterior of the Structure (dB(A))
All	Open	10
Light Frame	Ordinary Sash (closed)	20
	Storm Windows	25
Masonry	Single Glazed	25
	Double Glazed	35

Source: Federal Highway Administration, Highway Traffic Noise: Analysis and Abatement Guidance. December 2011.

Sound Rating Scales

Various rating scales approximate the human subjective assessment to the "loudness" or "noisiness" of a sound. Noise metrics have been developed to account for additional parameters, such as duration and cumulative effect of multiple events. Noise metrics are categorized as single event metrics and cumulative metrics, as summarized below.

In order to simplify the measurement and computation of sound loudness levels, frequency weighted networks have obtained wide acceptance. The A-weighted scale, discussed above, has become the most prominent of these scales and is widely used in community noise analysis. Its advantages are that it has shown good correlation with community response and is easily measured. The metrics used in this analysis are all based upon the dB(A) scale.

Equivalent Noise Level

Equivalent Noise Level (Leq) is the sound level corresponding to a steady-state A-weighted sound level containing the same total energy as several single event noise exposure level events during a given sample period. Leq is the "acoustic energy" average noise level during the period of the sample. It is based on the observation that the potential for noise annoyance is dependent on the total acoustical energy content of the noise. The equivalent noise level is expressed in units of dB(A). Leq can be measured for any period, but is typically measured for 15 minutes, 1 hour, or 24 hours. Leq for a 1-hour period is used by the Federal Highway Administration (FHWA) for assessing highway noise impacts. Leq for 1 hour is referred to as the Hourly Noise Level (HNL) in the California Airport Noise Regulations and is used to develop Community

Noise Equivalent Level values for aircraft operations. Construction noise levels and ambient noise measurements in this section use the Leq scale.

Community Noise Equivalent Level

Community Noise Equivalent Level (CNEL) is a 24-hour, time-weighted energy average noise level based on the A-weighted decibel. It is a measure of the overall noise experienced during an entire day. The term "time-weighted" refers to the penalties attached to noise events occurring during certain sensitive periods. In the CNEL scale, 5 dB are added to measured noise levels occurring between the hours of 7:00 p.m. and 10:00 p.m. For measured noise levels occurring between the hours of 10:00 p.m. and 7:00 a.m., 10 dB are added. These decibel adjustments are an attempt to account for the higher sensitivity to noise in the evening and nighttime hours and the expected lower ambient noise levels during these periods. Existing and projected future traffic noise levels in this section use the CNEL scale.

Day-Night Average Noise Level

The day-night average sound level (Ldn or DNL) is another average noise level over a 24-hour period. Noise levels occurring between the hours of 10:00 p.m. and 7:00 a.m. are increased by 10 decibels (dB). This noise is weighted to take into account the decrease in community background noise of 10 dB(A) during this period. Noise levels measured using the Ldn scale are typically similar to CNEL measurements.

Adverse Effects of Noise Exposure

Noise is known to have several adverse effects on humans, which has led to laws and standards being set to protect public health and safety, and to ensure compatibility between land uses and activities. Adverse effects of noise on people include hearing loss, communication interference, sleep interference, physiological responses, and annoyance. Each of these potential noise impacts on people is briefly discussed in the following narrative.

Hearing Loss

Hearing loss is generally not a community noise concern, even near a major airport or a major freeway. The potential for noise-induced hearing loss is more commonly associated with occupational noise exposures in heavy industry, very noisy work environments with long-term exposure, or certain very loud recreational activities (e.g., target shooting and motorcycle or car racing). The Occupational Safety and Health Administration (OSHA) identifies a noise exposure limit of 90 dB(A) for 8 hours per day to protect from hearing loss (higher limits are allowed for shorter duration exposures). Noise levels in neighborhoods, even in very noisy neighborhoods, are not sufficiently loud enough to cause hearing loss.

Communication Interference

Communication interference is one of the primary concerns in environmental noise. Communication interference includes speech disturbance and intrusion with activities such as watching television. Noise can also interfere with communications such as within school classrooms. Normal conversational speech is in the range of 60 to 65 dB(A) and any noise in this range or louder may interfere with speech.

Sleep Interference

Noise can make it difficult to fall asleep, create momentary disturbances of natural sleep patterns by causing shifts from deep to lighter stages, and cause awakening. Noise may even cause awakening that a person may or may not be able to recall.

Physiological Responses

Physiological responses are those measurable effects of noise on people that are realized as changes in pulse rate, blood pressure, and other physical changes. Studies to determine whether exposure to high noise levels can adversely affect human health have concluded that, while a relationship between noise and health effects seems plausible, there is no empirical evidence of the relationship.

Annoyance

Annoyance is an individual characteristic and can vary widely from person to person. Noise that one person considers tolerable can be unbearable to another of equal hearing capability. The level of annoyance depends both on the characteristics of the noise (including loudness, frequency, time, and duration), and how much activity interference (such as speech interference and sleep interference) results from the noise. However, the level of annoyance is also a function of the attitude of the receiver. Personal sensitivity to noise varies widely. It has been estimated that 2% to 10% of the population is highly susceptible to annoyance from any noise not of their own making, while approximately 20% are unaffected by noise.[5] Attitudes may also be affected by the relationship between the person affected and the source of noise, and whether attempts have been made to abate the noise.

Vibration

Vibration consists of waves transmitted through solid material. Groundborne vibration propagates from a source through the ground to adjacent buildings by surface waves. Vibration may comprise a single pulse, a series of pulses, or a continuous oscillatory motion. The frequency of a vibrating object describes how

5 Wayne County Airport Authority. *Background information on noise & its measurement, 2009*

rapidly it is oscillating and is measured in hertz (Hz). Most environmental vibrations consist of a composite, or "spectrum" of many frequencies, and are generally classified as broadband or random vibrations. The normal frequency range of most groundborne vibration that can be felt generally starts from a low frequency of less than one Hz to a high of about 200 Hz. Vibration is often measured in terms of the peak particle velocity (PPV) in inches per second (in/sec) when considering impacts on buildings or other structures, as PPV represents the maximum instantaneous peak of vibration that can stress buildings. Because it is a representation of acute vibration, PPV is often used to measure the temporary impacts of short-term construction activities that could instantaneously damage built structures. Vibration is often also measured by the Root Mean Squared (RMS) because it best correlates with human perception and response. Specifically, RMS represents "smoothed" vibration levels over an extended period of time and is often used to gauge the long-term chronic impact of a project's operation on the adjacent environment. RMS amplitude is the average of a signal's squared amplitude. It is most commonly measured in decibel notation (VdB).

Vibration energy attenuates as it travels through the ground, causing the vibration amplitude to decrease with distance away from the source. High frequency vibrations reduce much more rapidly than low frequencies, so that in the far-field from a source, the low frequencies tend to dominate. Soil properties also affect the propagation of vibration. When groundborne vibration interacts with a building, there is usually a ground-to-foundation coupling loss (i.e., the foundation of the structure does not move in sync with the ground vibration), but the vibration can also be amplified by the structural resonances of the walls and floors. Vibration in buildings is typically perceived as rattling of windows or items on shelves, or the motion of building surfaces. At high levels, vibration can result in damage to structures.

Manmade groundborne vibration is generally limited to areas within a few hundred feet of certain types of construction activities, especially pile driving. Road vehicles rarely create enough groundborne vibration to be perceptible to humans unless the road surface is poorly maintained and there are potholes or bumps. If traffic induces perceptible vibration in buildings, such as window rattling or shaking of small loose items (typically caused by heavy trucks in passing), then it is most likely an effect of low-frequency airborne noise or ground characteristics. Human annoyance by vibration is related to the number and duration of events. The more events or the greater the duration, the more annoying it will be to humans.

2.2 Noise Sensitive Receptors

Noise-sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Additional land uses such as natural parks and recreation areas, historic sites, and cemeteries are considered sensitive to increases in exterior noise levels. Schools, churches, hotels, libraries, and other places where low interior noise levels are essential are also considered noise-sensitive land uses. Noise-sensitive receptors surrounding the Project site include residential uses to the north of the Project site, residences to the east of the Project across Milpitas Blvd., Barbara Lee Senior Center southeast of the Project site along Milpitas Blvd.[6] and residential uses west of the Project site adjacent to the commercial complex.

2.3 Existing Conditions

A noise monitoring survey was completed to establish existing noise levels in the City of Milpitas at locations near the Project site. Transportation noise is the main source of noise in urban environments, largely from the operation of internal combustion engines and frictional contact between vehicles and ground and air.[7] It should be noted that due to the ongoing Coronavirus pandemic, traffic conditions are likely lower than usual. Therefore, noise measurements that were conducted in January 2021 are likely lower than pre-pandemic conditions and therefore conservative measurements for the existing noise environment. **Figure 1, Noise Monitoring Locations,** maps the noise measurement locations relative to the Project site. The existing average daily noise levels are presented in **Table 3, Ambient Sound-Level Readings**.

Table 3
Ambient Sound-Level Readings

Noise Measurement Location #	Date/Time	dB(A) Leq
Location A: 100 Block of Sagemeadow Court	01/19/2021 10:26 a.m.	52.6
Location B: 200 Block of Meadowhaven Way	01/19/2021 10:44 a.m.	48.1
Location C: 200 Block of Silverlake Drive	01/21/2021 11:04 a.m.	50.1
Location D: 200 Block of Milpitas Boulevard	01/21/2021 11:34 a.m.	63.2

The major sources of groundborne vibration in the Project site vicinity are heavy-duty vehicles (e.g., refuse trucks, delivery trucks, and school buses) traveling on local roadways like Milpitas Boulevard and

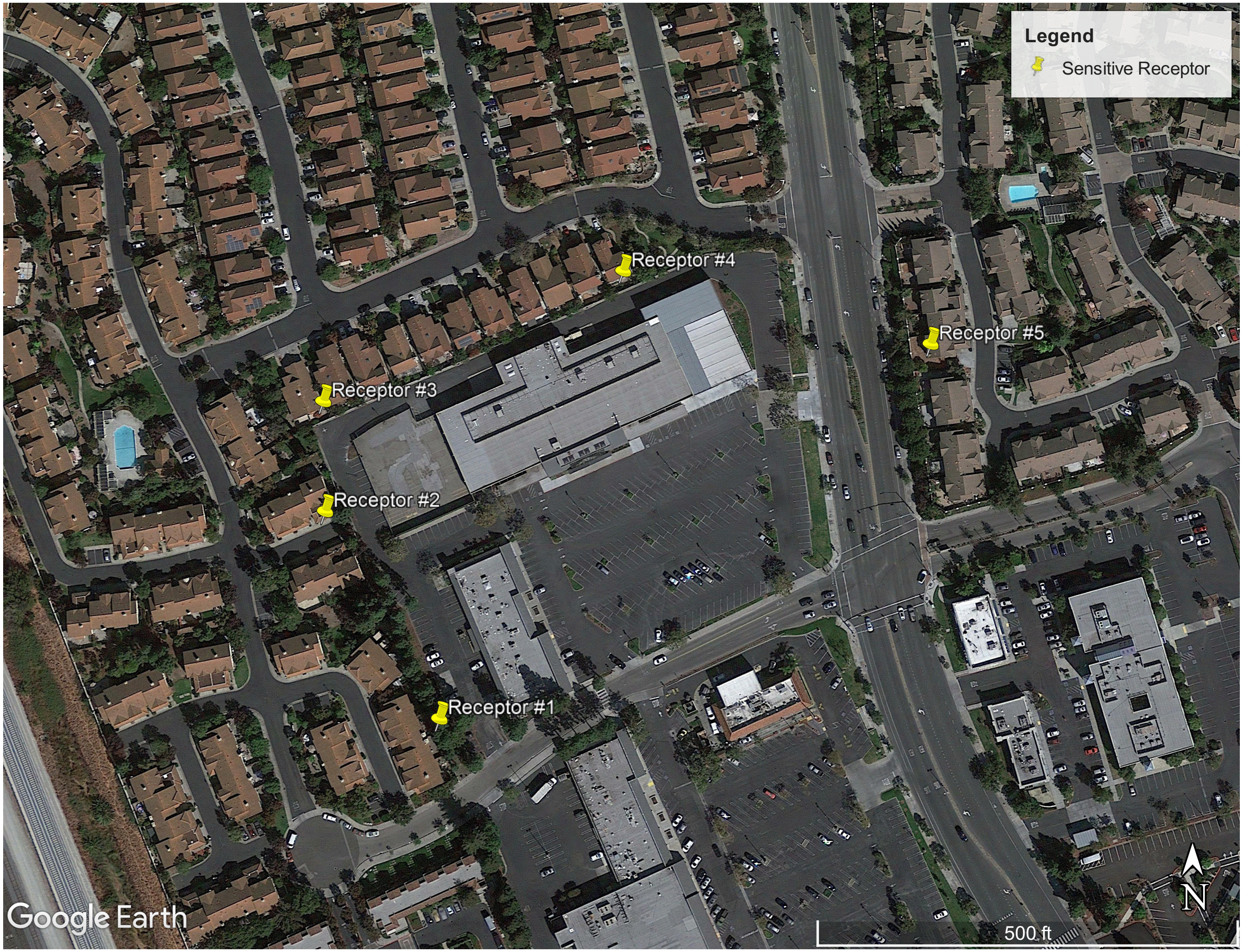
6 The Barbara Lee Senior Center is not analyzed quantitatively as a sensitive receptor in **Table 3** since it is located approximately 830 feet from the Project site, and impacts would be greater at the four noise measurement locations. Furthermore, the Barbara Lee Senior Center is obscured by other buildings which would attenuate noise impacts.

7 World Health Organization. Guidelines for Community Noise, https://www.who.int/docstore/peh/noise/Comnoise-1.pdf, accessed February 15, 2021.

occasional BART light rail trains and freight trains on the former Union Pacific Right-of-Way 480 feet west of the Project Site. Trucks and buses typically generate groundborne vibration velocity levels of around 63 VdB, and these levels could reach 72 VdB where trucks and buses pass over bumps in the road.[8] In terms of PPV levels, a heavy-duty vehicle traveling at a distance of 50 feet can result in a vibration level of approximately 0.001 inch per second. Rapid transit or light rail systems typically generate vibration levels of 70 VdB or more at a distance of 50 feet from the tracks.[9]

8 California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, 2013.

9 Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, September 2018.



SOURCE: Google Earth, 2021

FIGURE 1

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Noise Monitoring Locations

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3.0 REGULATORY FRAMEWORK

3.1 State Regulations

Title 24, California Code of Regulations

The California Noise Insulation Standards of 1988 (California Code of Regulations Title 24, Section 3501 et seq.) require that interior noise levels from the exterior sources not exceed 45 dB(A) Ldn/community noise equivalent level (CNEL)[10] in any habitable room of a multi-residential use facility (e.g., hotels, motels, dormitories, long-term care facilities, and apartment houses and other dwellings, except detached single-family dwellings) with doors and windows closed. Where exterior noise levels exceed 60 dB(A) CNEL/Ldn, an acoustical analysis is required to show that the building construction achieves an interior noise level of 45 dB(A) CNEL/Ldn or less.

3.2 Local

City of Milpitas General Plan

The Noise Element in the Milpitas General Plan (Last Amended April 2015) sets forth policies to guide public and private planning to attain and maintain acceptable noise levels and promote a comprehensive and long-range program of achieving acceptable noise levels. The City's noise compatibility standards are derived from guidelines published by the California Office of Planning and Research and are shown in **Figure 2, City of Milpitas General Plan Table 6-1.** The following policies are applicable to the proposed Project:

6-I-1 Use the guidelines in Table 6-1 (Noise and Land Use Compatibility) as review criteria for development projects.

6-I-2 Require an acoustical analysis for projects located within a "conditionally acceptable" or "normally unacceptable" exterior noise exposure area. Require mitigation measures to reduce noise to acceptable levels.

6-I-3 Prohibit new construction where the exterior noise exposure is considered "clearly unacceptable" for the use proposed.

6-I-7 Avoid residential DNL exposure increases of more than 3 dB or more than 65 dB at the property line, whichever is more restrictive.

10 Measurements are based on Ldn or CNEL.

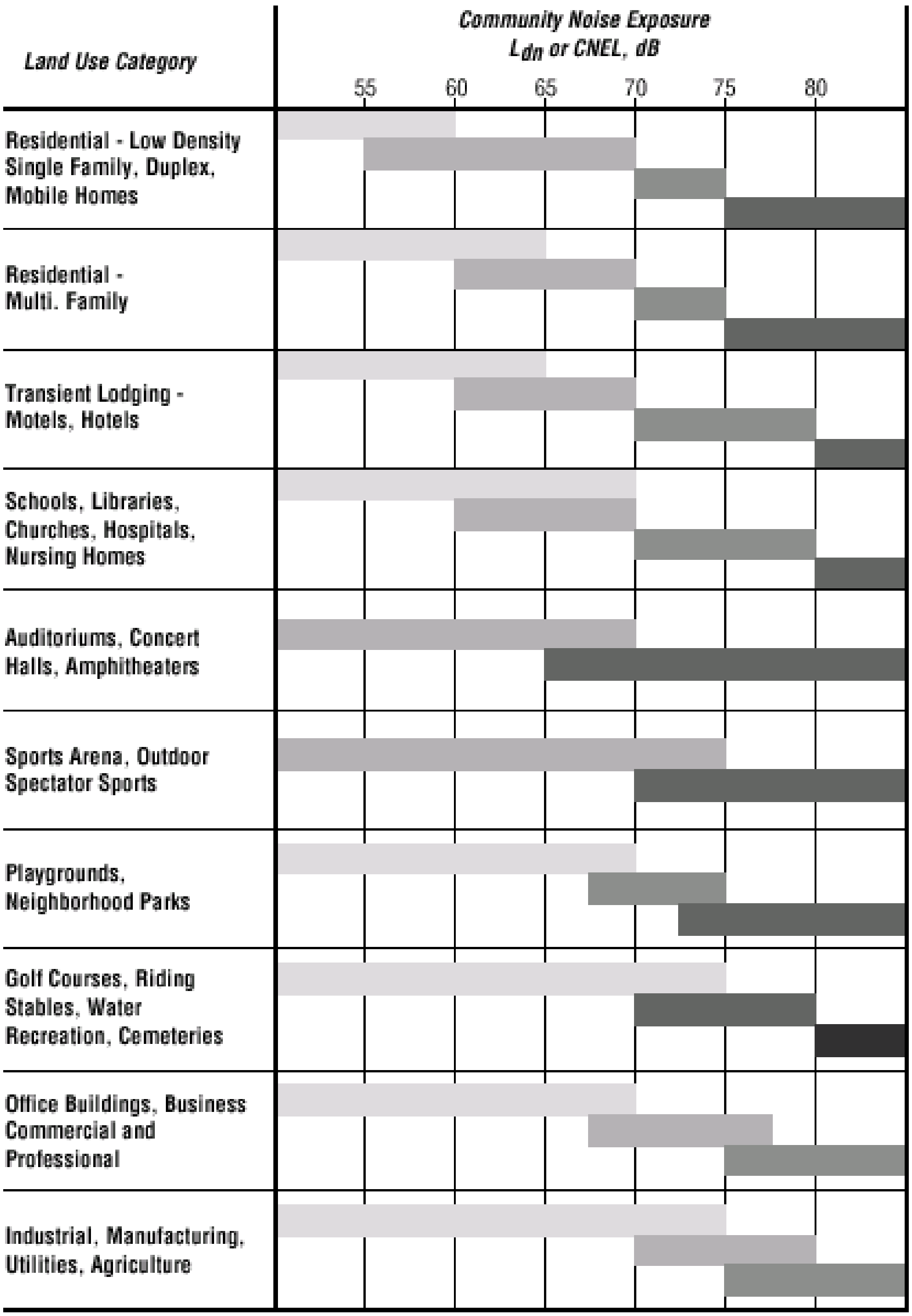
6-I-10 Reduce the noise impact in existing residential areas where feasible. Noise mitigation measures should be implemented with the cost shared by public and private agencies and individuals.

6-I-11 Minimize noise impacts on neighbors caused by commercial and industrial projects.

6-I-12 New noise-producing facilities introduced near sensitive land uses which may increase noise levels in excess of "acceptable" levels will be evaluated for impact prior to approval; adequate mitigation at the noise source will be required to protect noise-sensitive land uses.

6-I-13 Restrict the hours of operation, technique, and equipment used in all public and private construction activities to minimize noise impact. Include noise specifications in requests for bids and equipment information.

Table 6-1



INTERPRETATION:

Normally Acceptable
Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

Conditionally Acceptable
New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

Normally Unacceptable
New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

Clearly Unacceptable
New construction or development should generally not be undertaken.

SOURCE: City of Milpitas General Plan Noise Element, 2002

FIGURE **2**

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City of Milpitas General Plan Table 6-1

City of Milpitas Municipal Code

Chapter 213 of the City's Zoning Ordinance contains a Noise Abatement Section that limits noise levels at adjacent properties. The following policies are applicable to the proposed Project:

Code Section V-213-3 limits operational noise in residential areas to 65 dB(A) DNL at the property line or to an increase of less than 3 dB(A) DNL, whichever is more restrictive. Operational noise that "occurs with such intensity, frequency or in such a manner as to disturb the peace and quiet of reasonable person of normal sensitivity residing in that area" at a distance of 50 feet from the property line of the noise source or 100 feet from any nonstationary noise source shall be limited to the hours of 7:00 a.m. and 10:00 p.m. Construction operations are limited to between the hours of 7:00 a.m. and 7:00 p.m. on weekdays and weekends. No construction is permitted on holidays.

4.0 NOISE ANALYSIS

4.1 Thresholds of Significance

The impacts of the proposed Project related to noise would be considered significant if they would exceed any of the following Standards of Significance, in accordance with Appendix G of the *CEQA Guidelines*:

- Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project site in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;

  – A significant temporary noise impact would be identified if construction would occur outside of the hours specified in the Municipal Code. Additionally, a significant temporary noise increase would be identified if construction-related noise would result in hourly average noise levels exceeding 60 dB(A) Leq at the property lines shared with residential land uses, and the ambient noise environment by at least 5 dB(A) Leq, for a period of more than one year.

  – A significant permanent noise level increase would occur if Project-generated traffic or operational noise would result in a noise level increase of more than 3 dB(A) DNL.

  – A significant noise impact would be identified if the Project would expose persons to or generate noise levels that would exceed applicable noise standards presented in the General Plan or Municipal Code.

- Generation of excessive groundborne vibration or groundborne noise levels; and

- 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.

4.2 Methodology

Noise levels associated with on-site construction activities were calculated using the FHWA Roadway Construction Noise Model (RCNM) and combined with existing ambient noise level readings to determine new ambient noise levels with construction activities. This software package considers reference equipment noise levels, noise management techniques, distance to receptors, and any attenuating features to predict noise levels from sources like construction equipment. The distance from construction equipment noise sources (e.g., engines and tailpipes) assume that vehicles would not be capable of operating directly where the Project's property line abuts adjacent structures. These vehicles would retain some setback to preserve maneuverability, in addition to operating at reduced power and intensity to maintain precision at these locations.

The Project's off-site construction noise impact from haul trucks was analyzed by considering the Project's estimated haul truck usage with existing traffic and roadway noise levels along the Project's anticipated haul route. Because it takes a doubling of traffic volumes on a roadway to generate the increased sound energy it takes to elevate ambient noise levels by 3 dB(A),[11] the analysis focused on whether truck traffic would double traffic volumes on key roadways to be used for hauling soils to and/or from the Project Site during construction activities. Because haul trucks generate more noise than traditional passenger vehicles, a 19.1 passenger car equivalency (PCE) was used to convert haul truck trips to a reference level conversion to an equivalent number of passenger vehicles.[12] It should be noted that because an official haul route has not been approved as of the preparation of this analysis, assumptions were made about logical routes that would minimize haul truck traffic on local streets in favor of major arterials that can access regional-serving freeways.

For operational noise impacts, the City's noise ordinance generally limits the generation of noise that exceeds the actual measured existing ambient noise level by 3 dB(A) DNL at neighboring properties. Therefore, increases in 3 dB(A) DNL above ambient noise levels are considered significant, unless mitigated.

Traffic noise in the Project area was estimated using average daily traffic volumes obtained in the traffic study done for the Project. Traffic noise was compared to the existing traffic volumes to get a percentage

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11 Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, September 2018.

12 Caltrans, Technical Noise Supplement Table 3-3, 2013.

of increase due to the Project. As noted previously, it takes a doubling of traffic to increase ambient noise levels by 3 dB(A).[13]

Operational impacts from the outdoor play areas and noise activity from drop-off and pickup times was also analyzed to determine if there would be an increase in 3 dB(A) DNL above ambient noise levels.

Construction vibration damage criteria are assessed based on structural category (e.g., reinforced-concrete, steel, or timber). Federal Transit Administration (FTA) guidelines consider 0.2 inch/sec PPV to be the significant impact level for non-engineered timber and masonry buildings. Structures or buildings constructed of reinforced concrete, steel, or timber have a vibration damage criterion of 0.5 inch/sec PPV pursuant to FTA guidelines.[14]

4.3 Project Impacts and Mitigation Measures

Impact 1 **Would the proposed Project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the Project site in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies? *(Less than Significant).***

Construction Impacts

Temporary On-Site Construction Activity Noise

The Project would be considered to generate a significant temporary construction noise impact if Project construction activities exceeded 60 dB(A) Leq at nearby residences and exceeded the ambient noise environment by 5 dB(A) Leq or more for a period longer than one year.

Based on the expected construction schedule provided for the proposed Project, the demolition phase would start at the beginning of January 2022, and application of architectural coatings would conclude the construction project by September 2022, which would equate to approximately 8 months of construction. This is below the one-year threshold for temporary construction noise impacts. Furthermore, construction would only involve minor interior wall demolition, paving for the playground on the western side of the building, construction of interior walls for classrooms and accessory rooms, and painting of exterior and interior walls. These activities do not require the use of heavy construction equipment such as excavators or bulldozers. Furthermore, noise from interior construction activity would be attenuated by the existing exterior walls of the building. Construction of the outdoor playground areas would not include earth

13 Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual, September 2018.*

14 Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual. September* 2018.

disturbing activities. The installation of prefabricated playground equipment would involve only temporary, relatively minor noise impacts due to installation activities, vehicles such as haul trucks, vendor deliveries, and from employees that enter and exit the Project site.

A conservative quantitative analysis was completed to assess the noise impacts from the use of a dump truck during the demolition phase, as haul trucks remove debris and material from the Project site. This discussion is for informational purposes only, since, as noted above, the construction period would not last longer than the one-year threshold. To assess noise impacts at the receiving property lines of noise-sensitive receptors, average noise level for was centered at the northern portion of the site (where the loading area is located) and propagated to the nearest sensitive receptor. As shown on **Table 4, Construction Noise Impacts at Off-Site Sensitive Receptors (without Mitigation),** when considering ambient noise levels, the use of dump trucks could increase noise by up to approximately 11.7 dB(A) L_{eq} at the nearest residences on the 200 block of Silverslake Dr. to the north of the Project Site. The estimated maximum construction noise levels would exceed ambient noise levels by more than 5 dB(A) Leq at residences of the 200 block of Shadowlake Court, 100 Block of Silverslake Drive, and 200 block of Silverslake Drive. Furthermore, noise from the dump trucks, if left idling for a long enough period, would exceed the 60 dB(A) Leq threshold at nearby residences of the 200 block of Silverslake Drive. However, as noted above, this is a very conservative estimate as dump trucks would normally not be idling for a period long enough to raise ambient noise levels above the 60 dB(A) Leq threshold at these residences. Dump trucks would only reasonably be anticipated to be utilized during phases of construction that require the removal of debris from the Project site. Furthermore, the entire construction period is only expected to last approximately 8 months and would not last over the one-year threshold for temporary construction noise impacts. Therefore, impacts are considered less than significant. While mitigation would not be required since impacts would be considered less than significant, the inclusion of standard construction best management practices should be considered in order to reduce construction noise received at nearby receptors to the extent feasible. No additional mitigation measures are required.

Table 4
Construction Noise Impacts at Off-Site Sensitive Receptors (without Mitigation)

Sensitive Receptor	Maximum Construction Noise Level (RCNM) (dB(A), Leq)	Existing Ambient (dB(A), Leq)	New Ambient (dB(A), Leq)	Increase Above Existing Ambient (dB(A), Leq)	Construction Noise Level Above 60 dB(A) Leq Threshold
1. 100 Block of Sagemeadow Ct.	47.5	52.6	53.8	1.2	N/A
2. 200 Block of Shadowlake Ct.	51.4	48.1	53.1	5.0	N/A
3. 100 Block of Silverlake Dr.	57.4	48.1	57.9	9.8	N/A
4. 200 Block of Silverslake Dr.	61.5	50.1	61.8	11.7	1.5
5. 200 Block of Milpitas Blvd.	50.9	63.2	63.5	0.3	N/A

Construction Best Management Practices:

- Unless the Contractor requests in writing, and receives in advance, written approval from the City's Director of Public Works for a modified construction schedule, the City requires that construction activities be limited to 12-hour shifts between 7:00 a.m. and 7:00 p.m., Monday through Friday and construction shall not take place on weekends or City holidays. Per the City's Noise Ordinance, work shall not be conducted on the following City holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day.

- Utilize 'quiet' models of air compressors and other stationary noise sources where technology exists.

- Equip all internal combustion engine-driven equipment with intake and exhaust 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 residential land uses to the east.

- Construction staging areas shall be established at locations that will create the greatest distance between the construction-related noise sources and noise-sensitive receptors nearest the Project site during all Project construction.

- Prohibit all unnecessary idling of internal combustion engines, including from trucks on or near the Project site.

Temporary Off-Site Construction Activity Noise

Construction haul trucks would generate noise off-site during site demolition. This would include removal of materials from the Project site, base materials, and demolished materials. While this vehicle activity would increase ambient noise levels along the haul route, ambient noise levels would not be expected to significantly increase ambient noise levels by 3 dB(A) or greater at any noise sensitive land use. Studies have shown that a 3 dB(A) increase in sound level pressure is barely detectable by the human ear. A 3 dB(A) increase in roadway noise levels requires an approximate doubling of roadway traffic volume, assuming that travel speeds and fleet mix remain constant.[15] The Traffic Impact Analysis completed for the Project shows that the prior approved shopping center use totaled 1,664 daily vehicle trips. The demolition period is estimated to have a total of 50 hauling trips over an 11-day period, averaging about 4.5 trips per day. Because haul trucks generate more noise than traditional passenger vehicles, a 19.1 PCE was used to convert haul truck trips to a reference level conversion to an equivalent number of passenger vehicles. The addition of 86 PCE trips to local roadways would account for a 5.2% increase in daily traffic volume and corresponding noise impact. Since it would take a doubling of roadway traffic volume to increase noise levels by 3 dB(A), the addition of haul trucks from the Project would not increase traffic to levels capable of producing 3 dB(A) ambient noise increases and there would be no perceptible increase in noise due to the addition of haul trucks. Impacts are less than significant.

Operation Impacts

Permanent Operational Traffic Noise

As discussed above, a 3 dB(A) increase in roadway noise levels requires an approximate doubling of roadway traffic volume, assuming that travel speeds and fleet mix remain constant. A 3 dB(A) noise level increase is the minimum noise level increase required for a human to perceive a change in ambient noise.

Traffic volumes in the Project area were obtained from the traffic impact analysis prepared for the proposed Project. Trip generation information for the proposed Project was added to existing daily traffic volumes to determine whether traffic increased enough to result in an audible noise level increase. The Traffic Impact Analysis completed for the Project shows that the prior approved shopping center use totaled 1,664 daily vehicle trips. Based on trip generation rates for private schools, the Project would generate 1,967 gross daily vehicle trips. The Project's addition of 303 net daily trips (1,967 – 1,664 = 303 net trips) would cause an increase of 18.2% in daily traffic volumes. This increase in traffic volumes compared to current traffic

15 California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Protocol.* September 2013.

counts is not significant enough to cause an audible increase in traffic noise since it takes a doubling of traffic to increase noise levels to a perceptible degree. Impacts are less than significant.

Permanent Operation Stationary Noise

During Project operation, adjacent residential uses may be disrupted by intermittent noises from two outdoor play areas that flank the building. These outdoor areas would be as close as 40 feet south of the rear of residences along Silverlake Drive to the north and 50 feet from residences along Shadowlake Court to the west. Students' activities could occur intermittently through the day. Noise from these areas would be partially shielded by existing and proposed walls that enclose these spaces, as well as existing concrete masonry unit walls along the northern and western property lines that would shield any noise from the school and its play areas. The attenuation provided by a masonry wall depends on many site-specific considerations including its orientation of noise sources and receptors, and its size and design. As a general rule of thumb, interrupting the noise source with such a wall would reduce off-site noise levels by approximately 5 dB(A).

As illustrated in **Figure 3**, **Play Area Noise Impacts**, noise from these play activities would range from 35.9 dB(A) to 47.2 dB(A) Leq at nearby sensitive receptors during any peak activity periods, assuming up to one hour of activity in both areas in the morning and one hour in the afternoon. As shown in **Table 5, Play Area Noise Impacts of Off-Site Sensitive Receptors**, these increases would elevate ambient noise levels at sensitive receptors by up to 2.6 dB(A) Leq, changes that would be virtually inaudible to nearby sensitive receptors.

Table 5
Play Area Noise Impacts at Off-Site Sensitive Receptors

Sensitive Receptor	Maximum Noise Level	Existing Ambient (dB(A), Leq)	New Ambient (dB(A), Leq)	Increase
1. 100 Block of Sagemeadow Ct.	35.9	52.6	52.7	0.1
2. 200 Block of Shadowlake Ct.	47.2	48.1	50.7	2.6
3. 100 Block of Silverlake Dr.	45.1	48.1	49.9	1.8
4. 200 Block of Silverslake Dr.	41.0	50.1	51.3	0.5
5. 200 Block of Milpitas Blvd.	37.4	63.2	63.2	0.0

SOURCE: Google Earth, 2021

FIGURE 3

IMPACT SCIENCES

Play Area Noise Impacts

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Intermittent daytime noises have little effect on day-night average noise levels, which are critical to noise-sensitive land uses. Up to two hours of activity in these areas could generate 46.4 dB(A) DNL at the closest sensitive receptors. These would not elevate DNL at nearby receptors by more than 3 dB(A). Therefore, the increase in noise from outdoor activities would be less than a 3 dB(A) Ldn increase and impacts would be less than significant.

Parking noise typically generates noise levels of approximately 60 dB(A) at 50 feet. According to the Project site plan, passenger drop off and parking areas will be provided onsite. According to information provided by Straford, 90% of students will arrive during the drop off time between 8:00 – 8:30 a.m. This would be the most intense period, as during the afternoon, approximately 40% of students will be picked up between 3:00 and 3:30 p.m., with the remaining 60% of students picked up between a longer period between 3:30 and 6:00 p.m. Cars would queue around the back side of the school. Staff parking for the proposed Project would occur along the western perimeter of the building. The closest receptors would be residential uses to north and west adjacent to the property line. As noted above, intermittent daytime noises have little effect on day-night average noise levels. Furthermore, the concrete wall that separates the residential uses from the commercial complex would reduce noise by approximately 5 dB(A) and noise impacts from queuing cars during pickup and drop-off or parking would be less than significant.

Impact 2 **Would the proposed Project result in the generation of excessive groundborne vibration or groundborne noise levels? *(Less than Significant)*.**

Construction Activity Vibration

Construction vibration damage criteria are assessed based on structural category (e.g., reinforced-concrete, steel, or timber). FTA guidelines consider 0.2 inch/sec Peak Particle Velocity (PPV) to be the significant impact level for non-engineered timber and masonry buildings. Structures or buildings constructed of reinforced concrete, steel, or timber have a vibration damage criterion of 0.5 inch/sec PPV pursuant to FTA guidelines.[16] The FTA Guidelines include a table showing the vibration damage criteria based on structural category and is presented below in **Table 6, Construction Vibration Damage Criteria.**

16 Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual. September* 2018.

Table 6
Construction Vibration Damage Criteria

Building/Structural Category	PPV, in/sec
I. Reinforced-concrete, steel, or timber (no plaster)	0.5
II. Engineered concrete and masonry (no plaster)	0.3
III. Non-engineered timber and masonry buildings	0.2
IV. Buildings extremely susceptible to vibration damage	0.12

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual. September 2018.

Groundborne vibration generated by construction activities associated with the proposed Project would affect both on- and off-site sensitive uses located near the Project site. As shown in **Table 7, Vibration Source Levels for Construction Equipment**, vibration velocities could range from 0.003 to 0.089 inch/sec PPV at 25 feet from the source activity, with corresponding vibration levels (VdB) ranging from 58 VdB to 87 VdB at 25 feet from the source activity, depending on the type of construction equipment in use. The Project does not include ground disturbing activities and is primarily the renovation of the interior of the existing building. Therefore, construction phases will not utilize heavy equipment such as large bulldozers, nor would the Project include any drilling. Of the listed equipment in **Table 7**, only loaded trucks are likely to be utilized, primarily during the removal of debris and material during the demolition of interior walls. These loaded trucks would likely stage to the north end of the Project site at the loading area, located approximately 25 feet away from the closest residences. It should be noted that none of these buildings are considered historic and are thus evaluated as non-engineered timber and masonry buildings. According to

Table 7
Vibration Source Levels for Construction Equipment

	Approximate PPV (in/sec)					Approximate RMS (VdB)				
Equipment	**25 Feet**	**50 Feet**	**60 Feet**	**75 Feet**	**100 Feet**	**25 Feet**	**50 Feet**	**60 Feet**	**75 Feet**	**100 Feet**
Large Bulldozer	0.089	0.031	0.024	0.017	0.011	87	78	76	73	69
Caisson Drilling	0.089	0.031	0.024	0.017	0.011	87	78	76	73	69
Loaded Trucks	0.076	0.027	0.020	0.015	0.010	86	77	75	72	68
Jackhammer	0.035	0.012	0.009	0.007	0.004	79	70	68	65	61
Small Bulldozer	0.003	0.001	0.0008	0.0006	0.0004	58	49	47	44	40

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, 2018.
Notes: PPV = peak particle velocity, VdB = vibration levels measured in decibel notation

As shown above in **Table 7**, loaded trucks would have vibration velocities of 0.076 inch/sec PPV at the nearest receptors approximately 25 feet away. According to the FTA Guidelines in **Table 6**, this is below the 0.2 inch/sec PPV threshold for non-engineered timber and masonry buildings. Therefore, impacts would be less than significant.

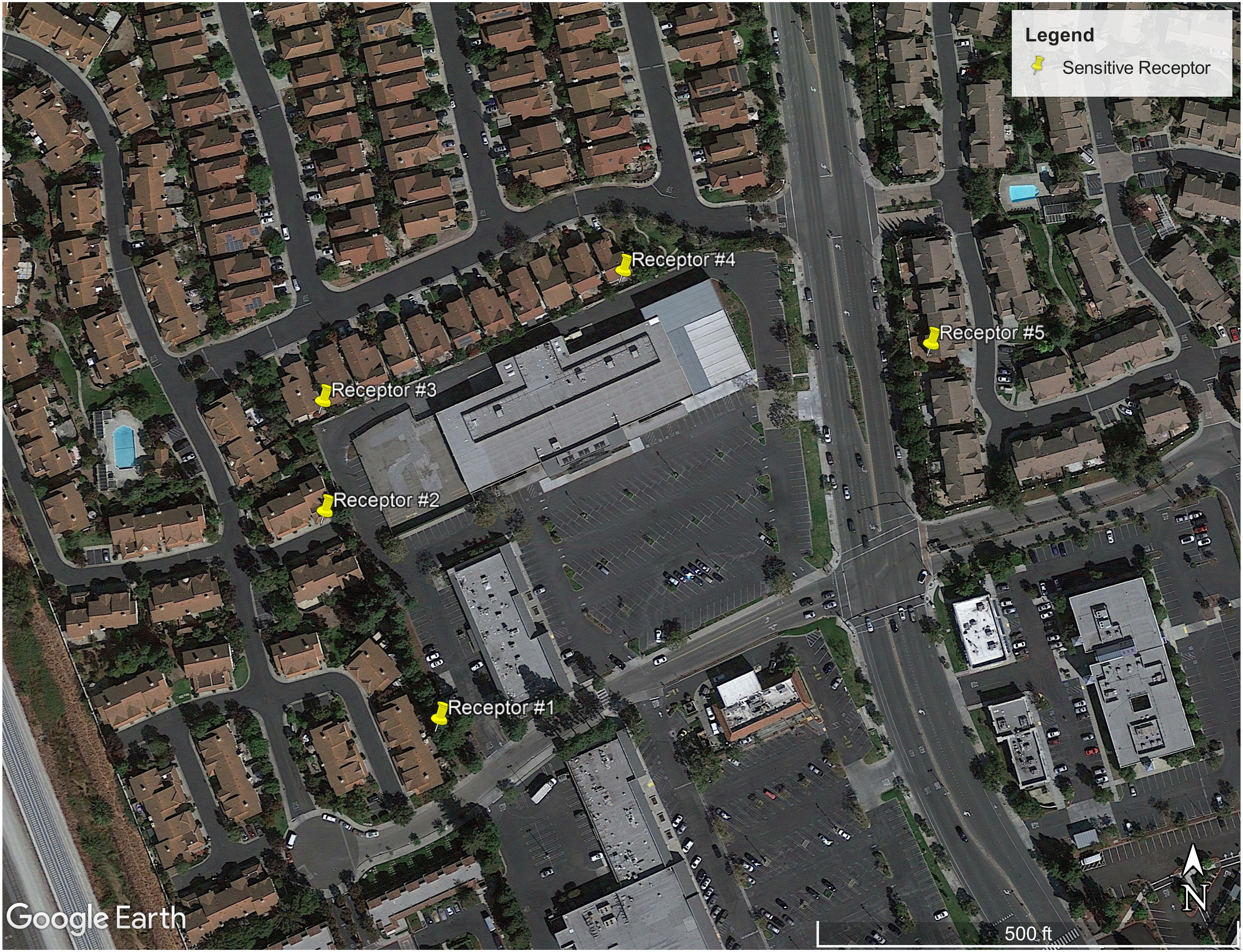
Impact 3 **For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project expose people residing or working in the Project area to excessive noise? *(No Impact).***

Permanent Operational Aircraft Noise

The Project site is not in the vicinity of a private airstrip or airport land use plan and the Norman Y. Mineta San José International Airport is a public-use airport located approximately four miles southwest of the Project Site. As such, the Project would not expose people residing or working in the Project area to excessive airport-related noise levels. No impact would occur from the proposed Project and no further analysis is required.

ATTACHMENT A

Noise and Vibration Technical Appendix


Legend
Sensitive Receptor
Receptor #4
Receptor #5
Receptor #3
Receptor #2
Receptor #1
Google Earth
500 ft
N

Session Report

2/1/2021

Information Panel

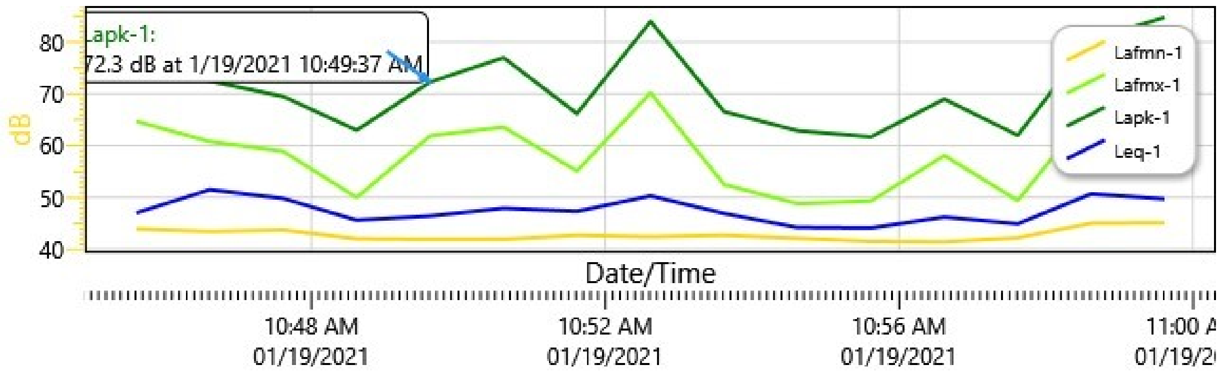
Name	200 Block of Meadowhaven Way (east side south of Silverlake Drive)
Comments	
Start Time	1/19/2021 10:44:37 AM
Stop Time	1/19/2021 10:59:48 AM
Run Time	00:15:11
Serial Number	SE40213991
Device Name	SE40213991
Model Type	Sound Examiner
Device Firmware Rev	R.11C
Company Name	
Description	
Location	
User Name	

Summary Data Panel

Description	Meter	Value	Description	Meter	Value
Leq	1	48.1 dB			
Exchange Rate	1	3 dB	Weighting	1	A
Response	1	FAST	Bandwidth	1	OFF

Logged Data Chart

200 Block of Meadowhaven Way (east side south of Silverlake Drive): Logged Data Chart



Logged Data Table

Date/Time	Lapk-1	Lafmn-1	Lafmx-1	Leq-1

Date/Time	Lapk-1	Lafmn-1	Lafmx-1	Leq-1
1/19/2021 10:45:37 AM	80.8	43.9	64.7	47
10:46:37 AM	72.5	43.4	60.8	51.5
10:47:37 AM	69.5	43.7	58.9	49.8
10:48:37 AM	63	42	50	45.6
10:49:37 AM	72.3	41.9	61.9	46.4
10:50:37 AM	77	41.9	63.6	47.9
10:51:37 AM	66.2	42.7	55.1	47.3
10:52:37 AM	84	42.4	70.2	50.3
10:53:37 AM	66.6	42.7	52.5	46.9
10:54:37 AM	62.9	42.1	48.8	44.2
10:55:37 AM	61.7	41.5	49.3	44.1
10:56:37 AM	69	41.4	58.1	46.2
10:57:37 AM	62	42.2	49.4	44.9
10:58:37 AM	80.4	45	66.9	50.7
10:59:37 AM	84.8	45.1	62.8	49.7

Session Report

2/1/2021

Information Panel

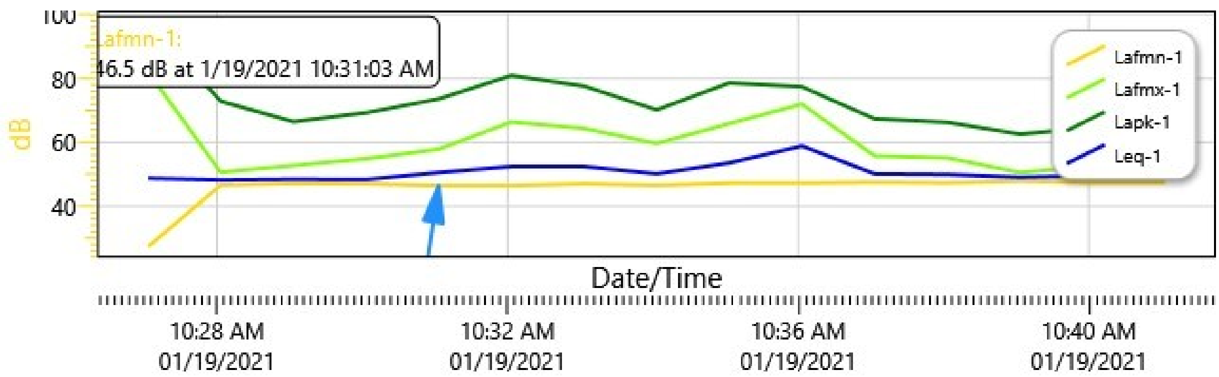
Name	100 Block of Sagemeadow Court (east side north of Beresford Court)
Comments	
Start Time	1/19/2021 10:26:03 AM
Stop Time	1/19/2021 10:41:15 AM
Run Time	00:15:12
Serial Number	SE40213991
Device Name	SE40213991
Model Type	Sound Examiner
Device Firmware Rev	R.11C
Company Name	
Description	
Location	
User Name	

Summary Data Panel

Description	Meter	Value	Description	Meter	Value
Leq	1	52.6 dB			
Exchange Rate	1	3 dB	Weighting	1	A
Response	1	FAST	Bandwidth	1	OFF

Logged Data Chart

100 Block of Sagemeadow Court (east side north of Beresford Court): Logged Data Chart



Logged Data Table

Date/Time	Lapk-1	Lafmn-1	Lafmx-1	Leq-1

Date/Time	Lapk-1	Lafmn-1	Lafmx-1	Leq-1
1/19/2021 10:27:03 AM	97.7	27.4	82	48.8
10:28:03 AM	72.9	46.7	50.7	48.3
10:29:03 AM	66.5	47.2	52.8	48.5
10:30:03 AM	69.3	47.1	54.9	48.4
10:31:03 AM	73.6	46.5	57.9	50.6
10:32:03 AM	80.9	46.5	66.4	52.5
10:33:03 AM	77.6	47.1	64.4	52.5
10:34:03 AM	70.2	46.6	59.7	50.2
10:35:03 AM	78.6	47.3	65.9	53.6
10:36:03 AM	77.4	47.3	72	58.9
10:37:03 AM	67.4	47.6	55.8	50.2
10:38:03 AM	66.3	47.4	55.2	50
10:39:03 AM	62.6	47.9	50.6	49.1
10:40:03 AM	64.7	47.5	52.7	49.6
10:41:03 AM	77.5	47.6	66.9	55.8

Session Report

2/1/2021

Information Panel

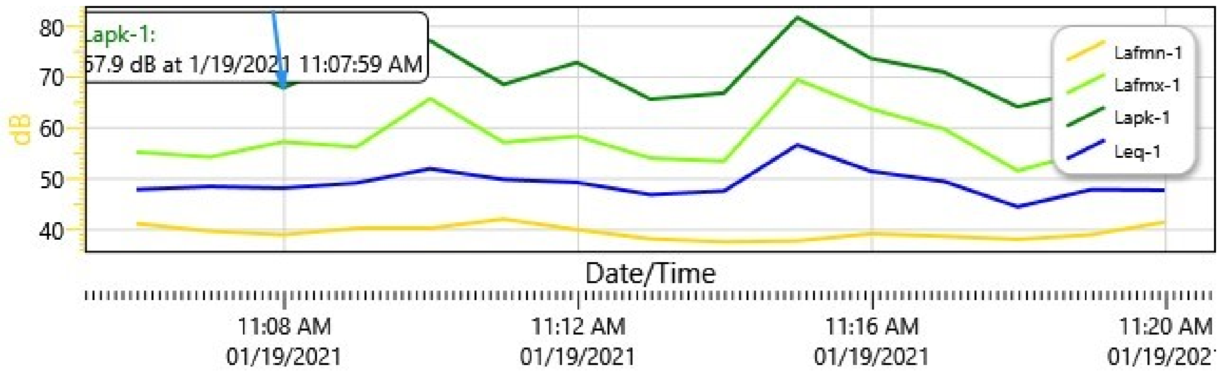
Name	200 Block of Silverlake Drive (south side west of Edgewater Drive)
Comments	
Start Time	1/19/2021 11:04:59 AM
Stop Time	1/19/2021 11:20:28 AM
Run Time	00:15:29
Serial Number	SE40213991
Device Name	SE40213991
Model Type	Sound Examiner
Device Firmware Rev	R.11C
Company Name	
Description	
Location	
User Name	

Summary Data Panel

Description	Meter	Value	Description	Meter	Value
Leq	1	50.1 dB			
Exchange Rate	1	3 dB	Weighting	1	A
Response	1	FAST	Bandwidth	1	OFF

Logged Data Chart

200 Block of Silverlake Drive (south side west of Edgewater Drive): Logged Data Chart



Logged Data Table

Date/Time	Lapk-1	Lafmn-1	Lafmx-1	Leq-1

Date/Time	Lapk-1	Lafmn-1	Lafmx-1	Leq-1
1/19/2021 11:05:59 AM	70.2	41.2	55.3	47.9
11:06:59 AM	74.5	39.7	54.3	48.5
11:07:59 AM	67.9	39	57.3	48.2
11:08:59 AM	74.2	40.3	56.3	49.2
11:09:59 AM	77.2	40.3	65.8	52
11:10:59 AM	68.6	42.1	57.2	49.9
11:11:59 AM	72.9	40	58.4	49.3
11:12:59 AM	65.7	38.2	54.1	46.9
11:13:59 AM	66.9	37.6	53.5	47.6
11:14:59 AM	81.8	37.8	69.5	56.7
11:15:59 AM	73.7	39.2	63.8	51.5
11:16:59 AM	71	38.7	59.8	49.5
11:17:59 AM	64.2	38.1	51.6	44.5
11:18:59 AM	67.6	39	55.5	47.9
11:19:59 AM	68.9	41.5	55.6	47.8

Session Report

2/1/2021

Information Panel

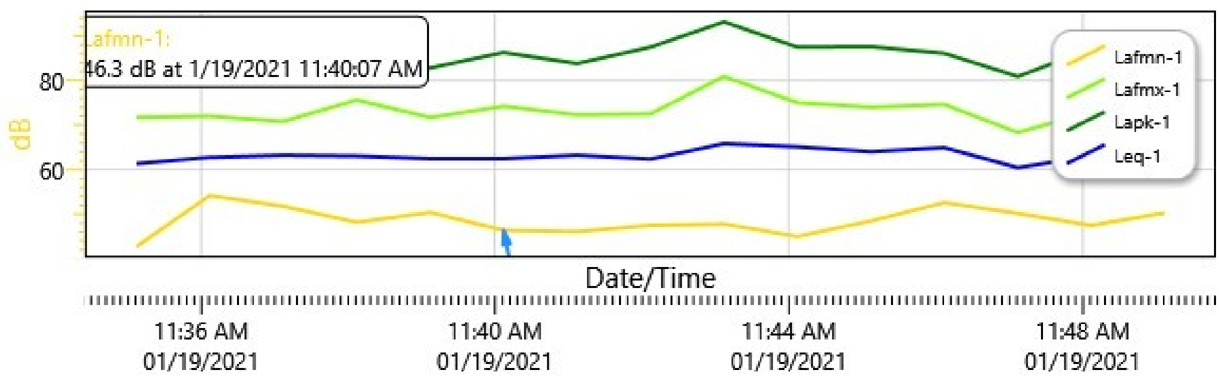
Name	200 Block of Milpitas Boulevard (east side between Silverlake Dr and Town Center Dr)
Comments	
Start Time	1/19/2021 11:34:07 AM
Stop Time	1/19/2021 11:49:57 AM
Run Time	00:15:50
Serial Number	SE40213991
Device Name	SE40213991
Model Type	Sound Examiner
Device Firmware Rev	R.11C
Company Name	
Description	
Location	
User Name	

Summary Data Panel

Description	Meter	Value	Description	Meter	Value
Leq	1	63.2 dB			
Exchange Rate	1	3 dB	Weighting	1	A
Response	1	FAST	Bandwidth	1	OFF

Logged Data Chart

200 Block of Milpitas Boulevard (east side between Silverlake Dr and Town Center Dr): Logged Data Chart



Logged Data Table

Date/Time	Lapk-1	Lafmn-1	Lafmx-1	Leq-1

Date/Time	Lapk-1	Lafmn-1	Lafmx-1	Leq-1
1/19/2021 11:35:07 AM	82.2	42.6	71.7	61.3
11:36:07 AM	88.9	54.1	72	62.7
11:37:07 AM	82.7	51.7	70.8	63.2
11:38:07 AM	88.3	48.1	75.6	63
11:39:07 AM	82.8	50.3	71.7	62.4
11:40:07 AM	86.3	46.3	74.2	62.4
11:41:07 AM	83.8	46	72.3	63.2
11:42:07 AM	87.5	47.4	72.5	62.3
11:43:07 AM	93.2	47.7	80.9	65.8
11:44:07 AM	87.5	44.9	75	65.1
11:45:07 AM	87.6	48.4	74	64
11:46:07 AM	86.1	52.5	74.6	64.9
11:47:07 AM	80.9	50.1	68.3	60.4
11:48:07 AM	87.1	47.4	72.9	63
11:49:07 AM	82.8	50.2	70.1	61.5

Stratford School Construction Noise - Unmitigated

Reference Noise Distance 50

Reference Noise Level 77.4

Sensitive Receptor	Distance (feet)	Attenuation Factors	Maximum Construction Noise Level (RCNM)	Existing Ambient (dBA, Leq)	New Ambient (dBA, Leq)	Increase
100 Sagemeadow	150	11	56.9	52.6	58.2	5.6
200 Shadowlake	80	11	62.3	48.1	62.5	14.4
100 Silverslake	100	11	60.4	48.1	60.6	12.5
200 Silverslake	90	11	61.3	50.1	61.6	11.5
200 Milpitas	230	6	58.1	63.2	64.4	1.2

A 6 dBA attenuation was given for hard ground surfuce, a 5 dBA attenuation was given for the concrete wall which seperates residences to the north and west of the site, and 3 dBA reduction was given for the first row of buildings intervening between the construction site and sensitive receptors (1.5 dBA for subsequent intervening structures), as recommended by the Caltrans Technical Noise Supplement.

Stratford School

Playground Noise

Sensitive Receptor	Maximum Construction Noise Level (RCNM)	Existing Ambient (dBA, Leq)	New Ambient (dBA, Leq)	Increase
100 Sagemeadow	35.9	52.6	52.7	0.1
200 Shadowlake	47.2	48.1	50.7	2.6
100 Silverslake	45.1	48.1	49.9	1.8
200 Silverslake	41.0	50.1	50.6	0.5
200 Milpitas	37.4	63.2	63.2	0.0

A 6 dBA attenuation was given for hard ground surfuce, a 5 dBA attenuation was given for the concrete wall which seperates residences to the north and west of the site, and 3 dBA reduction was given for the first row of buildings intervening between the construction site and sensitive receptors (1.5 dBA for subsequent intervening structures), as recommended by the Caltrans Technical Noise Supplement.

Figure 1
Noise Measurement Locations

Noise emissions of industry sources

Source name	Size	Reference	Level		Corrections		
			Day	Night	Cwall	CI	CT
	m/m²		dB(A)	dB(A)	dB	dB	dB
Play Area	1325 m²	Lw/	60.0	-	-	-	-
Play Area 2	939 m²	Lw/	60.0	-	-	-	-

Receiver list

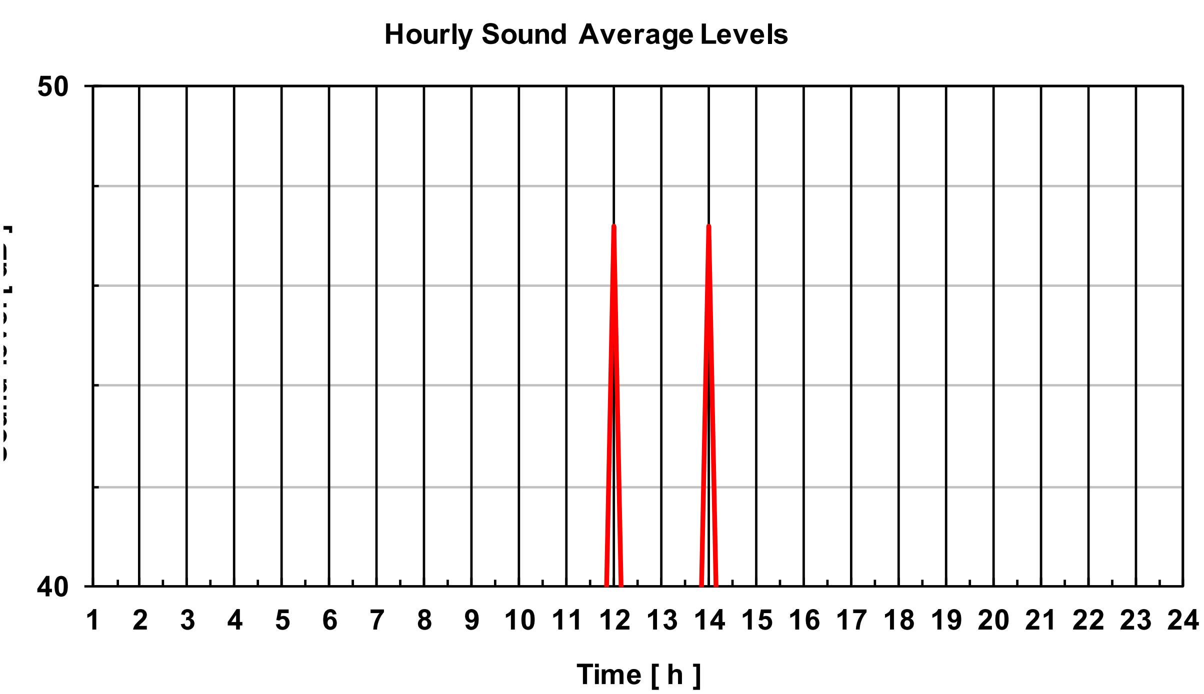
No.	Receiver name	Coordinates X (in meter)	Coordinates Y (in meter)	Building side	Floor	Height abv.grd. m	Limit Day dB(A)	Limit Night dB(A)	Level Day dB(A)	Level Night dB(A)	Conflict Day dB	Conflict Night dB
1	Residences - Milpitas Bouleva	11066317.3	4154521.84	West	GF	7.90	-	-	37.4	0.0	-	-
2	Residences - Sagemeadow C	11066132.7	4154351.33	East	GF	7.60	-	-	35.9	0.0	-	-
3	Residences - Shadowlake Co	11066095.0	4154453.94	East	GF	7.58	-	-	47.2	0.0	-	-
4	Residences - Silverlake Drive	11066210.8	4154526.05	South	GF	7.30	-	-	41.0	0.0	-	-
5	Residences - Silverlake Drive	11066089.8	4154479.72	South	GF	7.46	-	-	45.1	0.0	-	-

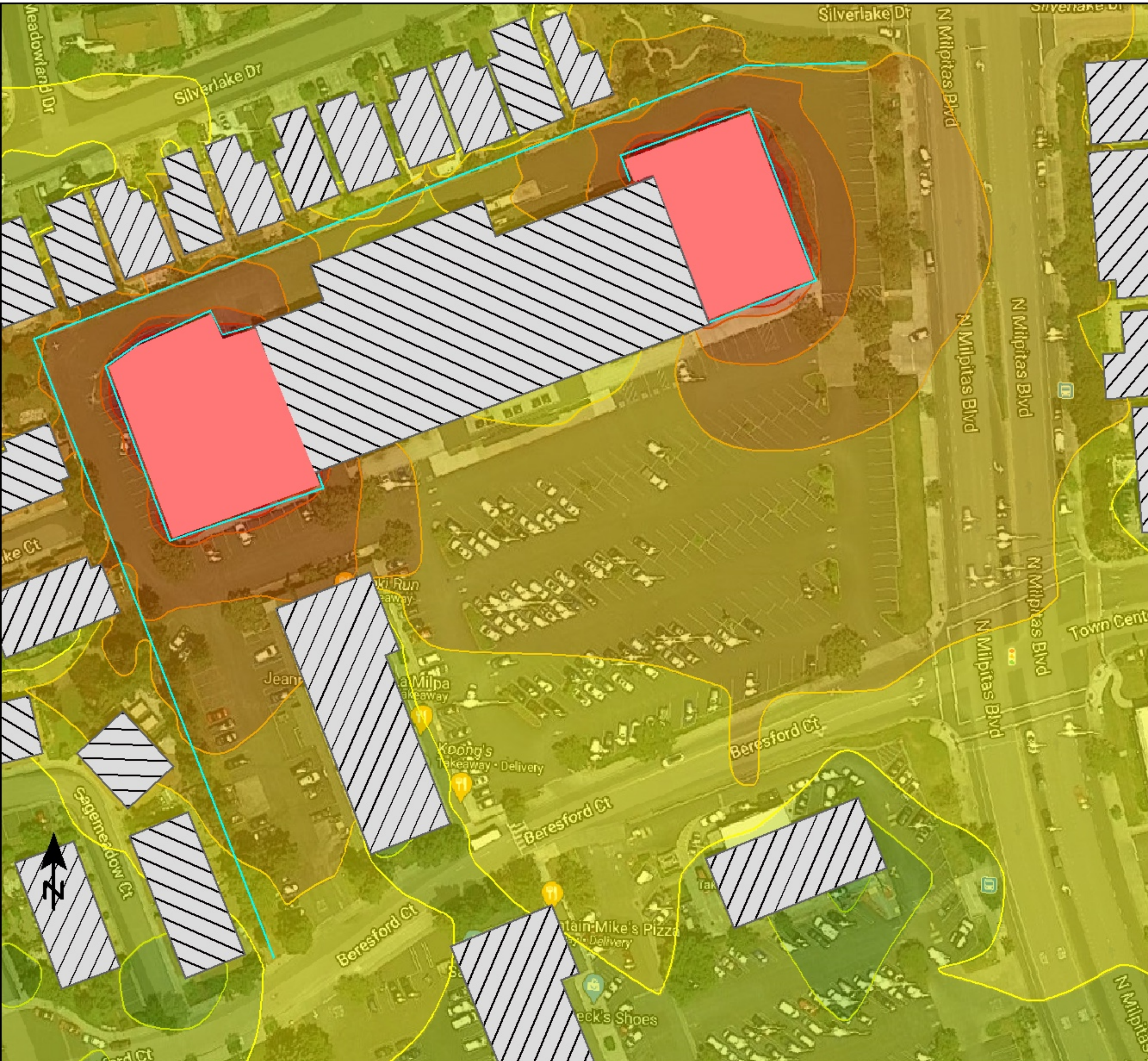
Contribution levels of the receivers

Source name		Level Day	Level Night
		dB(A)	dB(A)
Residences - Milpitas Boulevard	GF	37.4	0.0
Play Area		19.8	-
Play Area 2		37.3	-
Residences - Sagemeadow Court	GF	35.9	0.0
Play Area		35.9	-
Play Area 2		17.1	-
Residences - Shadowlake Court	GF	47.2	0.0
Play Area		47.2	-
Play Area 2		18.4	-
Residences - Silverlake Drive (NE)	GF	41.0	0.0
Play Area		24.8	-
Play Area 2		40.9	-
Residences - Silverlake Drive (NW)	GF	45.1	0.0
Play Area		45.1	-
Play Area 2		20.1	-

NOISE IMPACTS FROM OUTDOOR PLAY AREAS

Time [h]	L 1h	Time [h]	L 1h
1	0.0	13	0.0
2	0.0	14	47.2
3	0.0	15	0.0
4	0.0	16	0.0
5	0.0	17	0.0
6	0.0	18	0.0
7	0.0	19	0.0
8	0.0	20	0.0
9	0.0	21	0.0
10	0.0	22	0.0
11	0.0	23	0.0
12	47.2	24	0.0
Day average sound level, L_D			38.4
Night average sound level, L_N			0.0
24 hour average level, L_{24h}			36.4
Community noise level CNEL			46.4
Day-night average sound level, L_{DN}			46.4





Milpitas Stratford School

Signs and symbols

Wall

Outdoor Play Area

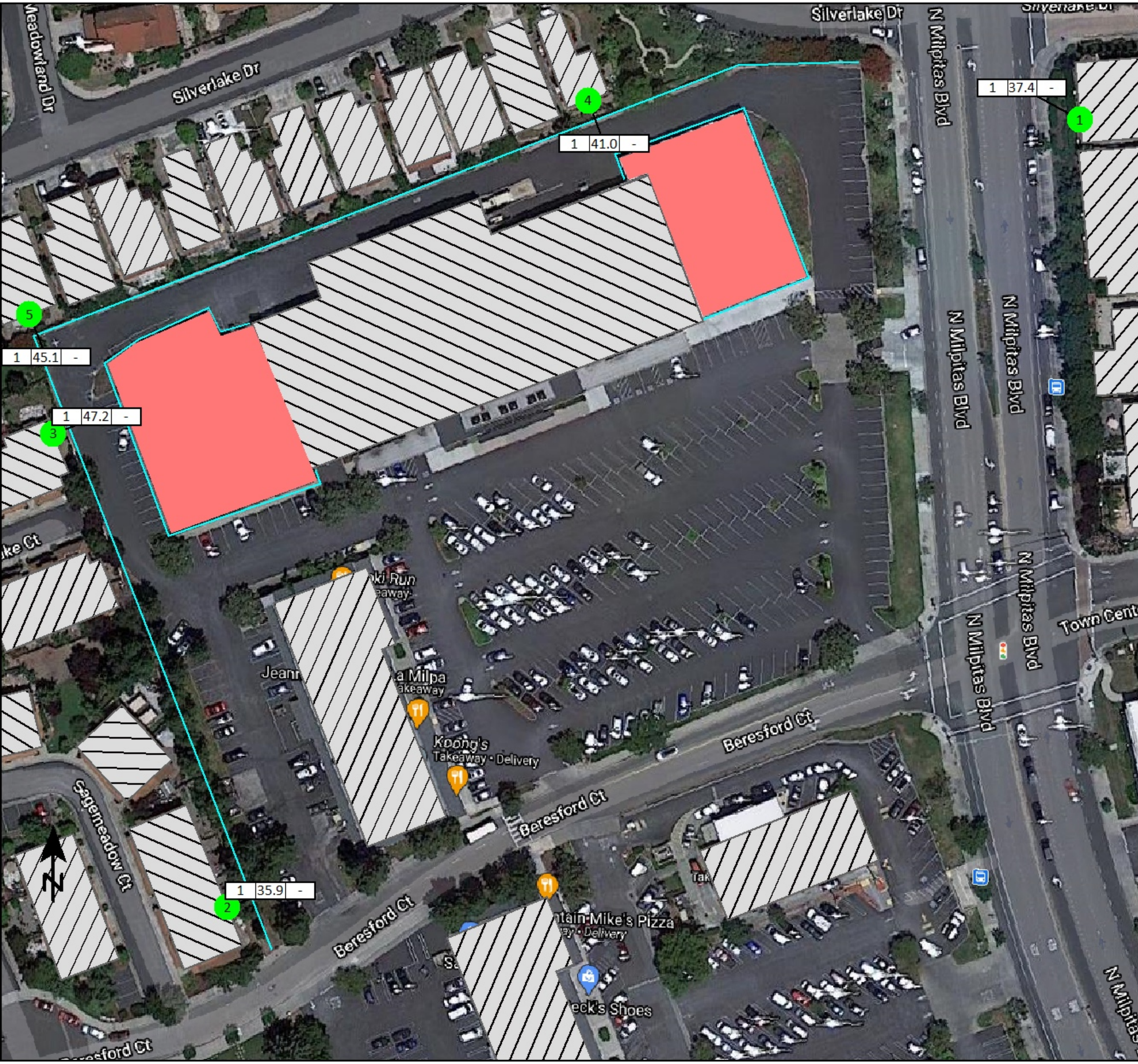
Levels in dB(A)

< 10
10 - 15
15 - 20
20 - 25
25 - 30
30 - 35
35 - 40
40 - 45
45 - 50
50 - 55
55 - 60
60 - 65
65 - 70
70 - 75
75 - 80
>= 80

1 : 91

0 25 50 100 150 200 feet

Milpitas Stratford School



Signs and symbols

- Wall
- Sensitive Receptor
- Outdoor Play Area

1 : 91

0 25 50 100 150 200 feet

Ref= Reference vibration level (PPV)
RefD= Reference distance for Reference vibration level (Feet)

Vibration PPV

Ref=	0.089	Based on type of equipment
RefD=	25	
D=	50	Distance from equipment to sensitive receptor
Equip=	0.031	

Annoyance VdB

Ref=	87	Based on type of equipment
RefD=	25	
D=	50	Distance from equipment to sensitive receptor
Equip=	78	

Peak demolition vibration based on utilizing a large bulldozer.

Source: FTA Tranist Noise and Vibration Impact Assessment, 2006.

Ref=	Reference vibration level (PPV)	
RefD=	Reference distance for Reference vibration level (Feet)	

Vibration PPV

Ref=	0.089	Based on type of equipment
RefD=	25	
D=	50	Distance from equipment to sensitive receptor
Equip=	0.031	

Annoyance VdB

Ref=	87	Based on type of equipment
RefD=	25	
D=	50	Distance from equipment to sensitive receptor
Equip=	78	

Peak demolition vibration based on utilizing a large bulldozer.

Source: FTA Tranist Noise and Vibration Impact Assessment, 2006.

Ref=	Reference vibration level (PPV)	
RefD=	Reference distance for Reference vibration level (Feet)	

Vibration PPV

Ref=	0.089	Based on type of equipment
RefD=	25	
D=	50	Distance from equipment to sensitive receptor
Equip=	0.031	

Annoyance VdB

Ref=	87	Based on type of equipment
RefD=	25	
D=	50	Distance from equipment to sensitive receptor
Equip=	78	

Peak demolition vibration based on utilizing a large bulldozer.

Source: FTA Tranist Noise and Vibration Impact Assessment, 2006.

Ref=	Reference vibration level (PPV)
RefD=	Reference distance for Reference vibration level (Feet)

Vibration PPV

Ref=	0.089	Based on type of equipment
RefD=	25	
D=	200	Distance from equipment to sensitive receptor
Equip=	0.004	

Annoyance VdB

Ref=	87	Based on type of equipment
RefD=	25	
D=	200	Distance from equipment to sensitive receptor
Equip=	60	

Peak demolition vibration based on utilizing a large bulldozer.

Source: FTA Tranist Noise and Vibration Impact Assessment, 2006.

IMPACT
SCIENCES