Appendix G Noise Assessment

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Noise Impact Assessment
for the
Mare Island Technical Academy Project

City Vallejo, California

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LIST OF ACRONYMS AND ABBREVIATIONS

Caltrans	California Department of Transportation
City	City of Vallejo
CNEL	Community Noise Equivalent Level
dB	Decibel
dBA	Decibel is A-weighted
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
Hz	Hertz
L_{dn}	Day-night average sound level
L_{eq}	Measure of ambient noise
L_{max}	The maximum A-weighted noise level during the measurement period.
L_{min}	The minimum A-weighted noise level during the measurement period.
NIOSH	National Institute for Occupational Safety and Health
OPR	Office of Planning and Research
OSHA	Federal Occupational Safety and Health Administration
PPV	Peak particle velocity
Project	Mare Island Technical Academy Project
RCNM	Roadway Construction Noise Model
RMS	Root mean square
STC	Sound Transmission Class
VdB	Vibration Velocity Level
WEAL	Western Electro-Acoustic Laboratory, Inc.

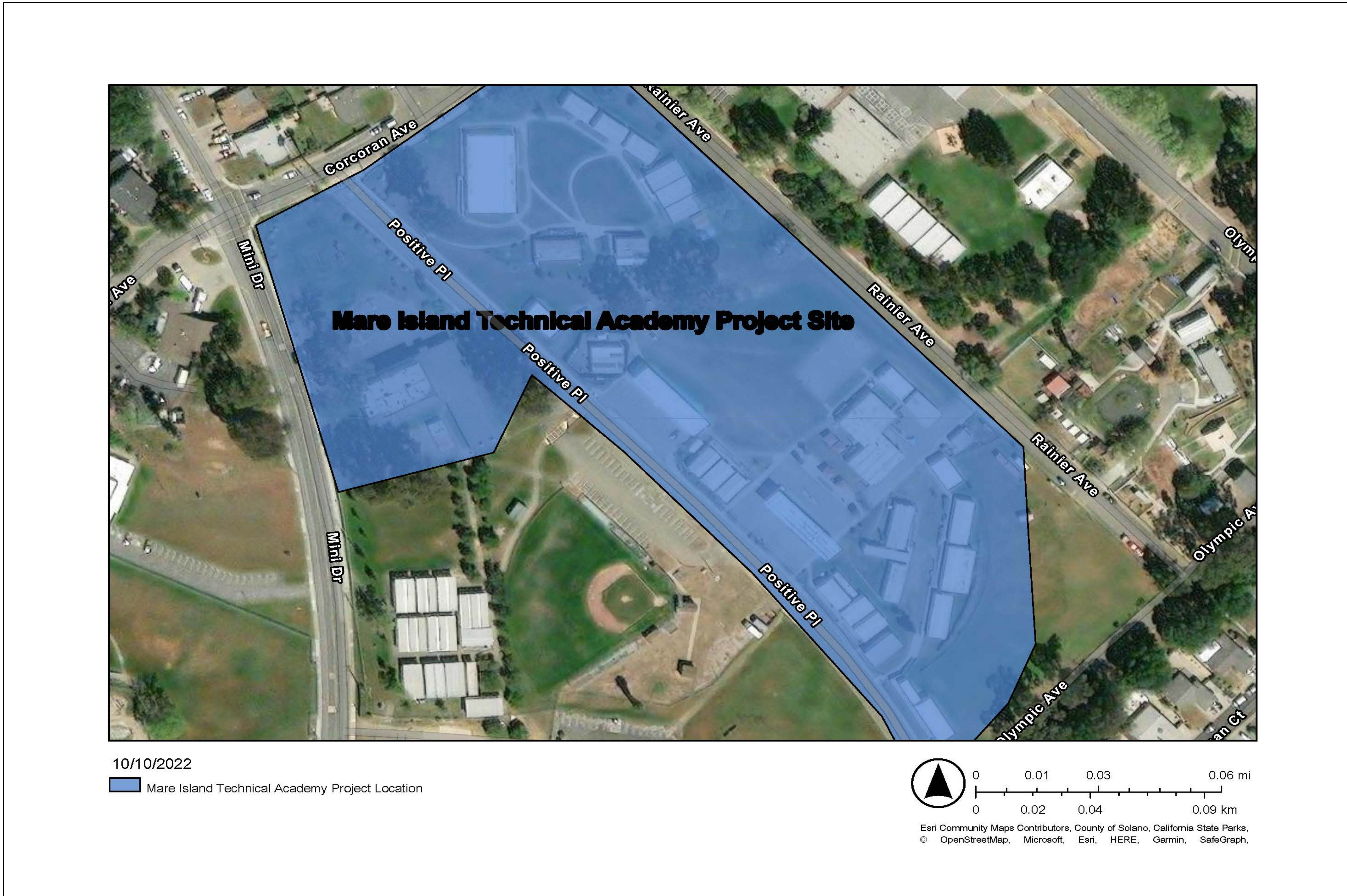
1.0 INTRODUCTION

This report documents the results of a Noise Impact Assessment completed for the Mare Island Technical Academy Project (Project), which proposes the near complete renovation and reconfiguration of an existing 6-12 charter school in Vallejo, California. This report was prepared as a comparison of predicted Project noise levels to noise standards promulgated by the City of Vallejo General Plan Nature and Built Environment Element and Municipal Code. The purpose of this report is to estimate Project-generated noise and to determine the level of impact the Project would have on the environment.

1.1 Project Location and Description

The existing Mare Island Technical Academy is located at 2 Positive Place in the City of Vallejo (City). The campus is located between Mini Drive and Rainier Avenue, and along Corcoran Avenue with Positive Place traversing the site. The school is predominately surrounded by residences and other educational land uses.

The Project is proposing a near complete renovation and reconfiguration of the school's campus with demolition of the existing buildings and re-grading the Project Site. The Proposed Project includes the construction of a total of 45 new classrooms, a science building, an administration building, a multipurpose building, a gymnasium, soccer field, and other outdoor play fields. Site improvements would also include on-site parking, improved vehicle circulation, landscaping, walkways, and other amenities. The existing campus consists of portable classrooms. All new facilities will meet current state and federal building standards. The proposed renovations would occur over two phases in order to maintain enough facilities to operate the educational program. The Proposed Project would not increase the capacity of students attending the school.



Map Date: *10/10/2022*
Photo (or Base) Source: *ARCGIS Online 2022*

Figure 1-1. Project Location Map

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2022-283 Mare Island Technical Academy

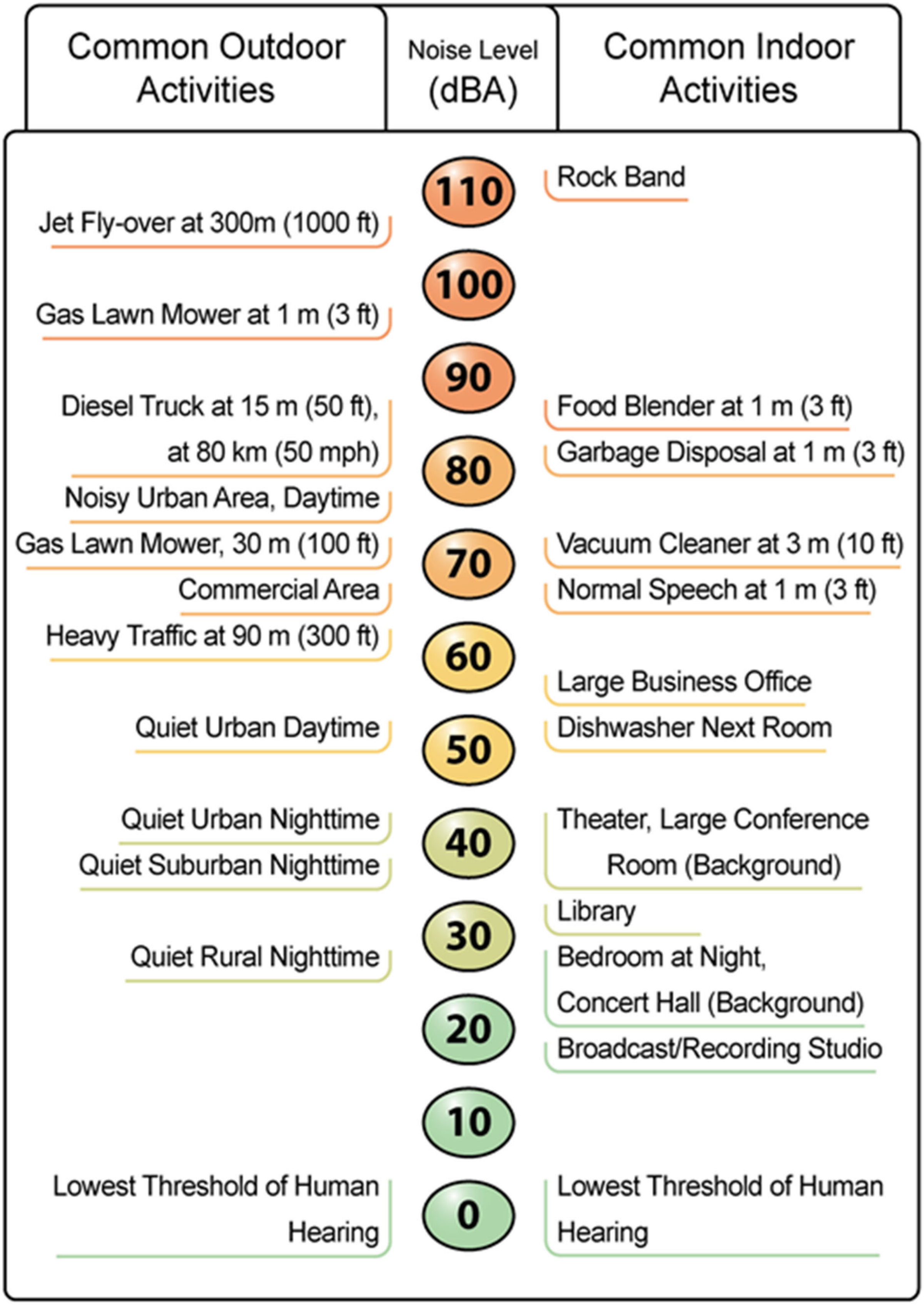
2.0 ENVIRONMENTAL NOISE AND GROUNDBORNE VIBRATION ANALYSIS

2.1 Fundamentals of Noise and Environmental Sound

2.1.1 Addition of Decibels

The decibel (dB) scale is logarithmic, not linear, and therefore sound levels cannot be added or subtracted through ordinary arithmetic. Two sound levels 10 dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic decibel is A-weighted (dBA), an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70-dBA sound is half as loud as an 80-dBA sound and twice as loud as a 60-dBA sound. When two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be three dB higher than one source under the same conditions (Federal Transit Administration [FTA] 2018). For example, a 65-dB source of sound, such as a truck, when joined by another 65 dB source results in a sound amplitude of 68 dB, not 130 dB (i.e., doubling the source strength increases the sound pressure by three dB). Under the decibel scale, three sources of equal loudness together would produce an increase of five dB.

Typical noise levels associated with common noise sources are depicted in Figure 2-1.



Source: California Department of Transportation (Caltrans) 2020a

Figure 1. Common Noise Levels
Vineyard Parkway Residential Project

2.1.2 Sound Propagation and Attenuation

Noise can be generated by a number of sources, including mobile sources such as automobiles, trucks and airplanes, and stationary sources such as construction sites, machinery, and industrial operations. Sound spreads (propagates) uniformly outward in a spherical pattern, and the sound level decreases (attenuates) at a rate of approximately 6 dB (dBA) for each doubling of distance from a stationary or point source (FHWA 2017). Sound from a line source, such as a highway, propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of approximately 3 dBA for each doubling of distance from a line source, such as a roadway, depending on ground surface characteristics (Federal Highway Administration [FHWA] 2017). No excess attenuation is assumed for hard surfaces like a parking lot or a body of water. Soft surfaces, such as soft dirt or grass, can absorb sound, so an excess ground-attenuation value of 1.5 dBA per doubling of distance is normally assumed. For line sources, an overall attenuation rate of three dB per doubling of distance is assumed (FHWA 2011).

Noise levels may also be reduced by intervening structures; generally, a single row of detached buildings between the receptor and the noise source reduces the noise level by about five dBA (FHWA 2006), while a solid wall or berm generally reduces noise levels by 10 to 20 dBA (FHWA 2011). However, noise barriers or enclosures specifically designed to reduce site-specific construction noise can provide a sound reduction 35 dBA or greater (Western Electro-Acoustic Laboratory, Inc. [WEAL] 2000). To achieve the most potent noise-reducing effect, a noise enclosure/barrier must physically fit in the available space, must completely break the "line of sight" between the noise source and the receptors, must be free of degrading holes or gaps, and must not be flanked by nearby reflective surfaces. Noise barriers must be sizable enough to cover the entire noise source and extend lengthwise and vertically as far as feasibly possible to be most effective. The limiting factor for a noise barrier is not the component of noise transmitted through the material, but rather the amount of noise flanking around and over the barrier. In general, barriers contribute to decreasing noise levels only when the structure breaks the "line of sight" between the source and the receiver.

The manner in which older homes in California were constructed generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows (Caltrans 2002). The exterior-to-interior reduction of newer residential units is generally 30 dBA or more (Harris Miller, Miller & Hanson Inc. [HMMH] 2006). Generally, in exterior noise environments ranging from 60 dBA Community Noise Equivalent Level (CNEL) to 65 dBA CNEL, interior noise levels can typically be maintained below 45 dBA, a typical residential interior noise standard, with the incorporation of an adequate forced air mechanical ventilation system in each residential building, and standard thermal-pane residential windows/doors with a minimum rating of Sound Transmission Class (STC) 28. (STC is an integer rating of how well a building partition attenuates airborne sound. In the U.S., it is widely used to rate interior partitions, ceilings, floors, doors, windows, and exterior wall configurations). In exterior noise environments of 65 dBA CNEL or greater, a combination of forced-air mechanical ventilation and sound-rated construction methods is often required to meet the interior noise level limit. Attaining the necessary noise reduction from exterior to interior spaces is readily achievable in noise environments less than 75 dBA CNEL with proper wall construction techniques following California Building Code methods, the selections of proper windows and doors, and the incorporation of forced-air mechanical ventilation systems.

2.1.3 Noise Descriptors

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Several rating scales have been developed to analyze the adverse effect of community noise on people. Because environmental noise fluctuates over time, these scales consider that the effect of noise on people is largely dependent on the total acoustical energy content of the noise, as well as the time of day when the noise occurs. The noise descriptors most often encountered when dealing with traffic, community, and environmental noise include the average hourly noise level (in L_{eq}) and the average daily noise levels/community noise equivalent level (in L_{dn}/CNEL). The L_{eq} is a measure of ambient noise, while the L_{dn} and CNEL are measures of community noise. Each is applicable to this analysis and defined as follows:

- **Equivalent Noise Level (L_{eq})** is the average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.
- **Day-Night Average (L_{dn})** is a 24-hour average L_{eq} with a 10-dBA "weighting" added to noise during the hours of 10:00 pm to 7:00 am to account for noise sensitivity in the nighttime. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.4 dBA L_{dn}.
- **Community Noise Equivalent Level (CNEL)** is a 24-hour average L_{eq} with a 5-dBA weighting during the hours of 7:00 pm to 10:00 pm and a 10-dBA weighting added to noise during the hours of 10:00 pm to 7:00 am to account for noise sensitivity in the evening and nighttime, respectively.

Table 2-1 provides a list of other common acoustical descriptors.

Table 2-1. Common Acoustical Descriptors	
Descriptor	**Definition**
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micropascals (or 20 micronewtons per square meter), where 1 pascal is the pressure resulting from a force of 1 newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 micropascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hertz (Hz)	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sounds are below 20 Hz and ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high-frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, L_{eq}	The average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, L_{dn} or DNL	A 24-hour average L_{eq} with a 10 dBA "weighting" added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the nighttime. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.4 dBA L_{dn}.
Community Noise Equivalent Level, CNEL	A 24-hour average L_{eq} with a 5 dBA "weighting" during the hours of 7:00 p.m. to 10:00 p.m. and a 10 dBA "weighting" added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.7 dBA CNEL.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends on its amplitude, duration, frequency, and time of occurrence and tonal or informational content, as well as the prevailing ambient noise level.
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20.

The A-weighted decibel sound level scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events.

The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about ±1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends on the distance between the receptor and the noise source. Close to the noise source, the models are accurate to within about ±1 to 2 dBA.

2.1.4 Human Response to Noise

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels.

Noise environments and consequences of human activities are usually well represented by median noise levels during the day or night or over a 24-hour period. Environmental noise levels are generally considered low when the CNEL or L_{dn} is below 60 dBA, moderate in the 60 to 70 dBA range, and high above 70 dBA. Examples of low daytime levels are isolated, natural settings with noise levels as low as 20 dBA and quiet, suburban, residential streets with noise levels around 40 dBA. Noise levels above 45 dBA at night can disrupt sleep. Examples of moderate-level noise environments are urban residential or semi-commercial areas (typically 55 to 60 dBA) and commercial locations (typically 60 dBA). People may consider louder environments adverse, but most will accept the higher levels associated with noisier urban residential or residential-commercial areas (60 to 75 dBA) or dense urban or industrial areas (65 to 80 dBA). Regarding increases in A-weighted noise levels (dBA), the following relationships should be noted in understanding this analysis:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived by humans.
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference.
- A change in level of at least 5 dBA is required before any noticeable change in community response would be expected. An increase of 5 dBA is typically considered substantial.
- A 10-dBA change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

2.1.5 Effects of Noise on People

2.1.5.1 Hearing Loss

While physical damage to the ear from an intense noise impulse is rare, a degradation of auditory acuity can occur even within a community noise environment. Hearing loss occurs mainly due to chronic exposure to excessive noise but may be due to a single event such as an explosion. Natural hearing loss associated with aging may also be accelerated from chronic exposure to loud noise.

The Occupational Safety and Health Administration (OSHA) has a noise exposure standard that is set at the noise threshold where hearing loss may occur from long-term exposures. The maximum allowable level is 90 dBA averaged over eight hours. If the noise is above 90 dBA, the allowable exposure time is correspondingly shorter.

2.1.5.2 Annoyance

Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources.

2.2 Fundamentals of Environmental Groundborne Vibration

2.2.1 Vibration Sources and Characteristics

Sources of earthborne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or manmade causes (explosions, machinery, traffic, trains, construction equipment, etc.). Vibration sources may be continuous (e.g., factory machinery) or transient (e.g., explosions).

Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several different methods are typically used to quantify vibration amplitude. One is the peak particle velocity (PPV); another is the root mean square (RMS) velocity. The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. The RMS velocity is defined as the average of the squared amplitude of the signal. The PPV and RMS vibration velocity amplitudes are used to evaluate human response to vibration.

PPV is generally accepted as the most appropriate descriptor for evaluating the potential for building damage. For human response, however, an average vibration amplitude is more appropriate because it takes time for the human body to respond to the excitation (the human body responds to an average vibration amplitude, not a peak amplitude). Because the average particle velocity over time is zero, the RMS amplitude is typically used to assess human response. The RMS value is the average of the amplitude squared over time, typically a 1- sec. period (FTA 2018).

Table 2-2 displays the reactions of people and the effects on buildings produced by continuous vibration levels. The annoyance levels shown in the table should be interpreted with care since vibration may be found to be annoying at much lower levels than those listed, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage. In high-noise environments, which are more prevalent where groundborne vibration approaches perceptible levels, this rattling phenomenon may also be produced by loud airborne environmental noise causing induced vibration in exterior doors and windows.

Ground vibration can be a concern in instances where buildings shake, and substantial rumblings occur. However, it is unusual for vibration from typical urban sources such as buses and heavy trucks to be perceptible. For instance, heavy-duty trucks generally generate groundborne vibration velocity levels of 0.006 PPV at 50 feet under typical circumstances, which as identified in Table 2-2 is considered very unlikely to cause damage to buildings of any type. Common sources for groundborne vibration are planes, trains, and construction activities such as earth-moving which requires the use of heavy-duty earth moving equipment.

Table 2-2. Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibration Levels

Peak Particle Velocity (inches/second)	Approximate Vibration Velocity Level (VdB)	Human Reaction	Effect on Buildings
0.006–0.019	64–74	Range of threshold of perception	Vibrations unlikely to cause damage of any type
0.08	87	Vibrations readily perceptible	Threshold at which there is a risk of architectural damage to extremely fragile historic buildings, ruins, ancient monuments
0.1	92	Level at which continuous vibrations may begin to annoy people, particularly those involved in vibration sensitive activities	Threshold at which there is a risk of architectural damage to fragile buildings. Virtually no risk of architectural damage to normal buildings
0.25	94	Vibrations may begin to annoy people in buildings	Threshold at which there is a risk of architectural damage to historic and some old buildings
0.3	96	Vibrations may begin to feel severe to people in buildings	Threshold at which there is a risk of architectural damage to older residential structures
0.5	103	Vibrations considered unpleasant by people subjected to continuous vibrations	Threshold at which there is a risk of architectural damage to new residential structures and Modern industrial/commercial buildings

Source: Caltrans 2020b

3.0 EXISTING ENVIRONMENTAL NOISE SETTING

3.1 Noise Sensitive Land Uses

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 hospitals, historic sites, cemeteries, and certain recreation areas 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.

The Project is proposing a near complete renovation and reconfiguration of Mare Island Technical Academy campus. As stated above, schools are classified as noise-sensitive land uses; however, because the Project is proposing improvements to its the existing campus, the school itself it will not be evaluated as a noise-sensitive land use. The nearest off-site sensitive receptors to the Project Site are residences across Corcoran Avenue, north of the Project Site, and Loma Vista Elementary School across Rainier Avenue, east of the Project Site, both approximately 50 feet distant.

3.1.1 Existing Ambient Noise Environment

The most common and significant source of noise in Vallejo is mobile noise generated by transportation-related sources. Other sources of noise are the various land uses (i.e., residential, educational, and commercial) that generate stationary-source noise. The Project Site is currently a fully functioning 6-12 charter school surrounded mainly by residential and educational land uses. As shown in Table 3-1 below, the ambient recorded noise levels range from 48.9 to 52.5 dBA L_{eq} near the Project Site and 63.8 dBA directly adjacent to the Project Site.

3.1.2 Existing Ambient Noise Measurements

As previously stated, the Project Site is currently a fully functioning 6-12 charter school surrounded mainly by residential and educational land uses. In order to quantify existing ambient noise levels in the Project Area, ECORP Consulting, Inc. conducted a long-term (6-hour) noise measurement directly adjacent to the Project Site during active school hours on October 6, 2022. This long-term noise measurement site is representative of typical existing noise exposure on the Project Site during a typical school day (see Attachment A). Additionally, ECORP conducted four short-term noise measurements (15-minutes) in the areas surrounding the Project Site on the afternoon of October 7, 2022, while school was in session. These short-term noise measurements are representative of typical existing noise exposure within and immediately adjacent to the Project Site during the daytime (see Attachment A). The 15-minute measurements were taken between 10:47 a.m. and 12:02 p.m. The average noise levels at each location are listed in Table 3-1.

Table 3-1. Existing (Baseline) Noise Measurements					
Long-Term (October 6, 2022)					
Location Number	Location	L_{eq} dBA	L_{min} dBA	L_{max} dBA	Time
LT	South corner of Cochran Avenue and Rainier Avenue	**63.8**	44.2	92.5	9:48 a.m. – 3:48 p.m.
Short-Term (October 7, 2022)					
Location Number	Location	L_{eq} dBA	L_{min} dBA	L_{max} dBA	Time
ST 1	Approximately 35 feet northwest of Redwing Street and Cochran Avenue	**52.5**	41.1	71.1	10:47 a.m. – 11:02 a.m.
ST 2	Rainier Avenue, at the western corner of Loma Rica Farms. Across the roadway from Mare Island Technical Academy	**50.8**	43.9	64.3	11:07 a.m. – 11:22 a.m.
ST 3	Southeastern corner of Olympic Avenue and Whitney Avenue	**62.3**	44.6	49.8	11:29 a.m. – 11:44 a.m.
ST 4	On Chapman Court. Approximately 35 feet north of Chapman Court/Linfield Drive Intersection	**48.9**	41.7	66.0	11:47 a.m. – 12:02 p.m.

Source: Measurements were taken by ECORP with a Larson Davis SoundExpert LxT precision sound level meter, which satisfies the American National Standards Institute for general environmental noise measurement instrumentation. Prior to the measurements, the SoundExpert LxT sound level meter was calibrated according to manufacturer specifications with a Larson Davis CAL200 Class I Calibrator. See Attachment A for noise measurement outputs.

Notes: L_{eq} is the average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. L_{min} is the minimum noise level during the measurement period and L_{max} is the maximum noise level during the measurement period. Long-term noise measurements (6-hours) taken during school hours.

As shown in Table 3-1, the ambient recorded noise level during the span of the long-term noise measurement was 63.8 dBA. The ambient recorded noise levels range from 48.9 to 52.5 dBA L_{eq} over the course of the four short-term noise measurements taken in the Project vicinity. The most common noise in the Project vicinity is produced by automotive vehicles (e.g., cars, trucks, buses, motorcycles) on area roadways.

4.0 REGULATORY FRAMEWORK

4.1 Federal

4.1.1 Occupational Safety and Health Act of 1970

OSHA regulates onsite noise levels and protects workers from occupational noise exposure. To protect hearing, worker noise exposure is limited to 90 decibels with A-weighting (dBA) over an eight-hour work shift (29 Code of Regulations 1910.95). Employers are required to develop a hearing conservation program when employees are exposed to noise levels exceeding 85 dBA. These programs include provision of hearing protection devices and testing employees for hearing loss on a periodic basis.

4.1.2 National Institute of Occupational Safety and Health

A division of the US Department of Health and Human Services, the National Institute for Occupational Safety and Health (NIOSH) has established a construction-related noise level threshold as identified in the Criteria for a Recommended Standard: Occupational Noise Exposure prepared in 1998. NIOSH identifies a noise level threshold based on the duration of exposure to the source. The NIOSH construction-related noise level threshold starts at 85 dBA for more than 8 hours per day; for every 3-dBA increase, the exposure time is cut in half. This reduction results in noise level thresholds of 88 dBA for more than 4 hours per day, 92 dBA for more than 1 hour per day, 96 dBA for more than 30 minutes per day, and up to 100 dBA for more than 15 minutes per day. The intention of these thresholds is to protect people from hearing losses resulting from occupational noise exposure.

4.2 State

4.2.1 State of California General Plan Guidelines

The State of California regulates vehicular and freeway noise affecting classrooms, sets standards for sound transmission and occupational noise control, and identifies noise insulation standards and airport noise/land-use compatibility criteria. The State of California General Plan Guidelines (State of California 2003), published by the Governor's Office of Planning and Research (OPR), also provides guidance for the acceptability of projects within specific CNEL/L_{dn} contours. The guidelines also present adjustment factors that may be used in order to arrive at noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution.

4.2.2 State Office of Planning and Research Noise Element Guidelines

The State OPR *Noise Element Guidelines* include recommended exterior and interior noise level standards for local jurisdictions to identify and prevent the creation of incompatible land uses due to noise. The Noise Element Guidelines contain a Land Use Compatibility table that describes the compatibility of various land uses with a range of environmental noise levels in terms of the CNEL.

4.2.3 California Department of Transportation

In 2020, the California Department of Transportation (Caltrans) published the Transportation and Construction Vibration Manual (Caltrans 2020b). The manual provides general guidance on vibration issues associated with the construction and operation of projects concerning human perception and structural damage. Table 2-2 above presents recommendations for levels of vibration that could result in damage to structures exposed to continuous vibration.

4.3 Local

4.3.1 Vallejo General Plan Nature and Built Environment Element

The City of Vallejo General Plan- Propel Vallejo General Plan 2040 is a roadmap that encompasses the hopes, aspirations, values and dreams of the Vallejo community. The Nature and Built Environment Element of the General Plan covers the state-mandated Noise Element. The City's land use compatibility standards for community noise environments are presented in Table NBE-1, California Land Use Compatibility for Community Noise Environments, of the City's Nature and Built Environment Element. This table lists normally acceptable, conditionally acceptable, normally unacceptable and clearly unacceptable noise levels for a variety of land uses.

Per Table NBE-1, a normally acceptable noise environment for the location of a school is 70 dBA CNEL or lower.

4.3.2 Vallejo Municipal Code

The City's regulations with respect to noise are also included in, Chapter 12.40, *Excavation, Grading and Filling, and* Chapter 16.502, *Performance Standards*, of the Municipal Code. The information applicable to the Project is as follows:

Section 12.40.070 limits grading and associated noise within a residential zone or within one thousand feet of any residential occupancy, hotel, motel or hospital between the hours of 7:00 a.m. and 6:00 p.m.

Section 16.502.09 provides exterior and interior noise standards for various land uses within the City and are presented in Table 4-1.

Table 4-1. Maximum Noise Level by Noise Zone

Noise Zoning Districts	Maximum Noise Level in dBA (level not to be exceeded more than 30 minutes in any hour)		Maximum Noise Level in dBA (level not to be exceeded more than 5 minutes in any hour)
	Measured at Property Line or District Boundary	Measured at Any Boundary of a Residential Zone	Between 10:00 p.m. and 7:00 a.m., Measured at Any Boundary of a Residential Zone
Single-Unit Residential	60	60	--
Multiple-Unit Residential	65	65	--
Commercial and Mixed-Use, Medical, Office	70	60	50 dBA or ambient noise level
Light Industrial	75	65	50 dBA or ambient noise level
General Industrial	75	65	50 dBA or ambient noise level
Public Facilities and Community Use	65	60	50 dBA or ambient noise level
Open Space and Recreational Districts	65	60	50 dBA or ambient noise level

Source: City of Vallejo Municipal Code 2022

Additionally, Section 16.502.09, presents the City's regulations pertaining to construction noise and are presented in Table 4-2 below.

Table 4-2. Maximum Noise Levels for Temporary Construction Activities

Time	**Zoning District**		
	Rural Residential, Uhvlghqwldo#Orz # Ghqvlw|	**Residential Medium Density, Residential Medium Density, Neighborhood Mixed Use, Neighborhood Commercial**	**Commercial (Including medical and office) and Industrial**
Mobile Construction Equipment			
Weekdays 7:00 a.m. to 6:00 p.m.	75 dBA	80 dBA	85 dBA
Saturdays 9:00 a.m. to 6:00 p.m.	60 dBA	65 dBA	70 dBA
Sundays and legal holidays	No Construction Allowed	No Construction Allowed	No Construction Allowed
Stationary Construction Equipment			
Weekdays 7:00 a.m. to 6:00 p.m.	60 dBA	65 dBA	70 dBA
Saturdays 9:00 a.m. to 6:00 p.m.	60 dBA	65 dBA	70 dBA
Sundays and legal holidays	No Construction Allowed	No Construction Allowed	No Construction Allowed

Source: City of Vallejo Municipal Code 2022

5.0 Impact Assessment

5.1 Thresholds of Significance

The impact analysis provided below is based on the following California Environmental Quality Act Guidelines Appendix G thresholds of significance. The Project would result in a significant noise-related impact if it would result in the:

1) 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.

2) Generation of excessive groundborne vibration or groundborne noise levels.

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 levels.

For purposes of this analysis, the City noise standards were used for evaluation of Project-related noise impacts. The proposed renovations would occur over two phases in order to maintain enough facilities to operate the educational program, and therefore would likely occur when school is in session. Since the Project is proposing improvements to its existing campus, the school itself will not be evaluated as a noise-sensitive land use.

5.2 Methodology

This analysis of the existing and future noise environments is based on empirical observations and noise prediction modeling. Predicted construction noise levels were calculated utilizing the FHWA's Roadway Construction Noise Model (2006). Groundborne vibration levels associated with construction-related activities for the Project have been evaluated utilizing typical groundborne vibration levels associated with construction equipment. Potential groundborne vibration impacts related to structural damage and human annoyance were evaluated, taking into account the distance from construction activities to nearby structures and typically applied criteria for structural damage and human annoyance.

An assessment of the noise/land use compatibility to locate sensitive noise receptors within the existing noise environment, was completed by conducting existing ambient baseline noise measurements around the Project Site with the use of a Larson Davis SoundExpert LxT precision sound level meter, which satisfies the American National Standards Institute standard for general environmental noise measurement instrumentation. Prior to the measurements, the SoundExpert LxT sound level meter was calibrated according to manufacturer specifications with a Larson Davis CAL200 Class I Calibrator. Transportation-source noise levels associated with the Project are assessed qualitatively as the Project would not increase the number of students that attend the school. Onsite stationary source noise levels have been calculated, due to the reconfiguration of the campus, with the SoundPLAN 3D noise model, which predicts noise propagation from a noise source based on the location, noise level, and frequency spectra of the noise sources as well as the geometry and reflective properties of the local terrain, buildings and barriers.

5.3 Impact Analysis

5.3.1 Would the Project Result in Short-Term Construction-Generated Noise in Excess of City Standards?

Onsite Construction Noise

Construction noise associated with the Proposed Project would be temporary and would vary depending on the specific nature of the activities being performed. Noise generated would primarily be associated with the operation of off-road equipment for onsite construction activities as well as construction vehicle traffic on area roadways. Construction noise typically occurs intermittently and varies depending on the nature or phase of construction (e.g., site preparation, excavation, paving). Noise generated by construction equipment, including earth movers, pile drivers, and portable generators, can reach high levels. Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Other primary sources of acoustical disturbance would be random incidents, which would last less than one minute (such as dropping large pieces of equipment or the hydraulic movement of machinery lifts). During construction, exterior noise levels could negatively affect sensitive land uses in the vicinity of the construction site.

As shown above, in Table 4-2, Maximum Noise Levels for Temporary Construction Activities, the City provides mobile and stationary construction noise standards for a variety of zoning districts. It is noted that Phase 1 Building Construction, Phase 1 Paving & Architectural Coating, and Phase 2 Construction are the only phases in which stationary equipment will be used. Per information provided by the Project applicant, Project construction would only take place on weekdays between the hours of 7:00 a.m. and 4:00 p.m. The proposed renovations would occur over two phases in order to maintain enough facilities to operate the educational program. The nearest off-site sensitive receptors to the Project Site are residences across Corcoran Avenue, north of the Project Site, and Loma Vista Elementary School across Rainier Avenue, east of the Project Site, both approximately 50 feet distant.

It is acknowledged that the majority of construction equipment is not situated at any one location during construction activities, but rather spread throughout the Project Site and at various distances from sensitive receptors. Therefore, this analysis employs the FTA guidance for calculating construction noise, which recommends measuring construction noise produced by all construction equipment simultaneously from the center of the Project Site (FTA 2018), which in this case is approximately 255 feet from the nearest sensitive receptor, residences across Corcoran Avenue. The anticipated short-term construction noise levels generated for the necessary equipment is presented in Table 5-1.

Table 5-1. Construction Average (dBA) Noise Levels at Nearest Receptors

Equipment	Estimated Exterior Construction Noise Level @ Closest Noise Sensitive Receptor (dBA L_{eq})	Construction Noise Standard (dBA L_{eq})	Exceeds Standards?
Phase 1			
Phase 1 Demolition- Mobile Equipment	73.0	*80*	**No**
Phase 1 Site Preparation- Mobile Equipment	73.5	*80*	**No**
Phase 1 Grading- Mobile Equipment	73.1	*80*	**No**
Phase 1 Building Construction- Mobile Equipment	73.6	*80*	**No**
Phase 1 Building Construction- Stationary Equipment	63.5	*65*	**No**
Phase 1 Paving & Architectural Coating- Mobile Equipment	72.4	*80*	**No**
Phase 1 Paving & Architectural Coating- Stationary Equipment	59.5	*65*	**No**
Phase 2			
Phase 2 Demolition- Mobile Equipment	72.3	*80*	**No**
Phase 2 Site Preparation- Mobile Equipment	73.5	*80*	**No**
Phase 2 Grading- Mobile Equipment	73.1	*80*	**No**
Phase 2 Construction- Mobile Equipment	73.6	*80*	**No**
Phase 2 Construction- Stationary Equipment	63.5	*65*	**No**

Source: Construction noise levels were calculated by ECORP Consulting using the FHWA Roadway Noise Construction Model (FHWA 2006). Refer to Attachment B for Model Data Outputs.

Notes: Construction equipment used during construction provided by PlaceWorks 2022. Consistent with FTA recommendations for calculating construction noise, construction noise was measured from the center of the Project Site (FTA 2018), which is 255 feet from the nearest receptor, the residences across Corcoran Avenue. Due to the rectangular shaped Project Site Loma Vista Elementary School is further in distance. Phase 1 paving and architectural coating are assumed to occur simultaneously.

L_{eq} = The equivalent energy noise level, is the average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.

As shown in Table 5-1, during construction activities no individual or cumulative piece of construction equipment would exceed the City's mobile or stationary construction noise standards. It is noted that construction noise was modeled on a worst-case basis. It is very unlikely that all pieces of construction equipment would be operating at the same time for the various phases of Project construction as well as at the point closest to residences.

While no noise standard would be exceeded by construction of the Proposed Project, the following best management practices are recommended during the times when construction occurs while school is in session.

Measure NOI-1: The following measures shall be applied to the Project during construction:

1. All construction equipment, fixed or mobile, will be equipped with properly operating and maintained mufflers, consistent with manufacturer standards.
2. All stationary construction equipment will be placed so that emitted noise is directed away from the noise sensitive receptors nearest the project site.
3. As applicable, shut off all equipment when not in use.
4. Equipment staging shall be located in areas that create the greatest distance between construction-related noise/vibration sources and sensitive receptors surrounding the project site.
5. Jackhammers, pneumatic equipment, and all other portable stationary noise sources will be directed away from occupied classrooms to the extent possible. Either one-inch plywood or sound blankets can be utilized for this purpose. They should reach up from the ground and block the line of sight between equipment and the nearest off-site residences. The shielding should be without holes and cracks.
6. No amplified music and/or voice will be allowed on the construction site.

Offsite Construction Worker Trips

Project construction would result in additional traffic on adjacent roadways over the period that construction occurs. According to the California Emissions Estimator Model Construction Off-Road Equipment Inputs provided by PlaceWorks (2022), the maximum number of construction workers traveling to and from the Project Site during a single construction phase would not be expected to exceed 81 daily trips in total (56 construction worker trips, 13 vendor trips and 12 haul truck trips). According to Caltrans Technical Noise Supplement to the Traffic Noise Analysis Protocol (2013), a doubling of traffic on a roadway is required to result in an increase of 3 dB (outside of the laboratory, a 3-dBA change is considered a just-perceivable difference). The Project Site is accessible from Corcoran Avenue. According to the City of Vallejo Traffic Counts (2008), Corcoran Avenue accommodates 5,261 average daily trips (City of Vallejo 2008). Thus, the Project construction would not result in a doubling of traffic, and therefore its contribution to existing traffic noise would not be perceptible. Additionally, it is noted that construction is temporary, and these trips would cease upon completion of the Project.

5.3.2 Would the Project Result in a Substantial Permanent Increase in Ambient Noise Levels in Excess of City Standards During Operations?

As previously described, noise-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 each be considered noise-sensitive and may warrant unique measures for protection from intruding noise. The nearest off-site sensitive receptors to the Project Site are residences across Corcoran Avenue, north of the Project Site, and Loma Vista Elementary School across Rainier Avenue, east of the Project Site.

Project Land Use Compatibility

The City of Vallejo uses the land use compatibility table presented in the Nature and Built Environment Element, which provides the City with a tool to gauge the compatibility of new land users relative to existing noise levels. This table identifies normally acceptable, conditionally acceptable, normally unacceptable and clearly unacceptable noise levels for various land uses, including those proposed by the Project. In the case that the noise levels identified at the Proposed Project Site fall within normally acceptable levels presented in the General Plan, the Project is considered compatible with the existing noise environment. As previously stated, the Project is proposing a near complete renovation of Mare Island Technical Academy campus. Per the General Plan, a normally acceptable noise level for uses such as that proposed by the Project is any noise level under 70 dBA CNEL.

In order to quantify existing ambient noise levels on the Project Site, ECORP conducted a long-term noise measurement starting on October 6, 2022. As shown in Table 3-1, the long-term ambient recorded noise measurement directly adjacent to the Project Site measured 63.8 dBA over the course of a school day. As this noise level falls below the normally acceptable noise standard of 70 dBA CNEL, the Project Site is considered an appropriate noise environment to locate the proposed land use. Additionally, the Project Site is currently an existing school and is predominately surrounded by other education facilities and residential land uses, and thus would be compatible with the existing noise environment.

Operational Traffic Noise

As previously stated, the Project does not anticipate to increase the number of students that attend Mare Island Technology Academy. Thus, there would be no increase over existing conditions to the number of operational trips generated by the Project.

Operational Noise

The Project is proposing a near complete renovation and reconfiguration of the school’s campus. Specifically, the construction of a total of 45 new classrooms, a science building, an administration building, a multipurpose building, a gymnasium, soccer field, outdoor play fields, on-site parking, improved vehicle circulation, landscaping, walkways, and other amenities. The Project is not anticipating increasing the number of students that attend the school.

On-site noise associated with the Proposed Project has been calculated using the SoundPLAN 3D noise model. Although already an existing school, the reconfiguration of the Project Site could potentially result in a change in the ambient noise environment in a manner that results in an impact to noise-sensitive receptors located in the vicinity. Two scenarios were modeled to account for the main noise producing activities on the site; school drop off/ pickup and lunch/recess. The school drop off/ pickup scenario modeled area sources encompassing both new parking lot/ drop off areas using representative reference noise measurements taken by ECORP Consulting, Inc. at an elementary school during morning drop off. The lunch/recess scenario modeled area sources encompassing the new soccer field and courtyard/ basketball courts using representative reference noise measurements taken by ECORP Consulting, Inc. at Mare Island Technical Academy during lunch/recess. It is noted that the Project will be constructed in two phases and noise modeling for both scenarios (school drop off/ pickup and lunch/recess) account for full buildout of the Project Site.

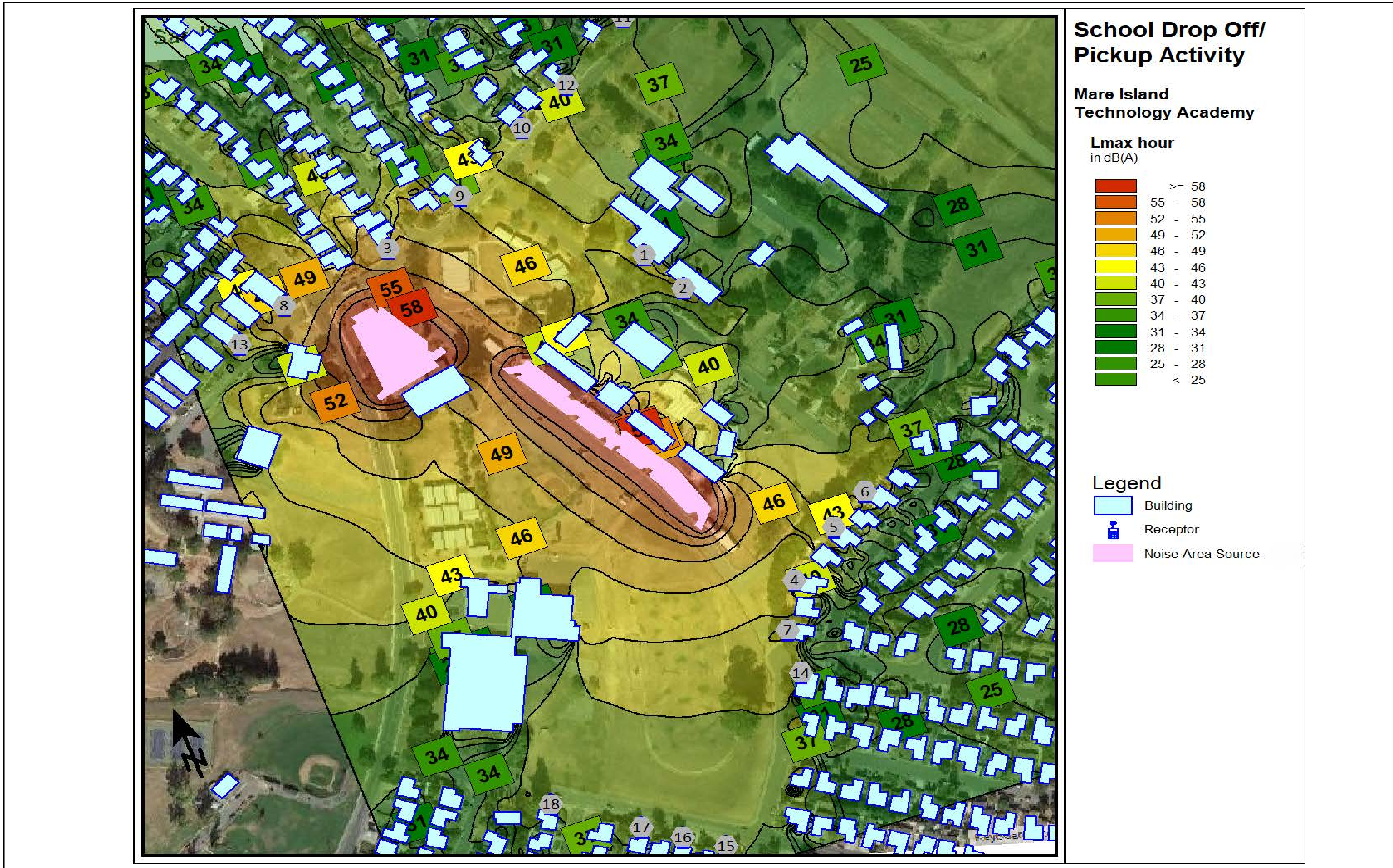
Table 5-2 shows the predicted Project noise levels for each scenario at 18 noise-sensitive locations in the Project vicinity, as predicted by SoundPLAN. These 18 noise-sensitive locations represent nearby residences and Loma Vista Elementary School located east of the Project Site, across Rainier Avenue. Additionally, noise contour graphics for each scenario (see Figure 5-1 and Figure 5-2) have been prepared to provide a visual depiction of the predicted noise levels in the Project vicinity from Project operations.

Table 5-2. Modeled Operational Daytime Noise Levels

Location	Modeled Operational Noise: School Drop Off/ Pickup Activity (dBA L_{eq})	Modeled Operational Noise: Lunch/Recess Activity (dBA L_{eq})	City Daytime Exterior Noise Standards (dBA L_{eq})	Exceed Daytime Exterior Standard?
#1 (Loma Vista Elementary School)	43.9	56.9	*65 dBA*	**No**
#2 (Loma Vista Elementary School)	42.5	55.9	*65 dBA*	**No**
#3	51.8	58.5	*60 dBA*	**No**
#4	45.8	47.7	*60 dBA*	**No**
#5	45.2	48.6	*60 dBA*	**No**
#6	42.3	48.2	*60 dBA*	**No**
#7	44.1	46.9	*60 dBA*	**No**
#8	48.8	52.5	*60 dBA*	**No**
#9	45.4	57.8	*60 dBA*	**No**
#10	41.3	51.5	*60 dBA*	**No**
#11	36.8	45.5	*60 dBA*	**No**
#12	39.5	48.9	*60 dBA*	**No**
#13	45.2	50.7	*60 dBA*	**No**
#14	40.6	44.8	*60 dBA*	**No**
#15	39.2	43.3	*60 dBA*	**No**
#16	39.4	42.9	*60 dBA*	**No**
#17	39.4	43.7	*60 dBA*	**No**
#18	39.9	44.1	*60 dBA*	**No**

Source: SounPLAN v 8.2. Refer to Attachment C for Model Data Outputs.

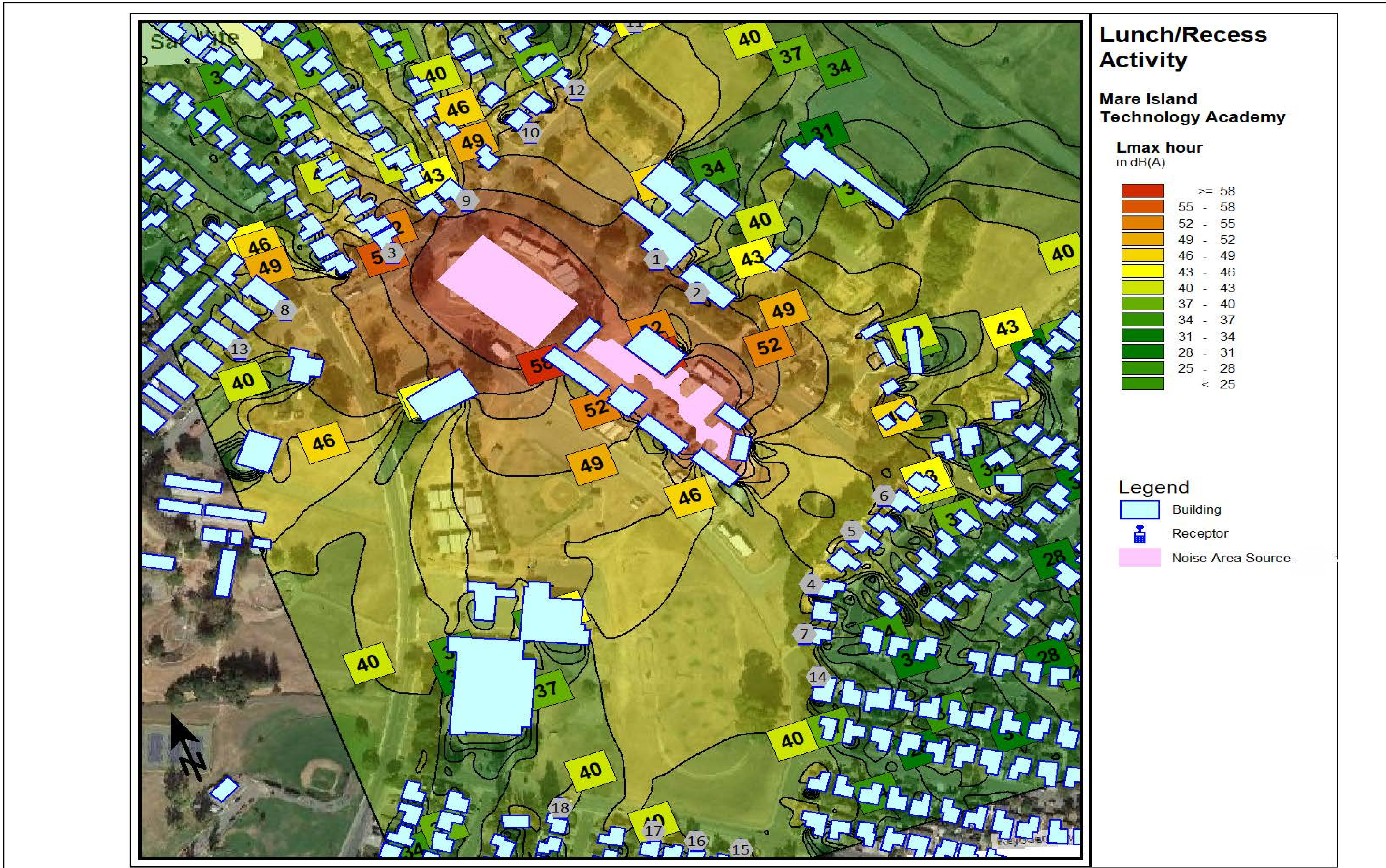
As shown in Table 5-2, Project operational noise would not exceed the maximum noise level standards at any of the nearest noise-sensitive receptors during school drop off/ pick up or lunch/recess activities (see Table 4-1 for City noise standards).



Map Date: 10/14/2022
Photo (or Base) Source: *SoundPLAN*

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

Figure 5-1. Modeled Operational Noise Levels- School Drop Off/ Pickup Activity



Map Date: 10/14/2022
Photo (or Base) Source: *SoundPLAN*

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Figure 5-2. Modeled Operational Noise Levels- Lunch/Recess Activity

2022-236 Mare Island Technical Academy

5.3.3 Would the Project Expose Structures to Substantial Groundborne Vibration During Construction?

Excessive groundborne vibration impacts result from continuously occurring vibration levels. Increases in groundborne vibration levels attributable to the Project would be primarily associated with short-term construction-related activities. Construction on the Project Site would have the potential to result in varying degrees of temporary groundborne vibration, depending on the specific construction equipment used and the operations involved. Ground vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance.

Construction-related ground vibration is normally associated with impact equipment such as pile drivers, jackhammers, and the operation of some heavy-duty construction equipment, such as dozers and trucks. It is not anticipated that pile drivers would be necessary during Project construction. Vibration decreases rapidly with distance, and it is acknowledged that construction activities would occur throughout the Project Site and would not be concentrated at the point closest to sensitive receptors. Groundborne vibration levels associated with construction equipment are summarized in Table 5-3.

Table 5-3. Representative Vibration Source Levels for Construction Equipment

Equipment Type	Peak Particle Velocity at 25 Feet (inches per second)
Large Bulldozer	0.089
Pile Driver	0.170
Loaded Trucks	0.076
Hoe Ram	0.089
Jackhammer	0.035
Small Bulldozer/Tractor	0.003
Vibratory Roller	0.210

Source: FTA 2018; Caltrans 2020b

The City of Vallejo does not regulate or have a numeric threshold associated with construction vibrations. However, a discussion of construction vibration is included for full disclosure purposes. For comparison purposes, the Caltrans (2020b) recommended standard of 0.3 inches per second PPV with respect to the prevention of structural damage for older residential buildings is used as a threshold. This is also the level at which vibrations may begin to annoy people in buildings. Consistent with FTA recommendations for calculating construction vibration, construction vibration was measured from the center of the Project Site (FTA 2018). The nearest structure of concern to the construction site, with regard to groundborne vibrations, are the residences across Corcoran Avenue approximately 255 feet from the Project Site center.

Based on the representative vibration levels presented for various construction equipment types in Table 5-3 and the construction vibration assessment methodology published by the FTA (2018), it is possible to estimate the potential project construction vibration levels. The FTA provides the following equation:

$$[PPVequip = PPVref \times (25/D)^{1.5}]$$

Table 5-4 presents the expected Project related vibration levels at a distance of 255 feet.

Table 5-4 Construction Vibration Levels at 255 Feet

Receiver PPV Levels (in/sec)[1]					Peak Vibration	Threshold	Exceed Threshold?
Large Bulldozer, Caisson Drilling, & Hoe Ram	**Loaded Trucks**	**Jackhammer**	**Pile Driver**	**Vibratory Roller**			
0.003	0.002	0.001	0.006	0.007	**0.007**	*0.2*	**No**

Notes: [1]Based on the Vibration Source Levels of Construction Equipment included on Table 5-4 (FTA 2018). Distance to the nearest structure of concern is approximately 255 feet measured from Project Site center.

As shown in Table 5-4, vibration as a result of onsite construction activities on the Project Site would not exceed 0.3 PPV at the nearest structure. Thus, onsite Project construction would not exceed the recommended threshold.

5.3.4 Would the Project Expose Structures to Substantial Groundborne Vibration During Operations?

The Project is proposing a near complete renovation of Mare Island Technical Academy campus. Project operations would not include the use of any large-scale stationary equipment that would result in excessive vibration levels. Therefore, the Project would not result groundborne vibration impacts during operations.

5.3.5 Would the Project Expose People Residing or Working in the Project area to Excessive Airport Noise?

The Project Site is located approximately 4.52 miles north of the Napa County Airport. The Project Site is not located within an airport land use plan and is not within two miles of an airport. Implementation of the Proposed Project would not affect airport operations, nor result in increased exposure of those on the Project Site to aircraft noise.

6.0 REFERENCES

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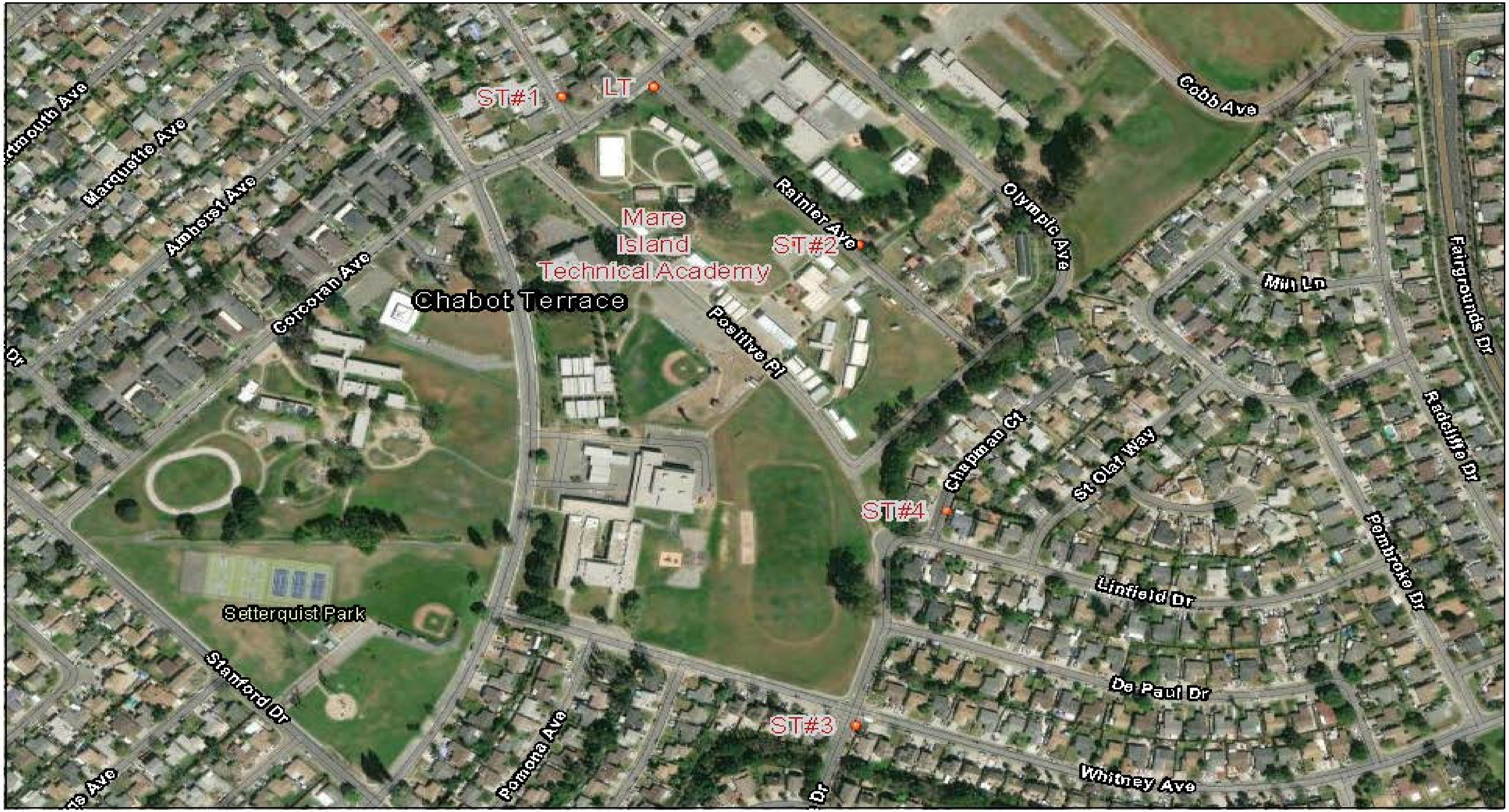
Western Electro-Acoustic Laboratory, Inc. 2000. Sound Transmission Sound Test Laboratory Report No. TL 96-186.

LIST OF ATTACHMENTS

ATTACHMENT A

Baseline (Existing) Noise Measurements – Project Site and Vicinity

Mare Island Technical Academy Baseline Noise Measurement Locations



10/10/2022

Mare Island Technical Academy Baseline Noise Measurement Locations

1:5,558

0 0.04 0.07 0.14 mi

0 0.05 0.1 0.2 km

Esri Community Maps Contributors, County of Solano, California State Parks, © OpenStreetMap, Microsoft, Esri, HERE, Garmin, SafeGraph,

Map Date: *10/10/2022*
Photo (or Base) Source: *ARCGIS Online 2022*

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Baseline Noise Measurement Locations

2022-283 Mare Island Technical Academy

Site Number: Long Term #1

Recorded By: Anaya Ward

Job Number: 2022-236 Mare Island Technical Academy

Date: 10/6/2022

Time: 9:48 a.m. – 3:48 p.m.

Location: South corner of Cochran Avenue and Rainier Avenue

Source of Peak Noise: Automobile traffic on Cochran Avenue. Student activity at Mare Island Technical Academy

Noise Data			
Leq (dB)	**Lmin (dB)**	**Lmax (dB)**	**Peak (dB)**
63.8	44.2	92.5	117.4

Equipment						
Category	**Type**	**Vendor**	**Model**	**Serial No.**	**Cert. Date**	**Note**
Sound	Sound Level Meter	**Larson Davis**	**LxT SE**	**0005120**	**11/29/2021**	
	Microphone	**Larson Davis**	**377B02**	**334361**	**11/30/2021**	
	Preamp	**Larson Davis**	**PRMLxT1L**	**042852**	**11/30/2021**	
	Calibrator	**Larson Davis**	**CAL200**	**14105**	**11/10/2021**	

Weather Data			
Est.	**Duration:** 6 Hours		**Sky:** Clear
	Note: dBA Offset = 0.01		**Sensor Height (ft):** 4 feet
	Wind Ave Speed (mph)	**Temperature (degrees Fahrenheit)**	**Barometer Pressure (hPa)**
	3 - 6	62 - 80	30.06

Photo of Measurement Location

Measurement Report

Report Summary

Meter's File Name	LxT_Data.450	Computer's File Name	SLM_0005120_LxT_Data_450.00.ldbin
Meter	LxT SE		
Firmware	2.404		
User	A Ward	Location	
Description	Mare Island Technical Academy		
Note			

Start Time	2022-10-06 09:48:12	Duration	6:00:00.0		
End Time	2022-10-06 15:48:12	Run Time	6:00:00.0	Pause Time	0:00:00.0

Results

Overall Metrics

LA_{eq}	63.8 dB		
LAE	107.1 dB	SEA	--- dB
EA	5.7 mPa²h		
LZ_{peak}	117.4 dB	2022-10-06 15:40:33	
LAS_{max}	92.5 dB	2022-10-06 15:40:34	
LAS_{min}	44.2 dB	2022-10-06 09:56:40	
LA_{eq}	63.8 dB		
LC_{eq}	71.1 dB	LC_{eq} - LA_{eq}	7.3 dB
LAI_{eq}	66.5 dB	LAI_{eq} - LA_{eq}	2.7 dB

Exceedances

Exceedances	Count	Duration
LAS > 85.0 dB	4	0:00:13.5
LAS > 115.0 dB	0	0:00:00.0
LZpeak > 135.0 dB	0	0:00:00.0
LZpeak > 137.0 dB	0	0:00:00.0
LZpeak > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight	
63.8 dB	63.8 dB	0.0 dB	

LDEN	LDay	LEve	LNight
63.8 dB	63.8 dB	--- dB	--- dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	63.8 dB		71.1 dB		--- dB	
$Ls_{(max)}$	92.5 dB	2022-10-06 15:40:34	--- dB		--- dB	
$LS_{(min)}$	44.2 dB	2022-10-06 09:56:40	--- dB		--- dB	
$L_{Peak(max)}$	--- dB		--- dB		117.4 dB	2022-10-06 15:40:33

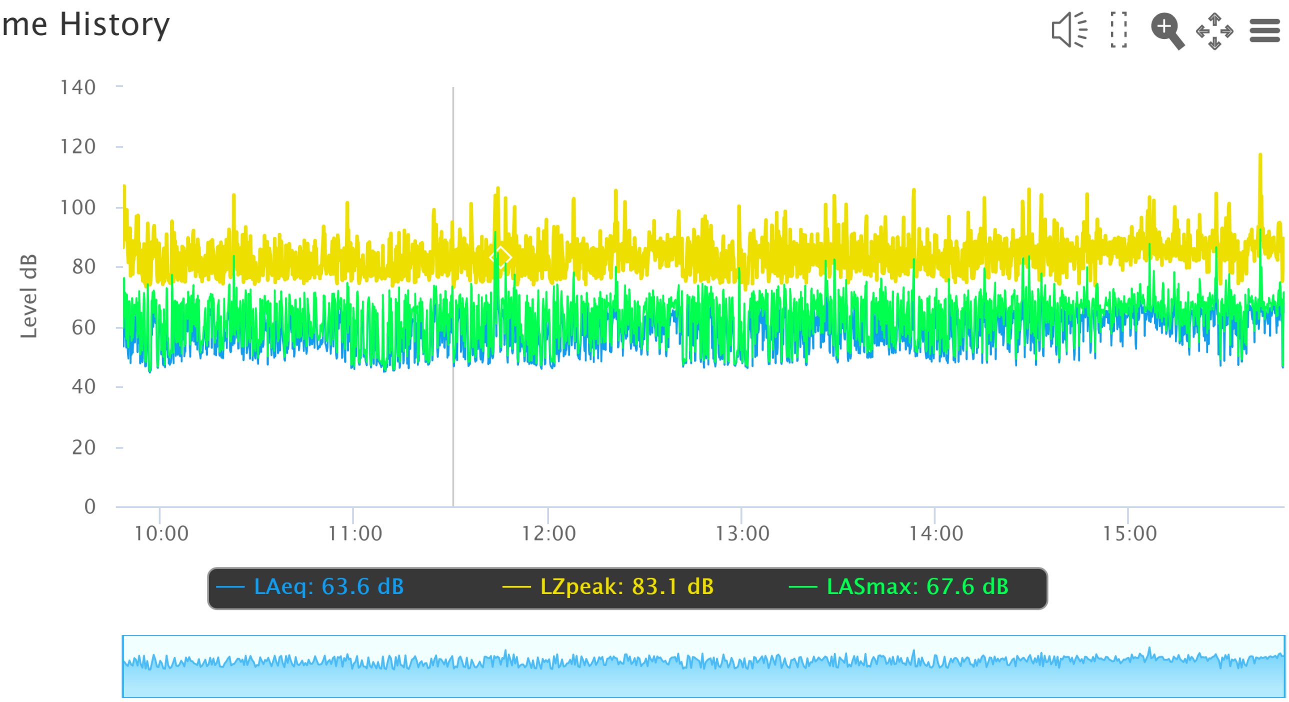
Overloads

Count	Duration	OBA Count	OBA Duration
0	0:00:00.0	0	0:00:00.0

Statistics

LAS 5.0	68.8 dB
LAS 10.0	66.9 dB
LAS 33.3	60.8 dB
LAS 50.0	56.7 dB
LAS 66.6	52.9 dB
LAS 90.0	48.2 dB

Time History



Site Number: Short Term #1			
Recorded By: Seth Myers			
Job Number: 2022-236 Mare Island Technical Academy			
Date: 10/7/2022			
Time: 10:47 a.m. – 11:02 a.m.			
Location: Approximately 35 feet northwest of Redwing Street and Cochran Avenue			
Source of Peak Noise: Automobile traffic on Cochran Avenue			
Noise Data			
Leq (dB)	**Lmin (dB)**	**Lmax (dB)**	**Peak (dB)**
52.5	41.1	71.1	98.2

Equipment						
Category	**Type**	**Vendor**	**Model**	**Serial No.**	**Cert. Date**	**Note**
Sound	Sound Level Meter	**Larson Davis**	**LxT SE**	**0005120**	**11/29/2021**	
	Microphone	**Larson Davis**	**377B02**	**334361**	**11/30/2021**	
	Preamp	**Larson Davis**	**PRMLxT1L**	**042852**	**11/30/2021**	
	Calibrator	**Larson Davis**	**CAL200**	**14105**	**11/10/2021**	

Weather Data			
Est.	**Duration:** 15 Minutes		**Sky:** Clear
	Note: dBA Offset = 0.05		**Sensor Height (ft):** 4 feet
	Wind Ave Speed (mph)	**Temperature (degrees Fahrenheit)**	**Barometer Pressure (hPa)**
	Calm	61	29.99

Photo of Measurement Location

Measurement Report

Report Summary

Meter's File Name	LxT_Data.451	Computer's File Name	SLM_0005120_LxT_Data_451.00.ldbin
Meter	LxT SE		
Firmware	2.404		
User	S Myers	Location	
Description	Mare Island Technical Academy		
Note			

Start Time	2022-10-07 10:47:59	Duration	0:15:00.0		
End Time	2022-10-07 11:02:59	Run Time	0:15:00.0	Pause Time	0:00:00.0

Results

Overall Metrics

LA_{eq}	52.5 dB		
LAE	82.1 dB	SEA	--- dB
EA	17.9 µPa²h		
LZ_{peak}	98.2 dB	2022-10-07 10:50:05	
LAS_{max}	71.1 dB	2022-10-07 10:50:05	
LAS_{min}	41.1 dB	2022-10-07 10:54:10	
LA_{eq}	52.5 dB		
LC_{eq}	67.9 dB	LC_{eq} - LA_{eq}	15.3 dB
LAI_{eq}	55.0 dB	LAI_{eq} - LA_{eq}	2.5 dB

Exceedances

Exceedances	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LZpeak > 135.0 dB	0	0:00:00.0
LZpeak > 137.0 dB	0	0:00:00.0
LZpeak > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight	
52.5 dB	52.5 dB	0.0 dB	

LDEN	LDay	LEve	LNight
52.5 dB	52.5 dB	--- dB	--- dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	52.5 dB		67.9 dB		--- dB	
$Ls_{(max)}$	71.1 dB	2022-10-07 10:50:05	--- dB		--- dB	
$LS_{(min)}$	41.1 dB	2022-10-07 10:54:10	--- dB		--- dB	
$L_{Peak(max)}$	--- dB		--- dB		98.2 dB	2022-10-07 10:50:05

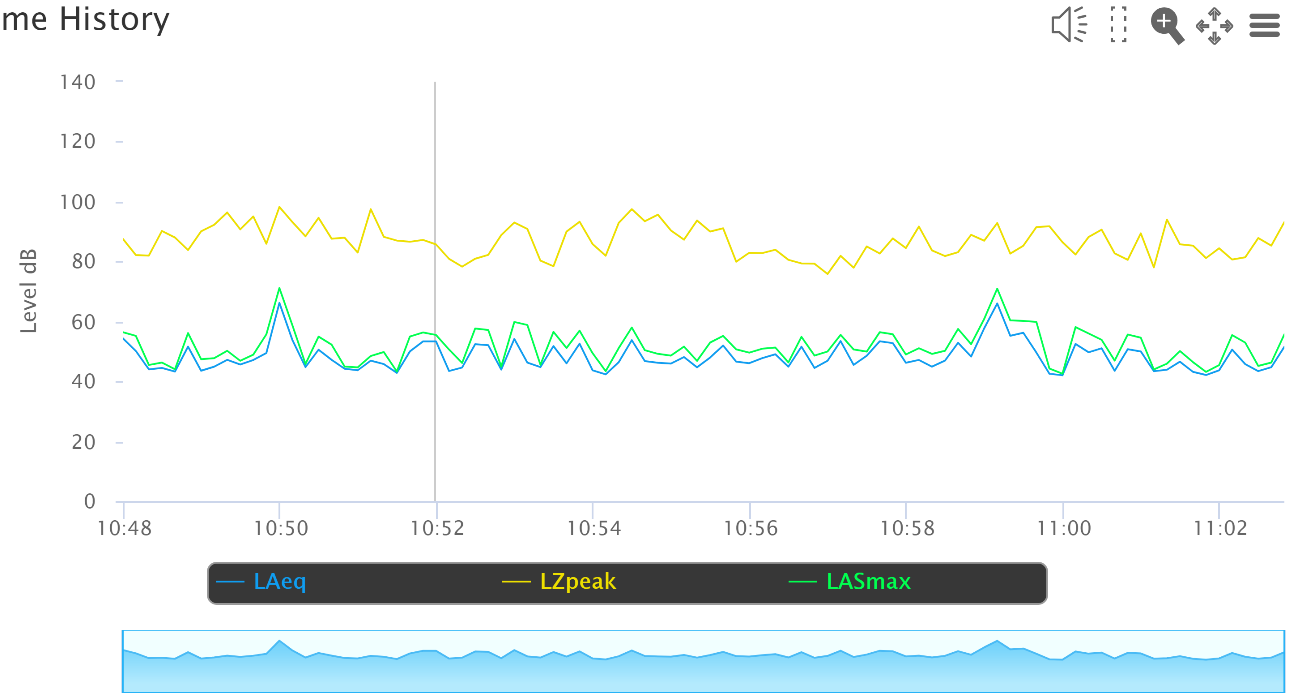
Overloads

Count	Duration	OBA Count	OBA Duration
0	0:00:00.0	0	0:00:00.0

Statistics

LAS 5.0	56.3 dB
LAS 10.0	54.5 dB
LAS 33.3	48.2 dB
LAS 50.0	45.9 dB
LAS 66.6	44.7 dB
LAS 90.0	43.0 dB

Time History



Site Number: Short Term #2
Recorded By: Seth Myers
Job Number: 2022-236 Mare Island Technical Academy
Date: 10/7/2022
Time: 11:07 a.m. – 11:22 a.m.
Location: Rainier Avenue, at the western corner of Loma Rica Farms. Across the roadway from Mare Island Technical Academy
Source of Peak Noise: Student Recess. School Landscaping Equipment

Noise Data			
Leq (dB)	**Lmin (dB)**	**Lmax (dB)**	**Peak (dB)**
50.8	43.9	64.3	93.7

Equipment						
Category	**Type**	**Vendor**	**Model**	**Serial No.**	**Cert. Date**	**Note**
Sound	Sound Level Meter	**Larson Davis**	**LxT SE**	**0005120**	**11/29/2021**	
	Microphone	**Larson Davis**	**377B02**	**334361**	**11/30/2021**	
	Preamp	**Larson Davis**	**PRMLxT1L**	**042852**	**11/30/2021**	
	Calibrator	**Larson Davis**	**CAL200**	**14105**	**11/10/2021**	

Weather Data			
Est.	**Duration:** 15 Minutes		**Sky:** Clear
	Note: dBA Offset = 0.05		**Sensor Height (ft):** 4 feet
	Wind Ave Speed (mph)	**Temperature (degrees Fahrenheit)**	**Barometer Pressure (hPa)**
	3	62	29.99

Photo of Measurement Location

Measurement Report

Report Summary

Meter's File Name	LxT_Data.452	Computer's File Name	SLM_0005120_LxT_Data_452.00.ldbin
Meter	LxT SE		
Firmware	2.404		
User	S Myers	Location	
Description	Mare Island Technical Academy		
Note			

Start Time	2022-10-07 11:07:54	Duration	0:15:00.0		
End Time	2022-10-07 11:22:54	Run Time	0:15:00.0	Pause Time	0:00:00.0

Results

Overall Metrics

LA_{eq}	50.8 dB		
LAE	80.3 dB	SEA	--- dB
EA	12.0 µPa²h		
LZ_{peak}	97.3 dB	2022-10-07 11:08:08	
LAS_{max}	64.3 dB	2022-10-07 11:20:47	
LAS_{min}	43.9 dB	2022-10-07 11:17:33	
LA_{eq}	50.8 dB		
LC_{eq}	62.1 dB	LC_{eq} - LA_{eq}	11.3 dB
LAI_{eq}	56.0 dB	LAI_{eq} - LA_{eq}	5.2 dB

Exceedances

Exceedances	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LZpeak > 135.0 dB	0	0:00:00.0
LZpeak > 137.0 dB	0	0:00:00.0
LZpeak > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight
50.8 dB	50.8 dB	0.0 dB

LDEN	LDay	LEve	LNight
50.8 dB	50.8 dB	--- dB	--- dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	50.8 dB		62.1 dB		--- dB	
$Ls_{(max)}$	64.3 dB	2022-10-07 11:20:47	--- dB		--- dB	
$LS_{(min)}$	43.9 dB	2022-10-07 11:17:33	--- dB		--- dB	
$L_{Peak(max)}$	--- dB		--- dB		97.3 dB	2022-10-07 11:08:08

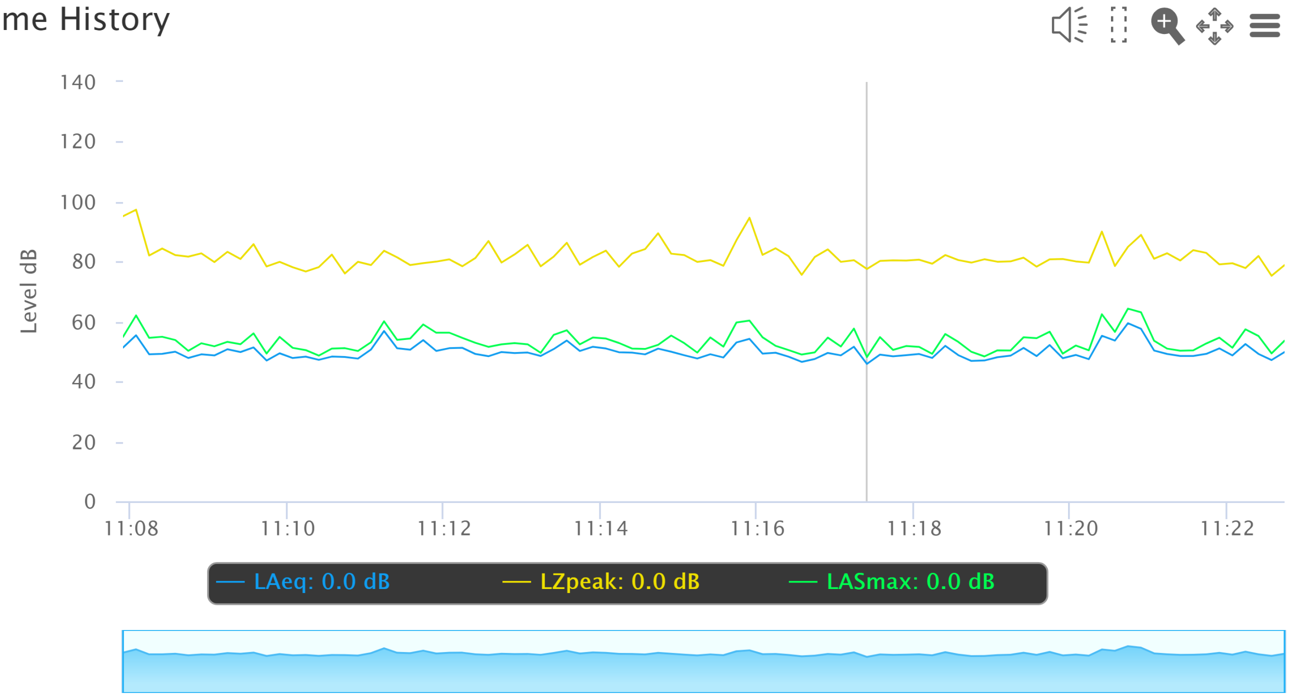
Overloads

Count	Duration	OBA Count	OBA Duration
0	0:00:00.0	0	0:00:00.0

Statistics

LAS 5.0	54.6 dB
LAS 10.0	53.0 dB
LAS 33.3	49.9 dB
LAS 50.0	48.8 dB
LAS 66.6	48.0 dB
LAS 90.0	46.6 dB

Time History



Site Number: Short Term #3			
Recorded By: Seth Myers			
Job Number: 2022-236 Mare Island Technical Academy			
Date: 10/7/2022			
Time: 11:29 a.m. – 11:44 a.m.			
Location: Southeastern corner of Olympic Avenue and Whitney Avenue			
Source of Peak Noise: Automobile traffic on Whitney Avenue. Operating PA system broadcasting music at Mare Island Technical Academy			
Noise Data			
Leq (dB)	**Lmin (dB)**	**Lmax (dB)**	**Peak (dB)**
62.3	44.6	49.8	100.5

Equipment						
Category	**Type**	**Vendor**	**Model**	**Serial No.**	**Cert. Date**	**Note**
Sound	Sound Level Meter	**Larson Davis**	**LxT SE**	**0005120**	**11/29/2021**	
	Microphone	**Larson Davis**	**377B02**	**334361**	**11/30/2021**	
	Preamp	**Larson Davis**	**PRMLxT1L**	**042852**	**11/30/2021**	
	Calibrator	**Larson Davis**	**CAL200**	**14105**	**11/10/2021**	

Weather Data			
Est.	**Duration:** 15 Minutes		**Sky:** Clear
	Note: dBA Offset = 0.05		**Sensor Height (ft):** 4 feet
	Wind Ave Speed (mph)	**Temperature (degrees Fahrenheit)**	**Barometer Pressure (hPa)**
	4	63	29.99

Photo of Measurement Location

Measurement Report

Report Summary

Meter's File Name	LxT_Data.453	Computer's File Name	SLM_0005120_LxT_Data_453.00.ldbin
Meter	LxT SE		
Firmware	2.404		
User	S Myers	Location	
Description	Mare Island Technical Academy		
Note			

Start Time	2022-10-07 11:29:14	Duration	0:15:00.0		
End Time	2022-10-07 11:44:14	Run Time	0:15:00.0	Pause Time	0:00:00.0

Results

Overall Metrics

LA_{eq}	62.3 dB		
LAE	91.9 dB	SEA	--- dB
EA	171.5 µPa²h		
LZ_{peak}	100.5 dB	2022-10-07 11:29:20	
LAS_{max}	79.8 dB	2022-10-07 11:33:16	
LAS_{min}	44.6 dB	2022-10-07 11:31:40	
LA_{eq}	62.3 dB		
LC_{eq}	71.5 dB	LC_{eq} - LA_{eq}	9.2 dB
LAI_{eq}	64.2 dB	LAI_{eq} - LA_{eq}	1.9 dB

Exceedances

Exceedances	Count	Duration
LAS > 85.0 dB	0	0:00:00.0
LAS > 115.0 dB	0	0:00:00.0
LZpeak > 135.0 dB	0	0:00:00.0
LZpeak > 137.0 dB	0	0:00:00.0
LZpeak > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight	
62.3 dB	62.3 dB	0.0 dB	

LDEN	LDay	LEve	LNight
62.3 dB	62.3 dB	--- dB	--- dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	62.3 dB		71.5 dB		--- dB	
$L_{S(max)}$	79.8 dB	2022-10-07 11:33:16	--- dB		--- dB	
$L_{S(min)}$	44.6 dB	2022-10-07 11:31:40	--- dB		--- dB	
$L_{Peak(max)}$	--- dB		--- dB		100.5 dB	2022-10-07 11:29:20

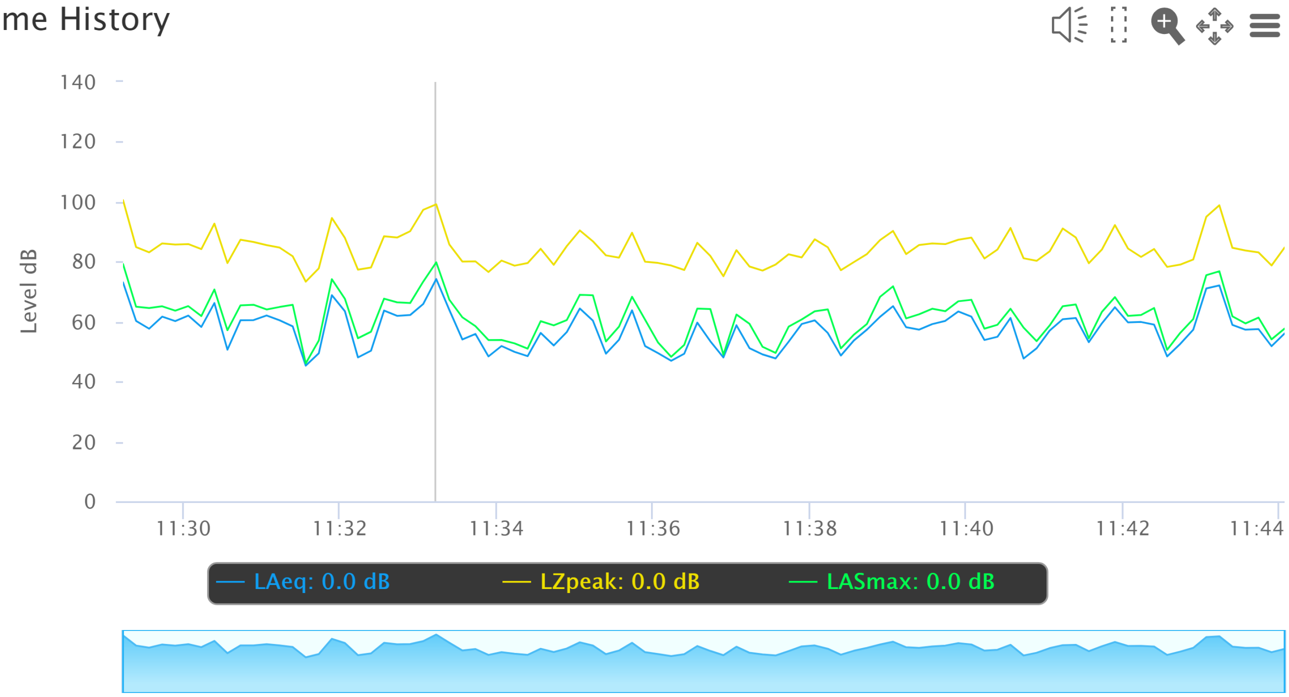
Overloads

Count	Duration	OBA Count	OBA Duration
0	0:00:00.0	0	0:00:00.0

Statistics

LAS 5.0	66.9 dB
LAS 10.0	64.2 dB
LAS 33.3	59.1 dB
LAS 50.0	56.0 dB
LAS 66.6	52.8 dB
LAS 90.0	47.9 dB

Time History



Site Number: Short Term #4			
Recorded By: Seth Myers			
Job Number: 2022-236 Mare Island Technical Academy			
Date: 10/7/2022			
Time: 11:47 a.m. – 12:02 p.m.			
Location: On Chapman Court. Approximately 35 feet north of Chapman Court/Linfield Drive Intersection			
Source of Peak Noise: Automobile traffic on Linfield Drive. Dog barking. Distant student activity.			
Noise Data			
Leq (dB)	**Lmin (dB)**	**Lmax (dB)**	**Peak (dB)**
48.9	41.7	66.0	93.9

Equipment						
Category	**Type**	**Vendor**	**Model**	**Serial No.**	**Cert. Date**	**Note**
Sound	Sound Level Meter	**Larson Davis**	**LxT SE**	**0005120**	**11/29/2021**	
	Microphone	**Larson Davis**	**377B02**	**334361**	**11/30/2021**	
	Preamp	**Larson Davis**	**PRMLxT1L**	**042852**	**11/30/2021**	
	Calibrator	**Larson Davis**	**CAL200**	**14105**	**11/10/2021**	

Weather Data			
Est.	**Duration:** 15 Minutes		**Sky:** Clear
	Note: dBA Offset = 0.05		**Sensor Height (ft):** 4 feet
	Wind Ave Speed (mph)	**Temperature (degrees Fahrenheit)**	**Barometer Pressure (hPa)**
	4	66	29.99

Photo of Measurement Location

Measurement Report

Report Summary

Meter's File Name	LxT_Data.454	Computer's File Name	SLM_0005120_LxT_Data_454.00.ldbin
Meter	LxT SE		
Firmware	2.404		
User	S Myers	Location	
Description	Mare Island Technical Academy		
Note			

Start Time	2022-10-07 11:47:26	Duration	0:15:00.0		
End Time	2022-10-07 12:02:26	Run Time	0:15:00.0	Pause Time	0:00:00.0

Results

Overall Metrics

LA_{eq}	48.9 dB		
LAE	78.5 dB	SEA	--- dB
EA	7.8 µPa²h		
LZ_{peak}	93.9 dB	2022-10-07 11:51:46	
LAS_{max}	66.0 dB	2022-10-07 12:00:16	
LAS_{min}	41.7 dB	2022-10-07 12:00:03	
LA_{eq}	48.9 dB		
LC_{eq}	59.0 dB	LC_{eq} - LA_{eq}	10.0 dB
LAI_{eq}	55.1 dB	LAI_{eq} - LA_{eq}	6.1 dB

Exceedances		Count	Duration
LAS >	85.0 dB	0	0:00:00.0
LAS >	115.0 dB	0	0:00:00.0
LZpeak >	135.0 dB	0	0:00:00.0
LZpeak >	137.0 dB	0	0:00:00.0
LZpeak >	140.0 dB	0	0:00:00.0

Community Noise	LDN	LDay	LNight	
	48.9 dB	48.9 dB	0.0 dB	
	LDEN	**LDay**	**LEve**	**LNight**
	48.9 dB	48.9 dB	--- dB	--- dB

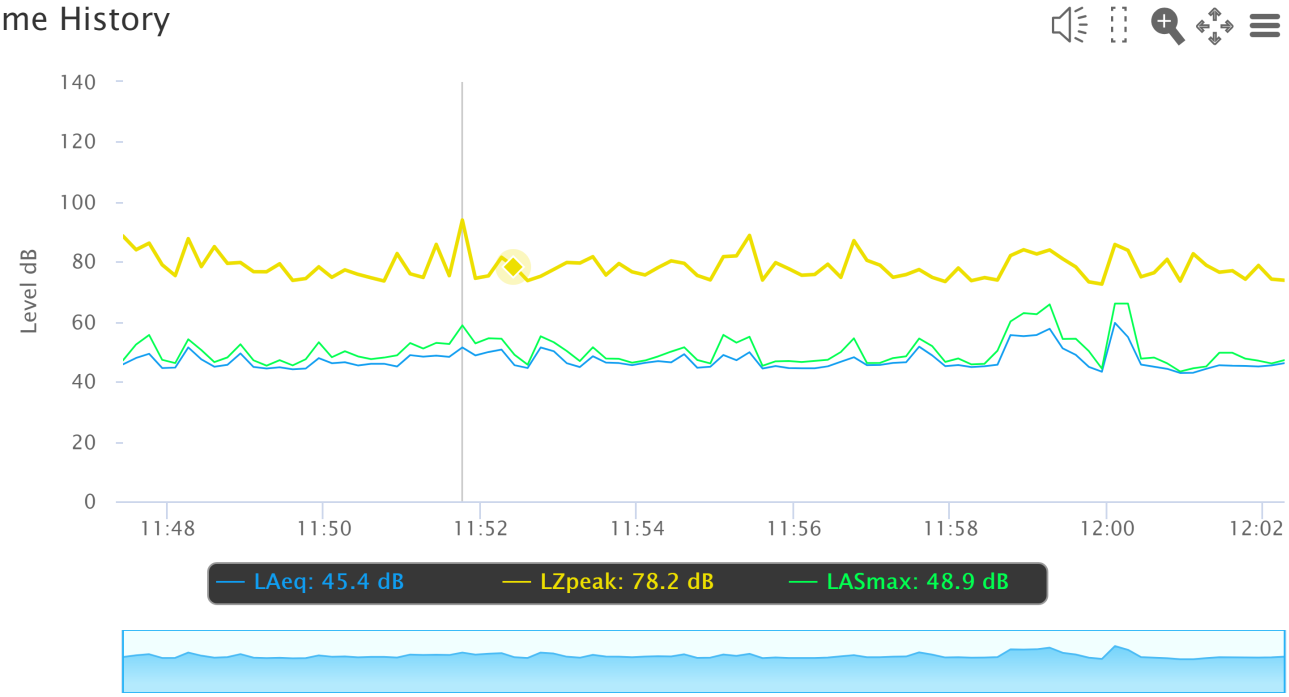
Any Data	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	48.9 dB		59.0 dB		--- dB	
$L_{S(max)}$	66.0 dB	2022-10-07 12:00:16	--- dB		--- dB	
$L_{S(min)}$	41.7 dB	2022-10-07 12:00:03	--- dB		--- dB	
$L_{Peak(max)}$	--- dB		--- dB		93.9 dB	2022-10-07 11:51:46

Overloads	Count	Duration	OBA Count	OBA Duration
	0	0:00:00.0	0	0:00:00.0

Statistics

LAS 5.0	52.9 dB
LAS 10.0	50.8 dB
LAS 33.3	46.5 dB
LAS 50.0	45.6 dB
LAS 66.6	44.9 dB
LAS 90.0	43.9 dB

Time History



ATTACHMENT B

Federal Highway Administration Roadway Construction Noise Outputs

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 10/10/2022
Case Description: Phase 1 Demolition- Mobile Equipment

Description	**Affected Land Use**
Phase 1 Demolition- Mobile Equipment	Residential

Description	**Impact Device**	**Usage(%)**	**Equipment Spec Lmax (dBA)**	**Actual Lmax (dBA)**	**Receptor Distance (feet)**
Concrete Saw	No	20		89.6	255
Excavator	No	40		80.7	255
Excavator	No	40		80.7	255
Excavator	No	40		80.7	255
Tractor	No	40	84		255
Tractor	No	40	84		255

Calculated (dBA)

Equipment		***Lmax**	**Leq**
Concrete Saw		75.4	68.4
Excavator		66.6	62.6
Excavator		66.6	62.6
Excavator		66.6	62.6
Tractor		69.8	65.9
Tractor		69.8	65.9
	Total	**75.4**	**73**

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 10/10/2022
Case Description: Phase 1 Site Preparation- Mobile Equipment

Description	**Affected Land Use**
Phase 1 Site Preparation- Mobile Equipment	Residential

Description	**Impact Device**	**Usage(%)**	**Equipment Spec Lmax (dBA)**	**Actual Lmax (dBA)**	**Receptor Distance (feet)**
Dozer	No	40		81.7	255
Dozer	No	40		81.7	255
Dozer	No	40		81.7	255
Tractor	No	40	84		255
Tractor	No	40	84		255
Tractor	No	40	84		255
Tractor	No	40	84		255

Calculated (dBA)

Equipment		***Lmax**	**Leq**
Dozer		67.5	63.5
Dozer		67.5	63.5
Dozer		67.5	63.5
Tractor		69.8	65.9
Tractor		69.8	65.9
Tractor		69.8	65.9
Tractor		69.8	65.9
	Total	**69.8**	**73.5**

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 10/10/2022
Case Description: Phase 1 Grading- Mobile Equipment

Description	**Affected Land Use**
Phase 1 Grading- Mobile Equipment	Residential

Description	**Impact Device**	**Usage(%)**	**Equipment Spec Lmax (dBA)**	**Actual Lmax (dBA)**	**Receptor Distance (feet)**
Excavator	No	40		80.7	255
Grader	No	40	85		255
Dozer	No	40		81.7	255
Tractor	No	40	84		255
Tractor	No	40	84		255
Tractor	No	40	84		255

Calculated (dBA)

Equipment		***Lmax**	**Leq**
Excavator		66.6	62.6
Grader		70.8	66.9
Dozer		67.5	63.5
Tractor		69.8	65.9
Tractor		69.8	65.9
Tractor		69.8	65.9
	Total	**70.8**	**73.1**

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 10/10/2022
Case Description: Phase 1 Building Construction- Mobile Equipment

Description	**Affected Land Use**
Phase 1 Building Construction- Mobile Equipment	Residential

Description	**Impact Device**	**Usage(%)**	**Equipment Spec Lmax (dBA)**	**Actual Lmax (dBA)**	**Receptor Distance (feet)**
Crane	No	16		80.6	255
Tractor	No	40	84		255
Tractor	No	40	84		255
Tractor	No	40	84		255
Gradall	No	40		83.4	255
Gradall	No	40		83.4	255
Gradall	No	40		83.4	255
Welder / Torch	No	40		74	255

Calculated (dBA)

Equipment		***Lmax**	**Leq**
Crane		66.4	58.4
Tractor		69.8	65.9
Tractor		69.8	65.9
Tractor		69.8	65.9
Gradall		69.2	65.3
Gradall		69.2	65.3
Gradall		69.2	65.3
Welder / Torch		59.8	55.9
	Total	**69.8**	**73.6**

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 10/10/2022
Case Description: Phase 1 Building Construction- Stationary Equipment

Description	**Affected Land Use**
Phase 1 Building Construction- Stationary Equipment	Residential

Description	**Impact Device**	**Usage(%)**	**Equipment Spec Lmax (dBA)**	**Actual Lmax (dBA)**	**Receptor Distance (feet)**
Generator	No	50		80.6	255

Calculated (dBA)

Equipment		***Lmax**	**Leq**
Generator		66.5	63.5
	Total	**66.5**	**63.5**

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 10/10/2022
Case Description: Phase 1 Paving & Architectural Coating- Mobile Equipment

Description	**Affected Land Use**
Phase 1 Paving & Architectural Coating- Mobile Equipment	Residential

Description	**Impact Device**	**Usage(%)**	**Equipment Spec Lmax (dBA)**	**Actual Lmax (dBA)**	**Receptor Distance (feet)**
Paver	No	50		77.2	255
Paver	No	50		77.2	255
Pavement Scarafier	No	20		89.5	255
Pavement Scarafier	No	20		89.5	255
Roller	No	20		80	255
Roller	No	20		80	255

		Calculated (dBA)	
Equipment		***Lmax**	**Leq**
Paver		63.1	60.1
Paver		63.1	60.1
Pavement Scarafier		75.3	68.4
Pavement Scarafier		75.3	68.4
Roller		65.8	58.9
Roller		65.8	58.9
	Total	**75.3**	**72.4**

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date:	10/10/2022
Case Description:	Phase 1 Paving & Architectural Coating- Stationary Equipment

Description	**Affected Land Use**
Phase 1 Paving & Architectural Coating- Stationary Equipment	Residential

Description	**Impact Device**	**Usage(%)**	**Equipment Spec Lmax (dBA)**	**Actual Lmax (dBA)**	**Receptor Distance (feet)**
Compressor (air)	No	40		77.7	255

Calculated (dBA)

Equipment		***Lmax**	**Leq**
Compressor (air)		63.5	59.5
	Total	**63.5**	**59.5**

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 10/11/2022
Case Description: Phase 2 Demolition- Mobile Equipment

Description	**Affected Land Use**
Phase 2 Demolition- Mobile Equipment	Residential

Description	**Impact Device**	**Usage(%)**	**Equipment Spec Lmax (dBA)**	**Actual Lmax (dBA)**	**Receptor Distance (feet)**
Concrete Saw	No	20		89.6	255
Excavator	No	40		80.7	255
Excavator	No	40		80.7	255
Excavator	No	40		80.7	255
Dozer	No	40		81.7	255
Dozer	No	40		81.7	255

Calculated (dBA)

Equipment		*Lmax	Leq
Concrete Saw		75.4	68.4
Excavator		66.6	62.6
Excavator		66.6	62.6
Excavator		66.6	62.6
Dozer		67.5	63.5
Dozer		67.5	63.5
	Total	**75.4**	**72.3**

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 10/11/2022
Case Description: Phase 2 Site Preparation- Mobile Equipment

Description	**Affected Land Use**
Phase 2 Site Preparation- Mobile Equipment	Residential

Description	**Impact Device**	**Usage(%)**	**Equipment Spec Lmax (dBA)**	**Actual Lmax (dBA)**	**Receptor Distance (feet)**
Dozer	No	40		81.7	255
Dozer	No	40		81.7	255
Dozer	No	40		81.7	255
Tractor	No	40	84		255
Tractor	No	40	84		255
Tractor	No	40	84		255
Tractor	No	40	84		255

Calculated (dBA)

Equipment		***Lmax**	**Leq**
Dozer		67.5	63.5
Dozer		67.5	63.5
Dozer		67.5	63.5
Tractor		69.8	65.9
Tractor		69.8	65.9
Tractor		69.8	65.9
Tractor		69.8	65.9
	Total	**69.8**	**73.5**

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 10/11/2022
Case Description: Phase 2 Grading- Mobile Equipment

Description	**Affected Land Use**
Phase 2 Grading- Mobile Equipment	Residential

Description	**Impact Device**	**Usage(%)**	**Equipment Spec Lmax (dBA)**	**Actual Lmax (dBA)**	**Receptor Distance (feet)**
Excavator	No	40		80.7	255
Grader	No	40	85		255
Dozer	No	40		81.7	255
Tractor	No	40	84		255
Tractor	No	40	84		255
Tractor	No	40	84		255

Calculated (dBA)

Equipment		***Lmax**	**Leq**
Excavator		66.6	62.6
Grader		70.8	66.9
Dozer		67.5	63.5
Tractor		69.8	65.9
Tractor		69.8	65.9
Tractor		69.8	65.9
	Total	**70.8**	**73.1**

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 10/11/2022
Case Description: Phase 2 Construction- Mobile Equipment

Description	**Affected Land Use**
Phase 2 Construction- Mobile Equipment	Residential

Description	**Impact Device**	**Usage(%)**	**Equipment Spec Lmax (dBA)**	**Actual Lmax (dBA)**	**Receptor Distance (feet)**
Crane	No	16		80.6	255
Tractor	No	40	84		255
Tractor	No	40	84		255
Tractor	No	40	84		255
Gradall	No	40		83.4	255
Gradall	No	40		83.4	255
Gradall	No	40		83.4	255
Welder / Torch	No	40		74	255

Calculated (dBA)

Equipment		***Lmax**	**Leq**
Crane		66.4	58.4
Tractor		69.8	65.9
Tractor		69.8	65.9
Tractor		69.8	65.9
Gradall		69.2	65.3
Gradall		69.2	65.3
Gradall		69.2	65.3
Welder / Torch		59.8	55.9
	Total	**69.8**	**73.6**

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date:	10/11/2022
Case Description:	Phase 2 Construction- Stationary Equipment

Description	**Affected Land Use**
Phase 2 Construction- Stationary Equipment	Residential

Description	**Impact Device**	**Usage(%)**	**Equipment Spec Lmax (dBA)**	**Actual Lmax (dBA)**	**Receptor Distance (feet)**
Generator	No	50		80.6	255

Calculated (dBA)

Equipment		***Lmax**	**Leq**
Generator		66.5	63.5
	Total	**66.5**	**63.5**

*Calculated Lmax is the Loudest value.

ATTACHMENT C

SoundPLAN Onsite Noise Generation

SoundPLAN
Output Source Informatio- School Drop Off/ Pickup Activity

Number	Reciever Name	Floor	Level at Receiver (dBA)
1	Loma Vista Elementary School	Ground Floor	43.9
2	Loma Vista Elementary School	Ground Floor	42.5
3	Resdients off Corcoran	Ground Floor	51.8
4	Residents off Chapman Court	Ground Floor	45.8
5	Residents off Chapman Court	Ground Floor	45.2
6	Residents off Chapman Court	Ground Floor	42.3
7	Residents off Chapman Court	Ground Floor	44.1
8	Residents off Corcoran	Ground Floor	48.8
9	Residents off Corcoran	Ground Floor	45.4
10	Residents off Corcoran	Ground Floor	41.3
11	Residents off Corcoran	Ground Floor	36.8
12	Residents off Corcoran	Ground Floor	39.5
13	Residents off Corcoran	Ground Floor	45.2
14	Residents off Linfield	Ground Floor	40.6
15	Residents off Whitney	Ground Floor	39.2
16	Residents off Whitney	Ground Floor	39.4
17	Residents off Whitney	Ground Floor	39.4
18	Residents off Whitney	Ground Floor	39.9

Number	Noise Source Information	Citation	Level at Source
1	School Drop Off/ Pickup Activity	ECORP Consulting, Inc. Noise Measurements (Elementary school during morning drop off)	64.6 dBA

SoundPLAN
Output Source Information-
Lunch/Recess Activity

Number	Reciever Name	Floor	Level at Receiver (dBA)
1	Loma Vista Elementary School	Ground Floor	56.9
2	Loma Vista Elementary School	Ground Floor	55.9
3	Resdients off Corcoran	Ground Floor	58.5
4	Residents off Chapman Court	Ground Floor	47.7
5	Residents off Chapman Court	Ground Floor	48.6
6	Residents off Chapman Court	Ground Floor	48.2
7	Residents off Chapman Court	Ground Floor	46.9
8	Residents off Corcoran	Ground Floor	52.5
9	Residents off Corcoran	Ground Floor	57.8
10	Residents off Corcoran	Ground Floor	51.5
11	Residents off Corcoran	Ground Floor	45.5
12	Residents off Corcoran	Ground Floor	48.9
13	Residents off Corcoran	Ground Floor	50.7
14	Residents off Linfield	Ground Floor	44.8
15	Residents off Whitney	Ground Floor	43.3
16	Residents off Whitney	Ground Floor	42.9
17	Residents off Whitney	Ground Floor	43.7
18	Residents off Whitney	Ground Floor	44.1

Number	Noise Source Information	Citation	Level at Source
1	Lunch/Recess Activity	ECORP Consulting, Inc. Noise Measurements (Elementary school during recess)	68.6 dBA