NOISE AND VIBRATION IMPACT ANALYSIS

GRAND TERRACE CONTAINER/TRAILER STORAGE PROJECT

GRAND TERRACE, CALIFORNIA

LSA

November 2019

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LIST OF ABBREVIATIONS AND ACRONYMS

City	City of Grand Terrace
CNEL	Community Noise Equivalent Level
dB	decibel(s)
dBA	A-weighted decibel(s)
FHWA	Federal Highway Administration
ft	foot/feet
FTA	Federal Transit Administration
HVAC	heating, ventilation, and air conditioning
in/sec	inch/inches per second
L_{dn}	day-night average noise level
LED	light-emitting diode
L_{eq}	equivalent continuous sound level
L_{max}	maximum instantaneous noise level
PPV	peak particle velocity
project	Grand Terrace Container/Trailer Storage Project
Riverside County ALUC	Riverside County Airport Land Use Commission
RMS	root-mean-square (velocity)
SBIAA	San Bernardino International Airport Authority
sf	square feet
VdB	vibration velocity decibels

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GRAND TERRACE CONTAINER/TRAILER STORAGE PROJECT

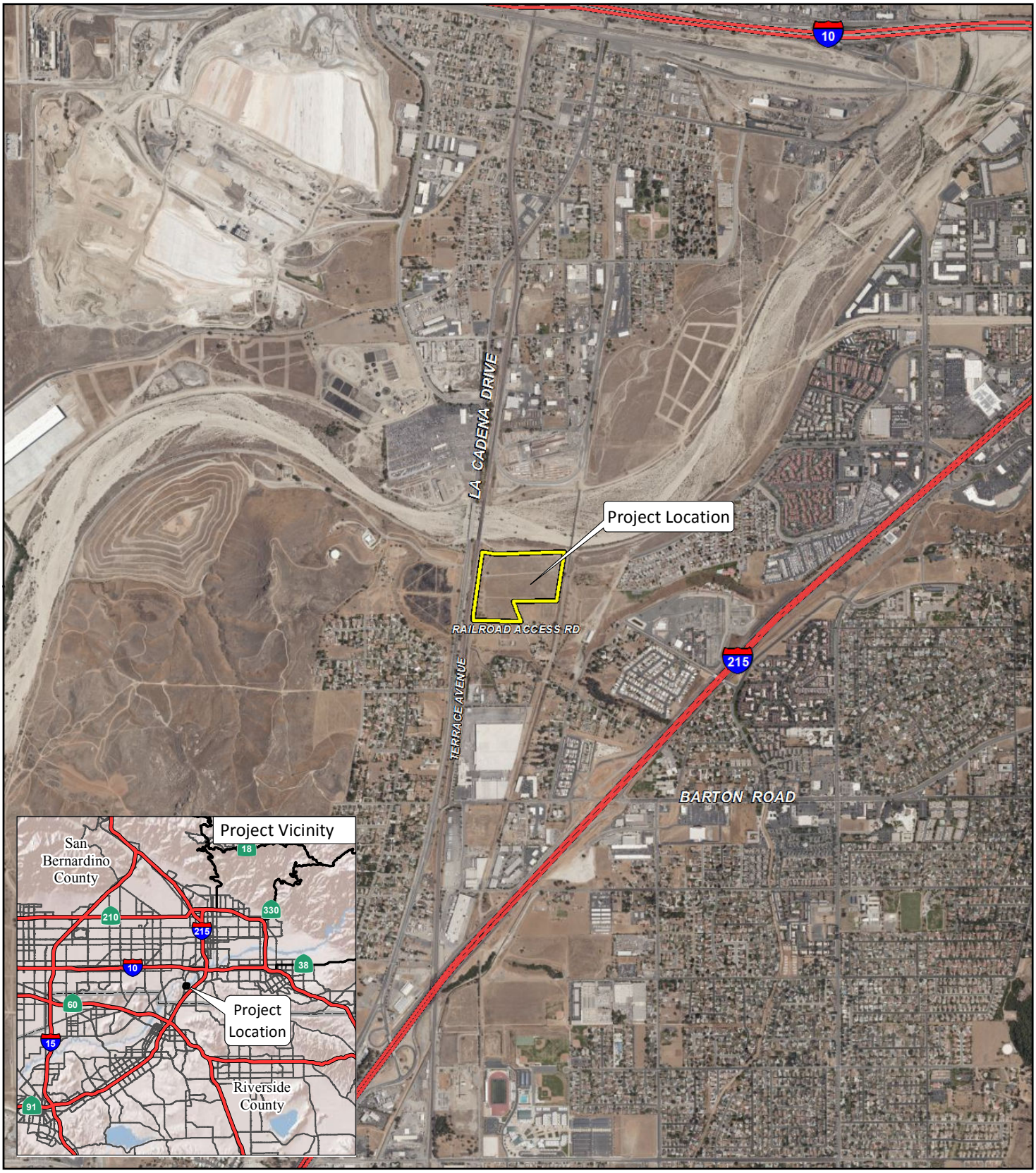
INTRODUCTION

This noise and vibration impact analysis has been prepared to evaluate the potential noise and vibration impacts and reduction measures associated with the proposed development of the Grand Terrace Container/Trailer Storage Project (project) in Grand Terrace, California. This report is intended to satisfy the City of Grand Terrace's (City) requirement for a project-specific noise and vibration impact analysis by examining the impacts of the proposed project site and evaluating whether the project would require any reduction measures to reduce potentially significant noise and vibration impacts.

PROJECT LOCATION AND DESCRIPTION

The project site is at the northern terminus of Terrace Avenue and fronting on Railroad Access Road (a private roadway easement) and south of the Santa Ana River in Grand Terrace, California. Figure 1 shows the project location, and Figure 2 shows the site plan. The project area is currently vacant except for overhead utility transmission lines and towers located within a Southern California Edison easement. The project site would be accessed using Terrace Avenue. The proposed project would develop the site with aggregate parking areas, access roads, a 4,800-square-foot (sf) maintenance shed, and a 900 sf security/caretakers/administrative office for the purpose of industrial chassis and trailer storage. The site is currently zoned Heavy Industrial (M-2), with a small portion of the northern boundary within an Agricultural Overlay District (AG). The majority of the project site (20 acres) would be used for the project's storage facilities. A maximum of 650 parking spaces for semi-trailers, shipping and storage containers and chassis will be provided on site, as well as the ancillary equipment to move and arrange stored units. The proposed improvements for the project will consist of perimeter fencing, a paved and gated entrance and turn around area, interior slag-sealed staging aisles, security cameras, on-site security light poles with light-emitting diode (LED) fixtures, landscaping, and an acceptable parking surface (rock base/slag) for the interior areas of the site to be used for storage of shipping and storage containers, chassis, and related equipment. It is also anticipated that there would be some public roadway improvements made to Terrace Avenue extending south of the subject property and extending down to Barton Road. Minor grading would occur on site to provide for foundations of the maintenance shed, the office trailer, and the parking area near the main project entrance. The project perimeter would be secured with fencing, gates, and other minor improvements.

A total of 12 employees would be assigned to the site. Their duties would include, among other things, internal transportation of trailers, chassis, storage containers, and general operation of the facilities. Most containers would be transported to and from the subject property using truck cabs with chassis-carrying containers. Containers would be either stored on a chassis or removed from the chassis with a forklift and "stacked" on grade to a maximum height of 16 feet (ft). Chassis that are stored may also be stacked to a maximum height of 12 ft. The anticipated hours of operation for the project would be Monday through Saturday, 6:00 a.m. to 10:00 p.m. On occasion, it may be necessary to access the project site after 10:00 p.m. and/or on weekends; however, such access and activity would be rare.



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LEGEND

Project Location

FIGURE 1

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0 1000 2000

FEET

SOURCE: Bing Maps (2015)

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Grand Terrace Container/Trailer Storage Project

Project Location

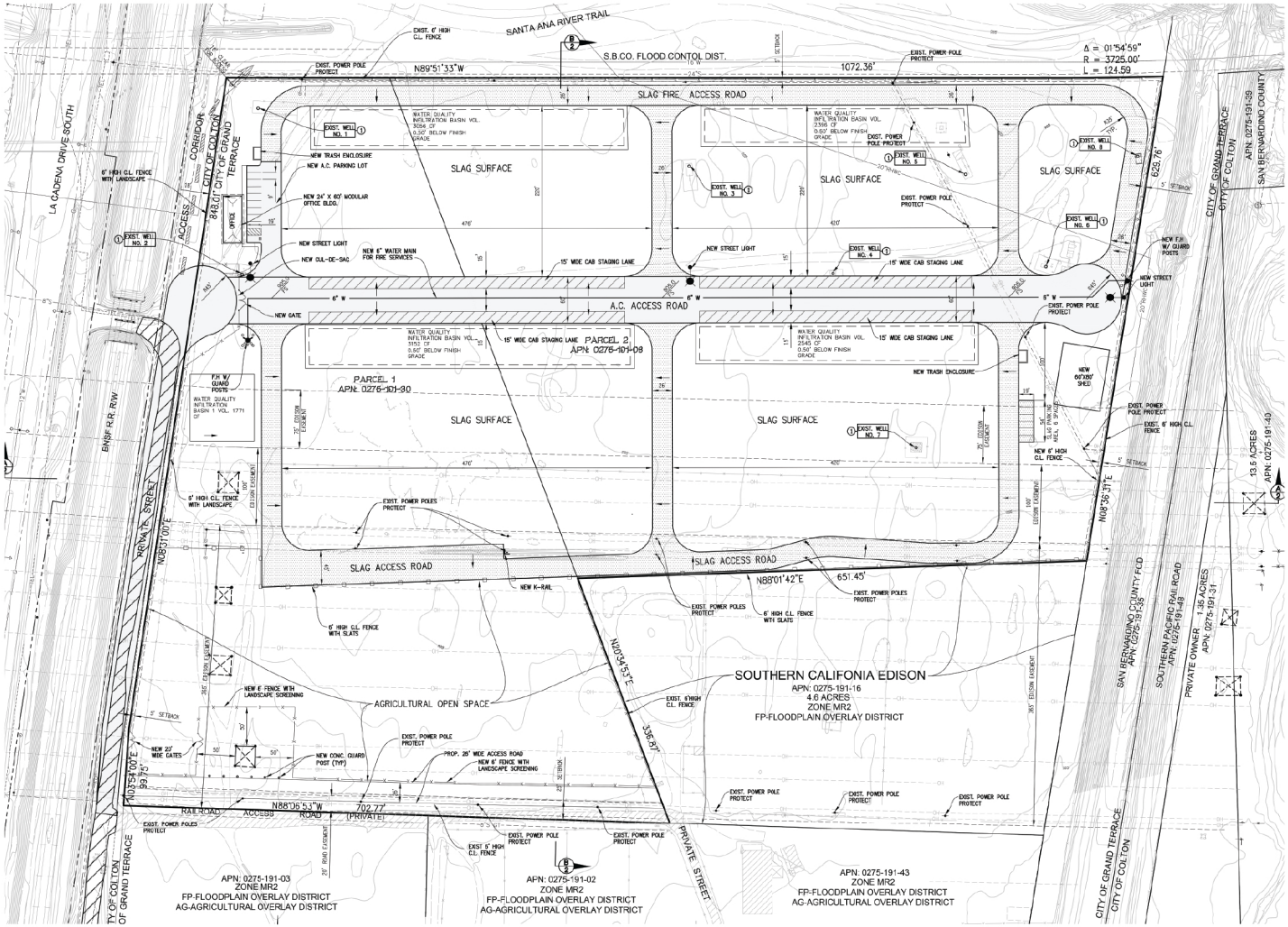

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FIGURE 2

Grand Terrace Container/Trailer Storage Project

Site Plan

N

0 120 240

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SOURCE: Transtech

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The maintenance shed would be used for activities associated with the regulatory inspection and maintenance of the trailers and containers as required for them to be "road-ready" prior to deployment. These activities are generally light inspection replacement, safety check-related items, and minor repair and replacement of needed equipment. Any major maintenance or repair-and-replacement activities would be performed at an off-site third-party vendor. Empty trailers/containers (the empties) would be towed between regional logistics facilities and the site, as needed, and the empty trailers/containers would be stored on site until they are required to be loaded and dispatched. The empties would be managed between the site and user facilities in an organized manner, employing appropriate traffic safety precautions. The trailers would be positioned a minimum of 100 ft from the southern property line.

EXISTING SENSITIVE LAND USES IN THE PROJECT AREA

The project site is surrounded primarily by vacant land and single-family residences. The areas adjacent to the project site include the following uses:

- **North:** Santa Ana River Trail and the Santa Ana River in Colton
- **East:** Vacant land and mobile homes in Colton
- **South:** Single-family residences and vacant land in Grand Terrace
- **Southwest:** Single-family residences in Colton
- **West:** BNSF Railway, La Cadena Drive, and vacant land in Colton

CHARACTERISTICS OF SOUND

Noise is usually defined as unwanted sound. Noise consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation, and sleep.

To the human ear, sound has two significant characteristics: pitch and loudness. Pitch is generally an annoyance, while loudness can affect the ability to hear. Pitch is the number of complete vibrations, or cycles per second, of a sound wave, which results in the tone's range from high to low. Loudness is the strength of a sound, and it describes a noisy or quiet environment; it is measured by the amplitude of the sound wave. Loudness is determined by the intensity of the sound wave combined with the reception characteristics of the human ear. Sound intensity is the average rate of sound energy transmitted through a unit area perpendicular to the direction in which the sound waves are traveling. This characteristic of sound can be precisely measured with instruments. The analysis of a project defines the noise environment of the project area in terms of sound intensity and its effect on adjacent sensitive land uses.

Table A lists definitions of acoustical terms, and Table B shows common sound levels and their sources.

Measurement of Sound

Sound intensity is measured with the A-weighted decibel scale to correct for the relative frequency response of the human ear. That is, an A-weighted noise level de-emphasizes low and very high frequencies of sound, similar to the human ear's de-emphasis of these frequencies. Decibels, unlike

Table A: Definitions of Acoustical Terms

Term	Definitions
Decibel, dB	A unit of sound level that denotes the ratio between two quantities that are proportional to power; the number of decibels is 10 times the logarithm (to the base 10) of this ratio.
Frequency, Hz	Of a function periodic in time, the number of times that the quantity repeats itself in 1 second (i.e., the number of cycles per second).
A-Weighted Sound Level, dBA	The sound level obtained by use of A-weighting. 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. (All sound levels in this report are A-weighted unless reported otherwise.)
L_{01}, L_{10}, L_{50}, L_{90}	The fast A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 1%, 10%, 50%, and 90% of a stated time period, respectively.
Equivalent Continuous Noise Level, L_{eq}	The level of a steady sound that, in a stated time period and at a stated location, has the same A-weighted sound energy as the time varying sound.
Community Noise Equivalent Level, CNEL	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 5 dBA to sound levels occurring in the evening from 7:00 p.m. to 10:00 p.m. and after the addition of 10 dBA to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
Day/Night Noise Level, L_{dn}	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 10 dBA to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
L_{max}, L_{min}	The maximum and minimum A-weighted sound levels measured on a sound level meter, during a designated time interval, using fast time averaging.
Ambient Noise Level	The all-encompassing noise associated with a given environment at a specified time. It is usually a composite of sound from many sources from many directions, near and far; no particular sound is dominant.
Intrusive	The noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content, as well as the prevailing ambient noise level.

Source: *Handbook of Acoustical Measurements and Noise Control* (Harris 1991).

Table B: Common Sound Levels and Their Noise Sources

Noise Source	A-Weighted Sound Level in Decibels	Noise Environments	Subjective Evaluations
Near Jet Engine	140	Deafening	128 times as loud
Civil Defense Siren	130	Threshold of Pain	64 times as loud
Hard Rock Band	120	Threshold of Feeling	32 times as loud
Accelerating Motorcycle at a Few Feet Away	110	Very Loud	16 times as loud
Pile Driver; Noisy Urban Street/Heavy City Traffic	100	Very Loud	8 times as loud
Ambulance Siren; Food Blender	95	Very Loud	—
Garbage Disposal	90	Very Loud	4 times as loud
Freight Cars; Living Room Music	85	Loud	—
Pneumatic Drill; Vacuum Cleaner	80	Loud	2 times as loud
Busy Restaurant	75	Moderately Loud	—
Near Freeway Auto Traffic	70	Moderately Loud	Reference level
Average Office	60	Quiet	One-half as loud
Suburban Street	55	Quiet	—
Light Traffic; Soft Radio Music in Apartment	50	Quiet	One-quarter as loud
Large Transformer	45	Quiet	—
Average Residence without Stereo Playing	40	Faint	One-eighth as loud
Soft Whisper	30	Faint	—
Rustling Leaves	20	Very Faint	—
Human Breathing	10	Very Faint	Threshold of Hearing
—	0	Very Faint	—

Source: Compiled by LSA Associates, Inc. (2016).

the linear scale (e.g., inches or pounds), are measured on a logarithmic scale, which is a scale based on powers of 10.

For example, 10 decibels (dB) is 10 times more intense than 0 dB, 20 dB is 100 times more intense than 0 dB, and 30 dB is 1,000 times more intense than 0 dB. Thirty decibels (30 dB) represents 1,000 times as much acoustic energy as 0 dB. The decibel scale increases as the square of the change, representing the sound pressure energy. A sound as soft as human breathing is about 10 times greater than 0 dB. The decibel system of measuring sound gives a rough connection between the physical intensity of sound and its perceived loudness to the human ear. A 10 dB increase in sound level is perceived by the human ear as only a doubling of the sound's loudness. Ambient sounds generally range from 30 dB (very quiet) to 100 dB (very loud).

Sound levels are generated from a source, and their decibel level decreases as the distance from that source increases. Sound levels dissipate exponentially with distance from their noise sources. For a single point source, sound levels decrease approximately 6 dB for each doubling of distance from the source. This drop-off rate is appropriate for noise generated by stationary equipment. If noise is produced by a line source (e.g., highway traffic or railroad operations) the sound decreases 3 dB for each doubling of distance in a hard site environment. Line source sound levels decrease 4.5 dB for each doubling of distance in a relatively flat environment with absorptive vegetation.

There are many ways to rate noise for various time periods, but an appropriate rating of ambient noise affecting humans also accounts for the annoying effects of sound. The equivalent continuous sound level (L_{eq}) is the total sound energy of time-varying noise over a sample period. However, the predominant rating scales for human communities in the State of California are the L_{eq} and Community Noise Equivalent Level (CNEL) or the day-night average noise level (L_{dn}) based on A-weighted decibels (dBA). CNEL is the time-weighted average noise over a 24-hour period, with a 5 dBA weighting factor applied to the hourly L_{eq} for noise occurring between 7:00 p.m. and 10:00 p.m. (defined as relaxation hours) and a 10 dBA weighting factor applied to noise occurring between 10:00 p.m. and 7:00 a.m. (defined as sleeping hours). L_{dn} is similar to the CNEL scale but without the adjustment for events occurring during the relaxation. CNEL and L_{dn} are within 1 dBA of each other and are normally interchangeable. The City uses the CNEL noise scale for long-term noise impact assessment.

Other noise rating scales of importance when assessing the annoyance factor include the maximum noise level (L_{max}), which is the highest sound level that occurs during a stated time period. The noise environments discussed in this analysis for short-term noise impacts are specified in terms of maximum levels denoted by L_{max}, which reflects peak operating conditions and addresses the annoying aspects of intermittent noise. It is often used together with another noise scale, or noise standards in terms of percentile noise levels, in noise ordinances for enforcement purposes. For example, the L_{10} noise level represents the noise level exceeded 10 percent of the time during a stated period. The L_{50} noise level represents the median noise level. Half the time the noise level exceeds this level, and half the time it is less than this level. The L_{90} noise level represents the noise level exceeded 90 percent of the time and is considered the background noise level during a monitoring period. For a relatively constant noise source, the L_{eq} and L_{50} are approximately the same.

Noise impacts can be described in three categories. The first category includes audible impacts that refer to increases in noise levels noticeable to humans. Audible increases in noise levels generally refer to a change of 3 dB or greater because this level has been found to be barely perceptible in exterior environments. The second category, potentially audible, refers to a change in the noise level between 1 dB and 3 dB. This range of noise levels has been found to be noticeable only in laboratory environments. The last category includes changes in noise levels of less than 1 dB, which are inaudible to the human ear. Only audible changes in existing ambient or background noise levels are considered potentially significant.

Physiological Effects of Noise

Physical damage to human hearing begins at prolonged exposure to sound levels higher than 85 dBA. Exposure to high sound levels affects the entire system, with prolonged sound exposure in excess of 75 dBA increasing body tensions, thereby affecting blood pressure and functions of the heart and the nervous system. In comparison, extended periods of sound exposure above 90 dBA would result in permanent cell damage. When the sound level reaches 120 dBA, a tickling sensation occurs in the human ear, even with short-term exposure. This level of sound is called the threshold of feeling. As the sound reaches 140 dBA, the tickling sensation is replaced by a feeling of pain in the ear (i.e., the threshold of pain). A sound level of 160–165 dBA will result in dizziness or a loss of equilibrium. The ambient or background noise problem is widespread and generally more concentrated in urban areas than in outlying, less-developed areas.

FUNDAMENTALS OF VIBRATION

Vibration refers to ground-borne noise and perceptible motion. Ground-borne vibration is almost exclusively a concern inside buildings and is rarely perceived as a problem outdoors, where the motion may be discernible, but without the effects associated with the shaking of a building there is less adverse reaction. Vibration energy propagates from a source through intervening soil and rock layers to the foundations of nearby buildings. The vibration then propagates from the foundation throughout the remainder of the structure. Building vibration may be perceived by occupants as the motion of building surfaces, the rattling of items sitting on shelves or hanging on walls, or a low-frequency rumbling noise. The rumbling noise is caused by the vibration of walls, floors, and ceilings that radiate sound waves. Annoyance from vibration often occurs when the vibration exceeds the threshold of perception by 10 dB or less. This is an order of magnitude below the damage threshold for normal buildings.

Typical sources of ground-borne vibration are construction activities (e.g., blasting, pile-driving, and operating heavy-duty earthmoving equipment), steel-wheeled trains, and occasional traffic on rough roads. Problems with both ground-borne vibration and noise from these sources are usually localized to areas within approximately 100 ft of the vibration source, although there are examples of ground-borne vibration causing interference out to distances greater than 200 ft (FTA 2018).

When roadways are smooth, vibration from traffic, even heavy trucks, is rarely perceptible. It is assumed for most projects that the roadway surface will be smooth enough that ground-borne vibration from street traffic will not exceed the impact criteria; however, both construction of the project and the freight train operations could result in ground-borne vibration that may be perceptible and annoying.

Ground-borne noise is not likely to be a problem because noise arriving via the normal airborne path will usually be greater than ground-borne noise.

Ground-borne vibration has the potential to disturb people and damage buildings. Although it is very rare for train-induced ground-borne vibration to cause even cosmetic building damage, it is not uncommon for construction processes such as blasting and pile-driving to cause vibration of sufficient amplitudes to damage nearby buildings (FTA 2018). Ground-borne vibration is usually measured in terms of vibration velocity, either the root-mean-square (RMS) velocity or peak particle velocity (PPV). The RMS is best for characterizing human response to building vibration, and PPV is used to characterize potential for damage. Decibel notation acts to compress the range of numbers required to describe vibration. Vibration velocity level in decibels is defined as:

$$L_v = 20 \log_{10} [V/V_{ref}]$$

where "L_v" is the vibration velocity in decibels (VdB), "V" is the RMS velocity amplitude, and "V_{ref}" is the reference velocity amplitude, or 1×10^{-6} inches/second (in/sec) used in the United States. Table C illustrates human response to various vibration levels, as described in the *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).

Table C: Human Response to Different Levels of Ground-Borne Noise and Vibration

Vibration Velocity Level	Noise Level		Human Response
	Low Frequency[1]	Mid Frequency[2]	
65 VdB	25 dBA	40 dBA	Approximate threshold of perception for many humans. Low-frequency sound is usually inaudible; mid-frequency sound is excessive for quiet sleeping areas.
75 VdB	35 dBA	50 dBA	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find transit vibration at this level unacceptable. Low-frequency noise is acceptable for sleeping areas; mid-frequency noise is annoying in most quiet occupied areas.
85 VdB	45 dBA	60 dBA	Vibration is acceptable only if there are an infrequent number of events per day. Low-frequency noise is unacceptable for sleeping areas; mid-frequency noise is unacceptable even for infrequent events with institutional land uses, such as schools and churches.

Source: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).
[1] Approximate noise level when vibration spectrum peak is near 30 Hz.
[2] Approximate noise level when vibration spectrum peak is near 60 Hz.
dBA = A-weighted decibels Hz = Hertz
FTA = Federal Transit Administration VdB = vibration velocity decibels

Factors that influence ground-borne vibration and noise include the following:

- **Vibration Source:** Vehicle suspension, wheel types and condition, railroad track/roadway surface, railroad track support system, speed, transit structure, and depth of vibration source
- **Vibration Path:** Soil type, rock layers, soil layering, depth to water table, and frost depth
- **Vibration Receiver:** Foundation type, building construction, and acoustical absorption

Among the factors listed above, there are significant differences in the vibration characteristics when the source is underground compared to at the ground surface. In addition, soil conditions are known to have a strong influence on the levels of ground-borne vibration. Among the most important factors are the stiffness and internal damping of the soil and the depth to bedrock.

Experience with ground-borne vibration indicates: (1) vibration propagation is more efficient in stiff, clay soils than in loose, sandy soils; and (2) shallow rock seems to concentrate the vibration energy close to the surface and can result in ground-borne vibration problems at large distances from a railroad track. Factors such as layering of the soil and the depth to the water table can have significant effects on the propagation of ground-borne vibration. Soft, loose, sandy soils tend to attenuate more vibration energy than hard, rocky materials. Vibration propagation through groundwater is more efficient than through sandy soils.

REGULATORY SETTING

Federal Regulations

Federal Transit Administration

Vibration standards included in the FTA's *Transit Noise and Vibration Impact Assessment Manual* (2018) are used in this analysis for ground-borne vibration impacts on human annoyance, as shown in Table D. The criteria presented in Table E account for the variations in project types as well as the frequency of events, which differ widely among projects. It is intuitive that when there will be fewer events per day, higher vibration levels would be required to evoke the same community response. This is accounted for in the criteria by distinguishing between projects with frequent and infrequent events, in which the term "occasional events" is defined as between 30 and 70 events per day.

The criteria for environmental impact from ground-borne vibration and noise are based on the maximum levels for a single event. Table E lists the potential vibration building damage criteria associated with construction activities, as suggested in the *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).

FTA guidelines show that a vibration level of up to 102 VdB (equivalent to 0.5 PPV [in/sec]) (FTA 2018) is considered safe for buildings consisting of reinforced concrete, steel, or timber (no plaster) and would not result in any construction vibration damage. For a non-engineered timber and masonry building, the construction building vibration damage criterion is 94 VdB (0.2 PPV [in/sec]).

Table D: Ground-Borne Vibration and Ground-Borne Noise Impact Criteria for General Assessment

Land Use Category	Ground-Borne Vibration Impact Levels (VdB re 1 µin/sec)			Ground-Borne Noise Impact Levels (dB re 20 µPa)		
	Frequent[1] Events	Occasional[2] Events	Infrequent[3] Events	Frequent[1] Events	Occasional[2] Events	Infrequent[3] Events
Category 1: Buildings where low ambient vibration is essential for interior operations.	65 VdB[4]	65 VdB[4]	65 VdB[4]	N/A[5]	N/A[5]	N/A[5]
Category 2: Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB	35 dBA	38 dBA	43 dBA
Category 3: Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB	40 dBA	43 dBA	48 dBA

Source: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).

[1] Frequent events are defined as more than 70 events per day.

[2] Occasional events are defined as between 30 and 70 events per day.

[3] Infrequent events are defined as fewer than 30 events per day.

[4] This criterion limit is based on levels that are acceptable for most moderately sensitive equipment, such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.

[5] Vibration-sensitive equipment is not sensitive to ground-borne noise.

µin/sec = microinches per second
µPa = micropascals
dB = decibels
dBA = A-weighted decibels
FTA = Federal Transit Administration
HVAC = heating, ventilation, and air conditioning
N/A = Not Applicable
VdB = vibration velocity decibels

Table E: Construction Vibration Damage Criteria

Building Category	PPV (in/sec)	Approximate L_V (VdB)[1]
Reinforced concrete, steel, or timber (no plaster)	0.50	102
Engineered concrete and masonry (no plaster)	0.30	98
Non-engineered timber and masonry buildings	0.20	94
Buildings extremely susceptible to vibration damage	0.12	90

Source: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).

[1] RMS vibration velocity in decibels (VdB) re 1 µin/sec.

µin/sec = microinches per second
FTA = Federal Transit Administration
in/sec = inches per second
L_V = velocity in decibels
PPV = peak particle velocity
RMS = root-mean-square
VdB = vibration velocity decibels

Local Regulations

City of Grand Terrace

Municipal Code. The City's Municipal Code Noise Ordinance (1986) has not established any upper limits for construction noise because construction noise is temporary and will stop after the project construction is completed. Section 8.108.040(c) of the City's Municipal Code Noise Ordinance regulates the timing of construction activities. Noise sources associated with or vibration created by construction, repair or remodeling, or grading of any real property shall occur only between the

hours of 7:00 a.m. and 8:00 p.m., Monday through Saturday. No construction shall be permitted outside of these hours or on Sundays and federal holidays.

Section 8.108.050(f) of the City's Municipal Code Noise Ordinance prohibits the creation of loud and excessive noise in connection with the loading or unloading of motor trucks and other vehicles, that would disturb the peace and quiet of adjacent residential neighborhoods, between the hours of 10:00 p.m. and 7:00 a.m. Loading or unloading in such a manner as to be loud or excessive at a distance of 50 ft from the trucks or vehicles being unloaded shall be prima facie evidence of a violation of this section (City of Grand Terrace 1986).

Section 8.108.050(g) of the City's Municipal Code Noise Ordinance prohibits the operation or use between the hours of 10:00 p.m. and 7:00 a.m. of any pile driver, steam shovel, pneumatic hammers, derrick, steam or electric hoist, power-driven saw, forklifts, milling equipment, other tools or apparatus, the use of which is attended by loud and excessive noise, or the movement of tractors, tractor trucks, or large trucks on property adjacent to residences. The operation of such equipment between the hours of 10:00 p.m. and 7:00 a.m. in such a manner as to be loud or excessive at a distance of 50 ft from the equipment being operated shall be prima facie evidence of a violation of this section. However, it is not the intent of this section to prohibit the direct movement of trucks on or off property at any time provided, however, that such movement directly on or off the property shall not be within 50 ft of an occupied residence (City of Grand Terrace, 1986).

Section 8.108.050(h) of the City's Municipal Code Noise Ordinance prohibits automotive repair, automotive body, or fender or other work on metal objects and metal parts between the hours of 10:00 p.m. and 7:00 a.m. on property adjacent to residences in such a manner as to be loud or excessive at a distance of 50 ft from the activities. The doing of such activities between the hours of 10:00 p.m. and 7:00 a.m. in such a manner as to be loud or excessive at a distance of 50 ft from the equipment being operated shall be prima facie evidence of a violation of this section (City of Grand Terrace, 1986).

The City's Municipal Code Noise Ordinance does not set numerical thresholds for stationary noise or define "loud or excessive noise." Therefore, the stationary noise standards from the County of San Bernardino Code of Ordinances were used to evaluate noise generated by container/trailer and chassis drop-off and pick-up activities (evaluated as loading or unloading of trucks), forklift operation, and maintenance shed activities (evaluated as automotive repair).

County of San Bernardino

County Code of Ordinances. Section 83.01.080(c) in the County of San Bernardino Code of Ordinances establishes noise standards for stationary sources and is shown in Table F (County of San Bernardino 2014). The County of San Bernardino Code of Ordinances were used to evaluate noise levels generated by heating, ventilation, and air conditioning (HVAC) equipment, parking lot activities, and nighttime (10:00 p.m. and 7:00 p.m.) project operations because the City's Municipal Code Noise Ordinance does not provide stationary noise standards or prescribe certain time periods for these activities.

Table F: County of San Bernardino Noise Standards for Stationary Noise Sources

Receiving Land Use	Time Period	L_{50} (30 min)	L_{25} (15 min)	L_8 (5 min)	L_2 (1 min)	L_{max} (Anytime)
Residentially Zoned Property	7:00 a.m.–10: 00 p.m. (daytime)	55	60	65	70	75
	10:00 p.m.–7:00 a.m. (nighttime)	45	50	55	60	65
Professional Services	7:00 a.m.–10: 00 p.m. (daytime)	55	60	65	70	75
	10:00 p.m.–7:00 a.m. (nighttime)	55	60	65	70	75
Other Commercial	7:00 a.m.–10: 00 p.m. (daytime)	60	65	70	75	80
	10:00 p.m.–7:00 a.m. (nighttime)	60	65	70	75	80
Industrial	7:00 a.m.–10: 00 p.m. (daytime)	70	75	80	85	90
	10:00 p.m.–7:00 a.m. (nighttime)	70	75	80	85	90

Source: County of San Bernardino Code of Ordinances (2014).
dBA = A-weighted decibels
L_{xx} = percentile-exceeded sound level
L_{max} = maximum instantaneous noise level
min = minute(s)

City of Colton

Municipal Code. Section 18.42.040 of the City of Colton Municipal Code (City of Colton 1992) prohibits stationary noise sources from exceeding 65 dBA at the boundary line of the property on which the sound is generated. Stationary noise generated from the project was evaluated at the property line of the receiving land use in Colton because the project is in Grand Terrace (not in Colton).

EXISTING SETTING

Overview of the Existing Noise Environment

Traffic on La Cadena Drive is the primary existing noise source, while train noise from the BNSF Railway also contributes high intermittent noise levels in the project area.

Sensitive Land Uses in the Project Vicinity

Sensitive land uses in the project vicinity include single-family residence and mobile homes. Single-family residences are located approximately 210 ft to the south and 510 ft to the southwest from the project boundary. Mobile homes are located approximately 860 ft to the east from the project boundary.

Ambient Noise Measurements

Short-Term Noise Level Measurements

Short-term (20-minute) noise level measurements were conducted on March 26, 2019, using a Larson Davis Model 824 Type 1 sound level meter to document the existing noise environment in the project area. Table G shows the results of the short-term measurements along with a description of the measurement location and noise sources that occurred during the measurement. Figure 3 shows the short-term monitoring locations.

LSA

LEGEND

Project Site Boundary

Noise Monitoring Location

FIGURE 3

N

0 200 400

FEET

SOURCE: Google Earth, 2019

I:\GRT1901\G\Noise_Monitoring_Locs.cdr (5/17/2019)

Grand Terrace Container/ Trailer Storage Project

Noise Monitoring Locations

Table G: Short-Term Ambient Noise Monitoring Results

Monitoring No	Location	Date	Start Time	Duration (minutes)	Noise Level			Noise Source(s)
					dBA L_{eq}	dBA L_{max}	dBA L_{min}	
ST-1	Between 145 and 155 Loma Verde West in Colton, in front of the house on the sidewalk	3/26/2019	9:54 AM	20	50.0	68.7	39.0	Birds and a few vehicles on Loma Verde West.
ST-2	21712 Vivienda Avenue, at the end of the driveway, along the south side of Railroad Access Road.	3/26/2019	10:22 AM	20	44.9	65.0	36.8	Birds, faint traffic on La Cadena Drive, and a rooster crowing.
ST-3	Rancho Mediterrania Mobile Homes, near 700 East Washington Street in Colton, southwest of the west end of Washington Street.	3/26/2019	11:07 AM	20	41.3	63.5	35.0	Light traffic on Washington Street.

Source: Compiled by LSA Associates, Inc. (March 2019).
dBA = A-weighted decibels
L_{eq} = equivalent continuous sound level

Long-Term Noise Measurements

The long-term (24-hour) noise level measurement was conducted on March 26, 2019, using a Larson Davis Spark 706RC noise dosimeter to document the existing noise environment in the project area. Table H shows hourly L_{eq} results from the long-term measurement and Table I shows the calculated CNEL level from the long-term noise level measurement. As shown in Table I, the calculated CNEL level is 63 dBA CNEL. Figure 3 shows the long-term monitoring location.

Existing Aircraft Noise

The nearest airports to the project site are San Bernardino International Airport, Flabob Airport, and Riverside Municipal Airport, which are 5.3 miles to the northeast, 5.5 miles to the southwest, and 8.5 miles to the southwest, respectively. The project site is well beyond the 65 dBA CNEL noise contour of San Bernardino International Airport based on the *Airport Layout Plan Narrative Report for San Bernardino International Airport* (SBIAA 2010) and well beyond the 55 dBA CNEL noise contour of both Flabob Airport and Riverside Municipal Airport based on the *Riverside County Airport Land Use Compatibility Plan* (Riverside County ALUC 2004).

Existing Railroad Noise

The BNSF Railway tracks run west of the project site, and noise generated from the rail line is approximately 62 dBA CNEL at LT-1. The 62 dBA CNEL level was calculated based on the measured 63 dBA CNEL at LT-1 and a calculated traffic noise level of 55 dBA CNEL on La Cadena Drive from Table J. The distance from LT-1 to the centerline of La Cadena Drive is 814 ft.

Table H: Long-Term (24-Hour) Noise Level Measurement Results at LT-1

	Start Time	Date	Noise Level		
			dBA L_{eq}	dBA L_2	dBA L_8
1	9:00 AM	3/26/2019	52	64	53
2	10:00 AM	3/26/2019	52	62	49
3	11:00 AM	3/26/2019	48	66	63
4	12:00 PM	3/26/2019	57	65	61
5	1:00 PM	3/26/2019	55	64	60
6	2:00 PM	3/26/2019	54	62	56
7	3:00 PM	3/26/2019	53	63	54
8	4:00 PM	3/26/2019	52	62	56
9	5:00 PM	3/26/2019	53	66	62
10	6:00 PM	3/26/2019	56	66	56
11	7:00 PM	3/26/2019	55	67	62
12	8:00 PM	3/26/2019	58	67	64
13	9:00 PM	3/26/2019	55	59	56
14	10:00 PM	3/26/2019	54	66	63
15	11:00 PM	3/26/2019	56	67	61
16	12:00 AM	3/27/2019	53	68	62
17	1:00 AM	3/27/2019	58	67	60
18	2:00 AM	3/27/2019	53	69	64
19	3:00 AM	3/27/2019	59	67	63
20	4:00 AM	3/27/2019	55	64	58
21	5:00 AM	3/27/2019	55	66	57
22	6:00 AM	3/27/2019	57	65	61
23	7:00 AM	3/27/2019	52	64	55
24	8:00 AM	3/27/2019	52	59	52

Source: Compiled by LSA Associates, Inc. (April 2019).
dBA L_{eq} = equivalent continuous sound level measured in A-weighted decibels
dBA L_2 = loudest 1-minute sound level per hour measured in A-weighted decibels
dBA L_8 = loudest 5-minute sound level per hour measured in A-weighted decibels

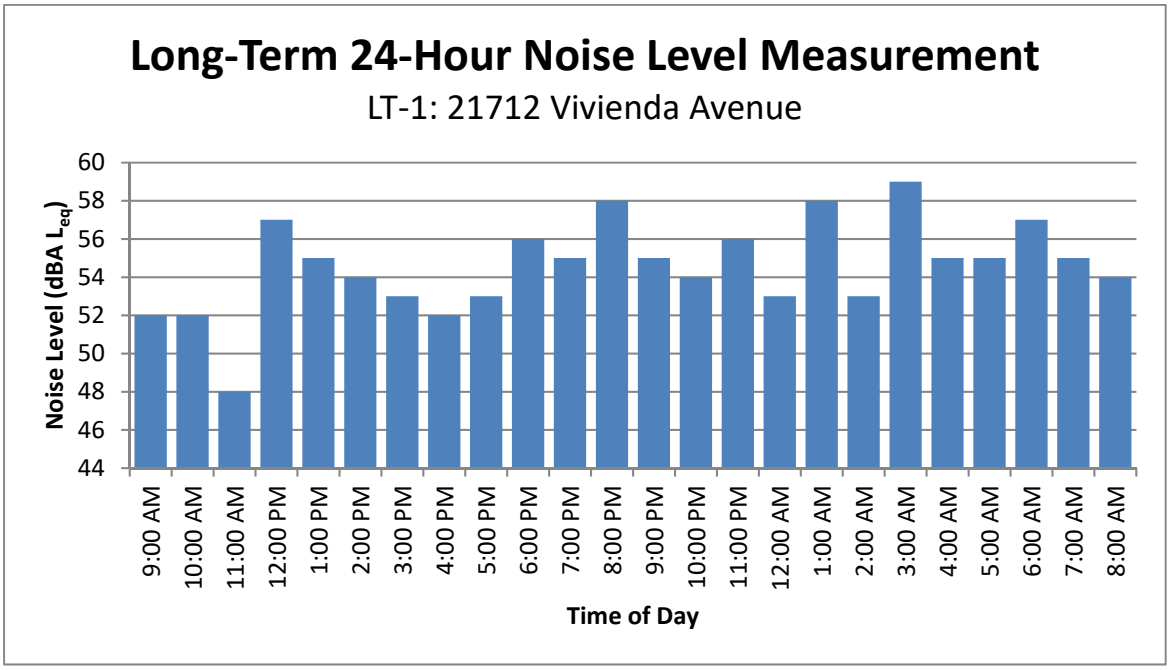

Table I: Long-Term Ambient Noise Monitoring Results

Monitoring No	Location	Start Date	Start Time	Duration (hours)	Noise Level (dBA CNEL)	Noise Source(s)
LT-1	In front of the single-family residence at 21712 Vivienda Avenue[1], on a power line pole along Railroad Access Road.	3/26/2019	9:00 AM	24	63	Occasional trains to the west and faint traffic on La Cadena Drive.

Source: Compiled by LSA Associates, Inc. (March 2019).
[1] Although the mailing address for the single-family residence is 21712 Vivienda Road, access to the home is from Railroad Access Road.
dBA = A-weighted decibels
CNEL = Community Noise Equivalent Level

Table J: Existing Traffic Noise Levels

Roadway Segment	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane
Barton Road Between La Cadena Drive and Terrace Avenue	6,820	< 50	< 50	64	60.9
Barton Road Between Terrace Avenue and La Crosse Avenue	11,130	< 50	53	114	64.7
Barton Road Between La Crosse Avenue and I-215 SB Ramps	14,345	< 50	63	135	65.8
Barton Road Between I-215 SB Ramps and I-215 NB Ramps	20,205	< 50	79	169	67.2
La Cadena Drive North of Barton Road	20,070	71	144	305	69.3
La Cadena Drive South of Barton Road	19,550	70	141	299	69.2
Terrace Avenue North of Barton Road	380	< 50	< 50	< 50	46.6

Source: Compiled by LSA Associates, Inc. (2019).
Note: Traffic noise within 50 ft of the roadway centerline should be evaluated with site-specific information.
ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
ft = feet
I-215 = Interstate 215
NB = northbound
SB = southbound

Existing Traffic Noise

The Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA-RD-77-108) was used to evaluate traffic-related noise conditions along roadway segments in the project vicinity. This model requires various parameters (including traffic volumes, vehicle mix, vehicle speed, and roadway geometry) to compute typical equivalent noise levels during daytime, evening, and nighttime hours. The resultant noise levels are weighted and summed over 24-hour periods to determine the CNEL values. Existing traffic volumes were obtained from the *Traffic Impact Analysis for the Grand Terrace Trailer/Container Storage Project* (LSA, August 2019). The standard vehicle mix for Southern California streets was used in this analysis. Table J provides the existing traffic noise levels in the project vicinity. These noise levels represent the worst-case scenario, which assumes no shielding is provided between the traffic and the location where the noise contours are drawn. Appendix A provides the specific assumptions used in developing these noise levels and model printouts.

As shown in Table J, traffic noise levels along La Cadena Drive adjacent to the project site are moderately high, and the 70, 65, and 60 dBA CNEL noise contours extend 88, 181, and 387 ft, respectively, from the roadway centerline.

IMPACTS

Short-Term Construction Noise Impacts

Two types of short-term noise impacts could occur during construction of the proposed project. First, construction crew commutes and the transport of construction equipment and materials to the site for the proposed project would incrementally increase noise levels on access roads leading to the site. Although there would be a relatively high single-event noise exposure potential causing intermittent noise nuisance (passing trucks at 50 ft would generate up to a maximum of 84 dBA), the effect on longer-term (hourly or daily) ambient noise levels would be small. The grading and excavation phase would generate the most trips out of all of the construction phases, at 30 vehicles per hour, or 104 vehicles per day. Roadways that would be used to access the project site include Terrace Avenue, La Cadena Drive, and Barton Road, which has estimated existing hourly/daily traffic volumes of 38/380, 1,955/19,550, and 682/6,820, respectively. The hourly/daily construction-related traffic would increase by up to 1.0/2.5 dBA, 0.0/0.1 dBA, and 0.1/0.2 dBA, respectively. A noise level increase of less than 3 dBA would not be perceptible to the human ear in an outdoor environment. Therefore, no short-term, construction-related noise impacts associated with worker commute and equipment transport to the project site would occur.

The second type of short-term noise impact is related to noise generated during demolition, excavation, grading, and building erection on the project site. Construction is completed in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. These various sequential phases would change the character of the noise generated on the site and, therefore, the noise levels surrounding the site as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by work phase. Table K lists typical construction equipment noise levels recommended for noise impact assessments, based on a distance of 50 ft between the equipment and a noise receptor, taken from the 2006 FHWA Roadway Construction Noise Model.

Typical noise levels range up to 88 dBA L_{max} at 50 ft during the noisiest construction phases. The site preparation phase, which includes excavation and grading of the site, tends to generate the highest noise levels because the noisiest construction equipment is earthmoving equipment. Earthmoving equipment includes excavating machinery such as backfillers, bulldozers, draglines, and front loaders. Earthmoving and compacting equipment includes compactors, scrapers, and graders.

Project construction is expected to require the use of graders, bulldozers, and water trucks/pickup trucks. Noise associated with the use of construction equipment for the site preparation phase is estimated to be between 55 dBA L_{max} and 85 dBA L_{max} at a distance of 50 ft from the active construction area. As shown in Table K, the maximum noise level generated by each grader is assumed to be approximately 85 dBA L_{max} at 50 ft. Each bulldozer would generate approximately 85 dBA L_{max} at 50 ft. The maximum noise level generated by water trucks/pickup trucks is

Table K: Typical Construction Equipment Noise Levels

Equipment Description	Acoustical Usage Factor[1]	Maximum Noise Level (L_{max}) at 50 Feet[2]
Backhoe	40	80
Compactor (ground)	20	80
Compressor	40	80
Crane	16	85
Dozer	40	85
Dump Truck	40	84
Excavator	40	85
Flat Bed Truck	40	84
Forklift	20	85
Front End Loader	40	80
Grader	40	85
Impact Pile Driver	20	95
Jackhammer	20	85
Pickup Truck	40	55
Pneumatic Tools	50	85
Pump	50	77
Rock Drill	20	85
Roller	20	85
Scraper	40	85
Tractor	40	84
Welder	40	73

Source: *FHWA Highway Construction Noise Handbook,* Table 9.1 (FHWA 2006).
Note: The noise levels reported in this table are rounded to the nearest whole number.
[1] Usage factor is the percentage of time during a construction noise operation that a piece of construction equipment is operating at full power.
[2] Maximum noise levels were developed based on Spec 721.560 from the CA/T program to be consistent with the City of Boston, Massachusetts, Noise Code for the "Big Dig" project.
CA/T = Central Artery/Tunnel
L_{max} = maximum instantaneous noise level
FHWA = Federal Highway Administration

approximately 55 dBA L_{max} at 50 ft from these vehicles. Each doubling of the sound sources with equal strength increases the noise level by 3 dBA. Assuming that each piece of construction equipment operates at some distance from the other equipment, the worst-case combined noise level during this phase of construction would be 88 dBA L_{max} at a distance of 50 ft from the active construction area. Based on a usage factor of 40 percent, the worst-case combined noise level during this phase of construction would be 84 dBA L_{eq} at a distance of 50 ft from the active construction area.

As shown in Table L, the closest residences to the project construction boundary are 120 ft south, 510 ft southwest, and 860 ft east of the boundary and would be exposed to construction noise levels of 80 dBA L_{max} (76 dBA L_{eq}), 68 dBA L_{max} (64 dBA L_{eq}), and 63 dBA L_{max} (59 dBA L_{eq}), respectively, after distance attenuation. Ambient noise levels at the project site range between 48 to 49 dBA L_{eq} based on the noise level measurement at LT-1 and noise levels generated by project construction would be higher than ambient noise levels. However, increases in ambient noise levels would no longer occur once project construction is completed. Implementation of measures that include compliance with the construction hours specified in the City's Municipal Code Noise Ordinance, using

Table L: Summary of Construction Noise Levels

Land Use	Direction	Maximum Noise Level (dBA L_{max}) at 50 ft	Average Noise Level (dBA L_{eq}) at 50 ft	Distance (ft)[1]	Maximum Noise Level (dBA L_{max})	Average Noise Level (dBA L_{eq})	Ambient Noise Level (dBA L_{eq})
Residence	South	88	84	120	80	76	48.0–59.0 (LT-1)
Residence	Southwest	88	84	510	68	64	50.0 (ST-1)
Residence	East	88	84	860	63	59	41.3 (ST-3)

Source: Compiled by LSA Associates, Inc. (2019).
[1] Distances reflect the nearest property line to the nearest project construction boundary. All other land uses in each direction would experience lower construction noise levels
dBA L_{eq} = average A-weighted hourly noise level
dBA L_{max} = maximum A-weighted instantaneous sound level
ft = foot/feet

construction equipment with noise mufflers that are properly operating and maintained, placing construction staging area away from off-site sensitive uses, and placing all stationary construction equipment so that the emitted noise is directed away from sensitive receptors would minimize noise impacts from construction equipment. Therefore, no construction noise impacts would occur with the implementation of measures described above. No noise reduction measures are required.

Short-Term Construction Vibration Impacts

This construction vibration impact analysis discusses the level of human annoyance using vibration levels in VdB and assesses the potential for building damage using vibration levels in PPV (in/sec), because vibration levels calculated in RMS are best for characterizing human response to building vibration, whereas vibration level in PPV is best used to characterize potential for damage. As shown in Table E, the FTA guidelines indicate that a vibration level up to 102 VdB (equivalent to 0.5 PPV [in/sec]) is considered safe for buildings consisting of reinforced concrete, steel, or timber (no plaster), and would not result in any construction vibration damage (FTA 2018). For a nonengineered timber and masonry building, the construction vibration damage criterion is 94 VdB (0.2 PPV [in/sec]). For a fragile building, the construction vibration damage criterion is 90 VdB (0.12 PPV [in/sec]).

The greatest levels of vibration are anticipated to occur during the site preparation phase, during which a large bulldozer and a loaded truck are expected to be used. All other phases are expected to result in lower vibration levels. The distance to the nearest buildings for vibration impact analysis is measured between the nearest off-site buildings and the project boundary (assuming the construction equipment would be used at or near the project boundary) because vibration impacts normally occur within the buildings. Table M shows the PPV and VdB values at a distance of 25 ft from the construction vibration source. As shown in Table M, bulldozers and loaded trucks would generate a ground-borne vibration level of 87 and 86 VdB, respectively, when measured at a distance of 25 ft, based on the *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).

The formula for vibration transmission is provided below:

$$L_vdB\ (D) = L_vdB\ (25\ ft) - 30\ Log\ (D/25)$$

$$PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$$

Table M: Vibration Source Amplitudes for Construction Equipment

Equipment	Reference PPV/L_V at 25 ft	
	PPV (in/sec)	L_V (VdB)[1]
Pile Driver (Impact), Typical	0.644	104
Pile Driver (Sonic), Typical	0.170	93
Vibratory Roller	0.210	94
Hoe Ram	0.089	87
Large Bulldozer[2]	0.089	87
Caisson Drilling	0.089	87
Loaded Trucks[2]	0.076	86
Jackhammer	0.035	79
Small Bulldozer	0.003	58

Sources: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).
[1] RMS vibration velocity in decibels (VdB) is 1 µin/sec.
[2] Equipment shown in **bold** is expected to be used on site.
µin/sec = microinches per second
ft = feet
FTA = Federal Transit Administration
in/sec = inches per second
L_V = velocity in decibels
PPV = peak particle velocity
RMS = root-mean-square
VdB = vibration velocity decibels

Table N lists the projected vibration level from various construction equipment expected to be used on the project site to the nearest buildings in the project vicinity. For typical construction activity, the equipment with the highest vibration generation potential is the large bulldozer, which would generate 87 VdB at 25 ft. The closest residential building to the south is approximately 100 ft from the project construction boundary. As shown in Table N, the closest single-family residence at 100 ft from the project construction boundary would experience vibration levels of up to 69 VdB (0.011 PPV [in/sec]). All other residences are farther than 100 ft from the project construction boundary and would experience lower vibration levels.

Table N: Summary of Construction Vibration Levels

Land Use	Direction	Equipment/ Activity	Reference Vibration Level (VdB) at 25 ft	Reference Vibration Level (PPV) at 25 ft	Distance (ft)[1]	Maximum Vibration Level (VdB)	Maximum Vibration Level (PPV)
Single-Family Residence	South	Large bulldozers	87	0.089	100	69	0.011
		Loaded trucks	86	0.076	100	68	0.010
Single-Family Residence	Southwest	Large bulldozers	87	0.089	665	43	0.001
		Loaded trucks	86	0.076	665	43	0.001
Single-Family Residence	East	Large bulldozers	87	0.089	860	46	0.000
		Loaded trucks	86	0.076	860	46	0.000

Source: Compiled by LSA Associates, Inc. (2019).
Note: The FTA-recommended building damage threshold is 90 VdB (or 0.12 PPV [in/sec]) for fragile buildings, 94 VdB (0.2 PPV [in/sec]) for nonengineered timber and masonry structures, and 98 VdB (0.3 PPV [in/sec]) for engineered concrete and masonry buildings.
[1] Distances reflect the nearest structure to the nearest project construction boundary. All other structures in each direction would experience lower vibration levels.
ft = feet
FTA = Federal Transit Administration
in/sec = inches per second
PPV = peak particle velocity
VdB = vibration velocity decibels

Construction vibration levels at the closest residential building from construction equipment or activity would not exceed the FTA threshold of 90 VdB (0.12 PPV [in/sec]) for building damage when bulldozers and loaded trucks operate at the project construction boundary. In addition, construction vibration levels would not exceed the vibration annoyance threshold of 72 VdB. Therefore, construction vibration levels would not occur. No vibration reduction measures are required.

Long-Term Aircraft Noise Impacts

The project is beyond the 65 dBA CNEL impact zone from San Bernardino International Airport based on the *Airport Layout Plan Narrative Report for San Bernardino International Airport* (SBIAA 2010), and beyond the 55 dBA CNEL noise contour of both Flabob Airport and Riverside Municipal Airport based on the *Riverside County Airport Land Use Compatibility Plan* (Riverside County ALUC 2004). Therefore, the project would not expose people residing or working in the project area to excessive noise levels.

Long-Term Off-Site Traffic Noise Impacts

The FHWA Highway Traffic Noise Prediction Model (FHWA-RD-77-108) was used to evaluate highway traffic-related noise conditions along roadway segments in the project vicinity. This model requires various parameters, including traffic volumes, vehicle mix, vehicle speed, and roadway geometry to compute typical equivalent noise levels during daytime, evening, and nighttime hours. The resultant noise levels are weighted and summed over 24-hour periods to determine the CNEL values. Traffic volumes were obtained from the *Traffic Impact Analysis for the Grand Terrace Trailer/Container Storage Project* (LSA, August 2019). The standard vehicle mix for Southern California streets was used in this analysis. Tables O, P, and Q provide the traffic noise levels for the existing, Opening Year (2020), and Cumulative (2020) with and without project, respectively. These noise levels represent the worst-case scenario, which assumes no shielding is provided between the traffic and the location where the noise contours are drawn. Appendix A provides the specific assumptions used in developing these noise levels and model printouts.

Tables O, P, and Q shows that the project-related traffic noise increase would be up to 2.6 dBA along Terrace Avenue and up to 0.1 dBA along Barton Road and La Cadena Drive. Noise level increases less than 3 dBA would not be perceptible to the human ear in an outdoor environment. It should be noted that traffic noise levels on Terrace Avenue would remain low as shown in Table Q and noise from traffic on La Cadena Drive and BNSF Railway operations dominate the noise environment in the project area. Therefore, no project-related traffic noise impacts on off-site sensitive receptors would occur. No noise reduction measures are required.

Long-Term Vibration Impacts

The proposed container/trailer storage facility would not generate vibration. In addition, vibration levels generated from project-related traffic on the adjacent roadways (La Cadena Drive, Barton Road, and Terrace Avenue) are unusual for on-road vehicles because the rubber tires and suspension systems of on-road vehicles provide vibration isolation. Therefore, no vibration generated from project-related traffic on the adjacent roadways would occur, and no vibration reduction measures are required.

Table O: Existing (2019) Traffic Noise Levels Without and With Project

Roadway Segment	Without Project Traffic Conditions					With Project Traffic Conditions					
	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	Increase from Baseline Conditions
Barton Road Between La Cadena Drive and Terrace Avenue	6,820	< 50	< 50	64	60.9	6,970	< 50	< 50	65	61.0	0.1
Barton Road Between Terrace Avenue and La Crosse Avenue	11,130	< 50	53	114	64.7	11,290	< 50	54	115	64.7	0.0
Barton Road Between La Crosse Avenue and I-215 SB Ramps	14,345	< 50	63	135	65.8	14,425	< 50	63	135	65.8	0.0
Barton Road Between I-215 SB Ramps and I-215 NB Ramps	20,205	< 50	79	169	67.2	20,285	< 50	79	170	67.3	0.1
La Cadena Drive North of Barton Road	20,070	71	144	305	69.3	20,070	71	144	305	69.3	0.0
La Cadena Drive South of Barton Road	19,550	70	141	299	69.2	19,700	70	142	301	69.2	0.0
Terrace Avenue North of Barton Road	380	< 50	< 50	< 50	46.6	690	< 50	< 50	< 50	49.2	2.6

Source: Compiled by LSA Associates, Inc. (2019).
Note: Traffic noise within 50 ft of the roadway centerline should be evaluated with site-specific information.
ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
ft = feet
I-215 = Interstate 215
NB = northbound
ND = no data
SB = southbound

Table P: Opening Year (2020) Traffic Noise Levels Without and With Project

Roadway Segment	Without Project Traffic Conditions					With Project Traffic Conditions					
	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	Increase from Baseline Conditions
Barton Road Between La Cadena Drive and Terrace Avenue	6,955	< 50	< 50	65	61.0	7,105	< 50	< 50	66	61.1	0.1
Barton Road Between Terrace Avenue and La Crosse Avenue	11,725	< 50	55	118	64.9	11,845	< 50	55	119	64.9	0.0
Barton Road Between La Crosse Avenue and I-215 SB Ramps	0	< 50	< 50	< 50	24.2	0	< 50	< 50	< 50	24.2	0.0
Barton Road Between I-215 SB Ramps and I-215 NB Ramps	20,635	< 50	80	172	67.3	20,755	< 50	80	172	67.4	0.1
La Cadena Drive North of Barton Road	20,470	72	145	309	69.4	20,470	72	145	309	69.4	0.0
La Cadena Drive South of Barton Road	19,950	71	143	303	69.3	20,100	71	144	305	69.3	0.0
Terrace Avenue North of Barton Road	380	< 50	< 50	< 50	46.6	690	< 50	< 50	< 50	49.2	2.6

Source: Compiled by LSA Associates, Inc. (2019).
Note: Traffic noise within 50 ft of the roadway centerline should be evaluated with site-specific information.
ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
ft = feet
I-215 = Interstate 215
NB = northbound
ND = no data
SB = southbound

Table Q: Cumulative (2020) Traffic Noise Levels Without and With Project

Roadway Segment	Without Project Traffic Conditions					With Project Traffic Conditions					
	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	Increase from Baseline Conditions
Barton Road Between La Cadena Drive and Terrace Avenue	14,170	< 50	< 50	105	64.1	14,320	< 50	< 50	105	64.1	0.0
Barton Road Between Terrace Avenue and La Crosse Avenue	19,375	< 50	77	165	67.1	19,495	< 50	77	165	67.1	0.0
Barton Road Between La Crosse Avenue and I-215 SB Ramps	0	< 50	< 50	< 50	24.2	0	< 50	< 50	< 50	24.2	0.0
Barton Road Between I-215 SB Ramps and I-215 NB Ramps	31,570	< 50	106	228	69.2	31,690	< 50	106	229	69.2	0.0
La Cadena Drive North of Barton Road	27,930	86	178	379	70.7	27,930	86	178	379	70.7	0.0
La Cadena Drive South of Barton Road	28,480	87	180	384	70.8	28,630	87	181	385	70.8	0.0
Terrace Avenue North of Barton Road	380	< 50	< 50	< 50	46.6	690	< 50	< 50	< 50	49.2	2.6

Source: Compiled by LSA Associates, Inc. (2019).
Note: Traffic noise within 50 ft of the roadway centerline should be evaluated with site-specific information.
ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
ft = feet
I-215 = Interstate 215
NB = northbound
ND = no data
SB = southbound

Long-Term Off-Site Stationary Noise Impacts

Adjacent off-site land uses would be potentially exposed to stationary-source noise impacts from the proposed on-site container and chassis drop-off and pick-up activities, forklift operations, HVAC equipment, and parking lot activities.

Container/Trailer and Chassis Drop-Off and Pick-up Activities

Container/trailer and chassis drop-off and pickup activities for the project would take place on the project site. Noise levels generated from these activities would result in maximum noise similar to noise readings conducted by LSA from truck loading and unloading activities, which assume a noise level of 75 dBA L_{max} at 50 ft. Although a container/trailer and chassis drop-off and pickup activities process takes an average of 15–20 minutes, this maximum noise level occurs in a much shorter period of time (less than 5 minutes). The City of Grand Terrace Noise Ordinance allows loading or unloading of trucks during daytime hours (7:00 a.m. to 10:00 p.m.) but prohibits these activities during nighttime hours (10:00 p.m. to 7:00 a.m.). Because the City's Noise Ordinance does not define loud or excessive noise, the County of San Bernardino noise standards were used to evaluate container/trailer and chassis drop-off and pick-up activities during nighttime hours. In addition, truck movement for container/trailer and chassis drop-off and pick-up activities would not occur within 50 ft of an occupied residence.

The closest residence to the south of the project in Grand Terrace is 300 ft from container/trailer and chassis drop-off and pick-up activities. At a distance of 300 ft, noise levels generated from these activities would be attenuated by 12 dBA. Noise associated with the on-site container/trailer and chassis drop-off and pick-up activities at the closest residence would reach 63 dBA L_{max} (i.e., 75 dBA - 12 dBA = 63 dBA). This noise level would not exceed the County of San Bernardino's exterior nighttime maximum noise standard of 65 dBA L_{max}, but would exceed the 5-minute and 1-minute noise standards of 55 dBA and 60 dBA, respectively. However, as shown in Table H, intermittent nighttime ambient noise levels in the vicinity of the residence currently reach up to 64 dBA L_8 and 69 dBA L_2. Intermittent nighttime noise levels from container/trailer and chassis drop-off and pick-up activities would be lower than existing intermittent noise levels at the residences in Grand Terrace.

The closest residences southwest and east of the project in Colton are 850 ft and 890 ft, respectively, from container/trailer and chassis drop-off and pick-up activities. At a distance of 850 ft and 890 ft, noise levels generated from these activities would be attenuated by 25 dBA. Noise associated with the on-site container/trailer and chassis drop-off and pick-up activities at the closest residences to the southwest and east would reach 50 dBA L_{max} (i.e., 75 dBA - 25 dBA = 50 dBA). Noise levels generated from on-site container/trailer and chassis drop-off and pick-up activities would not exceed the City of Colton's exterior noise standard of 65 dBA. Therefore, no noise impacts would occur from on-site container/trailer and chassis drop-off and pick-up activities. No noise reduction measures are required.

Forklift Operations

The project would use forklifts on the center road to remove some of the containers from their chassis and stack the separated containers and chassis. The City of Grand Terrace Noise Ordinance

allows forklift operations during daytime hours (7:00 a.m. to 10:00 p.m.) but prohibits loud or excessive noise levels from this activity during nighttime hours (10:00 p.m. to 7:00 a.m.). The County of San Bernardino noise standards were used to evaluate noise generated by forklift operations in the City of Grand Terrace because the City's Noise Ordinance does not define loud or excessive noise.

As shown in Table K, the maximum noise level generated by a forklift is assumed to be approximately 85 dBA L_{max} at 50 ft. At 630 ft, noise levels generated from these activities would be attenuated by 22 dBA. Noise associated with the on-site forklift operations at the closest residence in Grand Terrace would reach 63 dBA L_{max} (i.e., 85 dBA - 22 dBA = 63 dBA). These noise levels would not exceed the County of San Bernardino's exterior nighttime (10:00 p.m. to 7:00 a.m.) maximum noise standard of 65 dBA, but would exceed the 5-minute and 1-minute noise standards of 55 dBA and 60 dBA, respectively. However, as shown in Table H, nighttime ambient noise levels in the vicinity of the residence currently reach up to 69 dBA L_2 and 64 dBA L_8. Therefore, intermittent nighttime noise levels from container/trailer and chassis drop-off and pick-up activities would be similar to existing intermittent noise levels at the residences in Grand Terrace.

The closest residences southwest and east of the project in Colton are 1,020 ft and 850 ft, respectively, from forklift activities. At a distance of 1,020 ft and 850 ft, noise levels generated from these activities would be attenuated by 26 dBA and 25 dBA, respectively. Noise associated with forklift activities at the closest residences southwest and east of the project would reach 59 dBA L_{max} (i.e., 85 dBA - 26 dBA = 59 dBA) and 60 dBA L_{eq} (i.e., 85 dBA - 25 dBA = 60 dBA), respectively. Noise levels generated from forklift operations would not exceed the City of Colton's exterior noise standard of 65 dBA. Therefore, no noise impacts would occur from on-site forklift operations. No noise reduction measures are required.

Heating, Ventilation, and Air Conditioning Equipment

The project would have rooftop HVAC units for the proposed office trailer. The HVAC equipment could operate 24 hours per day. Rooftop HVAC equipment would generate noise levels of 66.6 dBA L_{eq} at 5 ft based on previous measurements conducted by LSA.

The closest residence south of the project in Grand Terrace is 930 ft from the proposed on-site HVAC equipment. At a distance of 930 ft, noise would be attenuated by 46 dBA compared to the noise level measured at 5 ft from the source. Noise generated from on-site HVAC equipment at the closest residence south of the project would reach 21 dBA L_{eq} (i.e., 66.6 dBA - 46 dBA = 21 dBA). This noise level would not exceed the County of San Bernardino's exterior daytime and exterior nighttime 30-minute noise standards of 55 and 45 dBA, respectively, for residential uses.

The closest residences southwest and east of the project in Colton are 1,145 ft and 1,980 ft, respectively, from the proposed on-site HVAC equipment. At a distance of 1,145 ft and 1,980 ft, noise would be attenuated by 48 dBA and 52 dBA, respectively, compared to the noise level measured at 5 ft from the source. Noise generated from on-site HVAC equipment at the closest residences southwest and east of the project would reach 19 dBA L_{eq} (i.e., 66.6 dBA - 48 dBA = 19 dBA) and 15 dBA L_{eq} (i.e., 66.6 dBA - 52 dBA = 15 dBA), respectively. These noise levels would not

exceed the City of Colton's exterior noise standard of 65 dBA. Therefore, no noise impacts from on-site HVAC equipment would occur. No noise reduction measures are required.

Parking Lot Activities

The project would include some parking near the on-site office building. The parking spaces would generate noise that would potentially impact adjacent land uses. Noise generated from parking activities would include noise generated by vehicles traveling at slow speeds, engine start-up noise, car door slams, car horns, car alarms, and tire squeals. Representative parking activities would generate approximately 60 to 70 dBA L_{max} at 50 ft. Noise levels generated from parking activities are intermittent in nature.

The closest residence south of the project in Grand Terrace is 1,000 ft from the proposed parking area. At a distance of 1,000 ft, noise would be attenuated by 26 dBA compared to the noise level measured at 50 ft from the source. Noise generated from on-site parking lot activities at the closest residence south of the project would reach 44 dBA L_{max} (70 dBA - 26 dBA = 44 dBA). This noise level would not exceed the County of San Bernardino's exterior daytime (7:00 a.m. to 10:00 p.m.) or nighttime (10:00 p.m. to 7:00 a.m.) maximum noise standards of 75 dBA L_{max} and 65 dBA L_{max}, respectively.

The closest residences southwest and east of the project in Colton are 1,145 ft and 1,965 ft, respectively, from the proposed parking area. At a distance of 1,145 ft and 1,965 ft, noise would be attenuated by 27 dBA and 32 dBA, respectively, compared to the noise level measured at 50 ft from the source. Noise generated from on-site parking lot activities at the closest residences located southwest and east of the project would reach 43 dBA L_{max} (70 dBA - 27 dBA = 43 dBA) and 38 dBA L_{max} (70 dBA - 32 dBA = 38 dBA), respectively. Intermittent noise levels from parking activities would not exceed the City of Colton's exterior noise standard of 65 dBA. Therefore, no noise impacts would occur from on-site parking activities. No noise reduction measures are required.

Maintenance Shed Activities

The maintenance shed will be used for activities associated with the regulatory inspection and maintenance of the trailers and containers as required to be "road-ready" prior to deployment. These activities are generally light inspection replacement, safety check-related items, and minor repair and replacement of needed equipment. The City of Grand Terrace Noise Ordinance allows automotive repair during daytime hours (7:00 a.m. to 10:00 p.m.) but prohibits loud or excessive noise from these activities during nighttime hours (10:00 p.m. to 7:00 a.m.). The County of San Bernardino noise standards were used to evaluate noise levels generated by maintenance shed activities during nighttime hours in the City of Grand Terrace because the City's Noise Ordinance does not define loud or excessive noise.

Equipment inside the maintenance shed that would generate the highest noise level was assumed to be used for welding activities. Based on the information in Table K, a welder/torch would generate 73 dBA L_{max} at 50 ft.

The closest residence south of the project in Grand Terrace is 630 ft from the proposed maintenance shed. At a distance of 630 ft, noise would be attenuated by 22 dBA compared to the noise level

measured at 50 ft from the source. In addition, the maintenance shed with doors open would provide a 12 dBA noise reduction when maintenance activities are conducted inside the shed. Noise generated from the on-site maintenance shed at the closest residence south of the project would reach 39 dBA L_{max} (73 dBA – 12 dBA – 22 dBA = 39 dBA). This noise level would not exceed the County of San Bernardino's exterior nighttime (10:00 p.m. to 7:00 a.m.) 5-minute (L_8), 1-minute (L_2), or maximum noise standards of 55 dBA, 60 dBA, and 65 dBA, respectively.

The closest residences southwest and east of the project in Colton are 1,740 ft and 860 ft, respectively, from the proposed maintenance shed. At distances of 1,740 ft and 860 ft, noise would be attenuated by 31 dBA and 25 dBA, respectively, compared to the noise level measured at 50 ft from the source. In addition, the maintenance shed, with doors open, would provide a 12 dBA noise reduction when maintenance activities are conducted inside the building. Noise generated from the on-site maintenance shed at the closest residences southwest and east of the project would reach 30 dBA L_{max} (73 dBA – 12 dBA – 31 dBA = 30 dBA) and 36 dBA L_{max} (73 dBA – 12 dBA – 25 dBA = 36 dBA), respectively. These noise levels would not exceed the City of Colton's exterior noise standard of 65 dBA. Therefore, no noise impacts would occur from noise generated at the proposed maintenance shed. No noise reduction measures are required.

NOISE REDUCTION MEASURES

Short-Term Construction Noise Impacts

The following measures would minimize construction noise impacts:

- The construction contractor shall limit construction activities to between 7:00 a.m. and 8:00 p.m., Monday through Saturday. No construction activities shall be permitted outside of these hours or on Sundays and federal holidays.
- During all project site excavation and grading, the project contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers consistent with manufacturers' standards.
- The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and most noise-sensitive receptors nearest the project site during all project construction.
- The construction contractor shall place all stationary construction equipment so that the emitted noise is directed away from the sensitive receptors nearest the project site.

Short-Term Construction Vibration Impacts

No noise reduction measures are required.

Long-Term Aircraft Noise Impacts

No noise reduction measures are required.

Long-Term Traffic Noise Impacts

No noise reduction measures are required.

Long-Term Vibration Impacts

No vibration reduction measures are required.

Long-Term Stationary Noise Impacts

No noise reduction measures are required.

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APPENDIX A

FHWA TRAFFIC NOISE MODEL PRINTOUTS

TABLE Existing (2019)-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: Barton Road Between La Cadena Drive and Terrace Avenue
NOTES: Grand Terrace Container/Trailer Storage Project - Existing (2019)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6820 SPEED (MPH): 30 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.92

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	64.4	138.3

TABLE Existing (2019)-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: Barton Road Between Terrace Avenue and La Crosse Avenue
NOTES: Grand Terrace Container/Trailer Storage Project - Existing (2019)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 11130 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.66

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL	70 CNEL	65 CNEL	60 CNEL	55 CNEL
	0.0	53.2	113.9	245.1

TABLE Existing (2019)-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: Barton Road Between La Crosse Avenue and I-215 SB Ramps
NOTES: Grand Terrace Container/Trailer Storage Project - Existing (2019)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 14345 SPEED (MPH): 35 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.76

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	62.8	134.9	290.3

TABLE Existing (2019)-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: Barton Road Between I-215 SB Ramps and I-215 NB Ramps
NOTES: Grand Terrace Container/Trailer Storage Project - Existing (2019)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 20205 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.25

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	78.8	169.4	364.7

TABLE Existing (2019)-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: La Cadena Drive North of Barton Road
NOTES: Grand Terrace Container/Trailer Storage Project - Existing (2019)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 20070 SPEED (MPH): 50 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 28 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.30

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
71.1	143.5	304.5	653.7

TABLE Existing (2019)-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: La Cadena Drive South of Barton Road
NOTES: Grand Terrace Container/Trailer Storage Project - Existing (2019)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 19550 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 28 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.18

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
70.1	141.1	299.3	642.4

TABLE Existing (2019)-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: Terrace Avenue North of Barton Road
NOTES: Grand Terrace Container/Trailer Storage Project - Existing (2019)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 380 SPEED (MPH): 25 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 5 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 46.63

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Existing (2019) with Project -01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: Barton Road Between La Cadena Drive and Terrace Avenue
NOTES: Grand Terrace Container/Trailer Storage Project - Existing (2019) with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6970 SPEED (MPH): 30 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 61.02

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	65.3	140.3

TABLE Existing (2019) with Project -02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: Barton Road Between Terrace Avenue and La Crosse Avenue
NOTES: Grand Terrace Container/Trailer Storage Project - Existing (2019) with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 11290 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.72

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	53.7	115.0	247.5

TABLE Existing (2019) with Project -03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: Barton Road Between La Crosse Avenue and I-215 SB Ramps
NOTES: Grand Terrace Container/Trailer Storage Project - Existing (2019) with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 14425 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.78

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	63.1	135.4	291.4

TABLE Existing (2019) with Project -04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: Barton Road Between I-215 SB Ramps and I-215 NB Ramps
NOTES: Grand Terrace Container/Trailer Storage Project - Existing (2019) with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 20285 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.26

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	79.0	169.9	365.7

TABLE Existing (2019) with Project -05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: La Cadena Drive North of Barton Road
NOTES: Grand Terrace Container/Trailer Storage Project - Existing (2019) with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 20070 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 28 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.30

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
71.1	143.5	304.5	653.7

TABLE Existing (2019) with Project -06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: La Cadena Drive South of Barton Road
NOTES: Grand Terrace Container/Trailer Storage Project - Existing (2019) with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 19700 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 28 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.22

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
70.4	141.8	300.8	645.7

TABLE Existing (2019) with Project -07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: Terrace Avenue North of Barton Road
NOTES: Grand Terrace Container/Trailer Storage Project - Existing (2019) with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 690 SPEED (MPH): 25 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 5 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 49.22

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Opening Year (2020) w/o Project -01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: Barton Road Between La Cadena Drive and Terrace Avenue
NOTES: Grand Terrace Container/Trailer Storage Project - Opening Year (2020) w/o Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6955 SPEED (MPH): 30 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 61.01

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	65.2	140.1

TABLE Opening Year (2020) w/o Project -02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: Barton Road Between Terrace Avenue and La Crosse Avenue
NOTES: Grand Terrace Container/Trailer Storage Project - Opening Year (2020) w/o Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 11725 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.88

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	55.0	117.9	253.8

TABLE Opening Year (2020) w/o Project -03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: Barton Road Between La Crosse Avenue and I-215 SB Ramps
NOTES: Grand Terrace Container/Trailer Storage Project - Opening Year (2020) w/o Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 0 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 24.19

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Opening Year (2020) w/o Project -04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: Barton Road Between I-215 SB Ramps and I-215 NB Ramps
NOTES: Grand Terrace Container/Trailer Storage Project - Opening Year (2020) w/o Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 20635 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.34

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	79.9	171.8	369.9

TABLE Opening Year (2020) w/o Project -05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: La Cadena Drive North of Barton Road
NOTES: Grand Terrace Container/Trailer Storage Project - Opening Year (2020) w/o Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 20470 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 28 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.38

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
71.9	145.4	308.5	662.4

TABLE Opening Year (2020) w/o Project -06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: La Cadena Drive South of Barton Road
NOTES: Grand Terrace Container/Trailer Storage Project - Opening Year (2020) w/o Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 19950 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 28 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.27

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
70.9	143.0	303.3	651.1

TABLE Opening Year (2020) w/o Project -07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: Terrace Avenue North of Barton Road
NOTES: Grand Terrace Container/Trailer Storage Project - Opening Year (2020) w/o Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 380 SPEED (MPH): 25 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 5 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 46.63

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Opening Year (2020) with Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: Barton Road Between La Cadena Drive and Terrace Avenue
NOTES: Grand Terrace Container/Trailer Storage Project - Opening Year (2020) with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 7105 SPEED (MPH): 30 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 61.10

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	66.2	142.1

TABLE Opening Year (2020) with Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: Barton Road Between Terrace Avenue and La Crosse Avenue
NOTES: Grand Terrace Container/Trailer Storage Project - Opening Year (2020) with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 11845 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.93

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	55.4	118.7	255.5

TABLE Opening Year (2020) with Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: Barton Road Between La Crosse Avenue and I-215 SB Ramps
NOTES: Grand Terrace Container/Trailer Storage Project - Opening Year (2020) with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 0 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 24.19

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Opening Year (2020) with Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: Barton Road Between I-215 SB Ramps and I-215 NB Ramps
NOTES: Grand Terrace Container/Trailer Storage Project - Opening Year (2020) with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 20755 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.36

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	80.2	172.5	371.3

TABLE Opening Year (2020) with Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: La Cadena Drive North of Barton Road
NOTES: Grand Terrace Container/Trailer Storage Project - Opening Year (2020) with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 20470 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 28 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.38

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
71.9	145.4	308.5	662.4

TABLE Opening Year (2020) with Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: La Cadena Drive South of Barton Road
NOTES: Grand Terrace Container/Trailer Storage Project - Opening Year (2020) with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 20100 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 28 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.30

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
71.2	143.7	304.8	654.4

TABLE Opening Year (2020) with Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: Terrace Avenue North of Barton Road
NOTES: Grand Terrace Container/Trailer Storage Project - Opening Year (2020) with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 690 SPEED (MPH): 25 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 5 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 49.22

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Cumulative w/o Project (2020)-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: Barton Road Between La Cadena Drive and Terrace Avenue
NOTES: Grand Terrace Container/Trailer Storage Project - Cumulative w/o Project (2020)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 14170 SPEED (MPH): 30 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.10

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	104.6	225.0

TABLE Cumulative w/o Project (2020)-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: Barton Road Between Terrace Avenue and La Crosse Avenue
NOTES: Grand Terrace Container/Trailer Storage Project - Cumulative w/o Project (2020)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 19375 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.07

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	76.7	164.7	354.7

TABLE Cumulative w/o Project (2020)-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: Barton Road Between La Crosse Avenue and I-215 SB Ramps
NOTES: Grand Terrace Container/Trailer Storage Project - Cumulative w/o Project (2020)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 0 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 24.19

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Cumulative w/o Project (2020)-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: Barton Road Between I-215 SB Ramps and I-215 NB Ramps
NOTES: Grand Terrace Container/Trailer Storage Project - Cumulative w/o Project (2020)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 31570 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.19

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	106.0	228.0	491.1

TABLE Cumulative w/o Project (2020)-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: La Cadena Drive North of Barton Road
NOTES: Grand Terrace Container/Trailer Storage Project - Cumulative w/o Project (2020)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 27930 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 28 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.73

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
86.1	177.7	379.0	814.6

TABLE Cumulative w/o Project (2020)-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: La Cadena Drive South of Barton Road
NOTES: Grand Terrace Container/Trailer Storage Project - Cumulative w/o Project (2020)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 28480 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 28 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.82

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
87.1	179.9	383.9	825.2

TABLE Cumulative w/o Project (2020)-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: Terrace Avenue North of Barton Road
NOTES: Grand Terrace Container/Trailer Storage Project - Cumulative w/o Project (2020)

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 380 SPEED (MPH): 25 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 5 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 46.63

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL	70 CNEL	65 CNEL	60 CNEL	55 CNEL
	0.0	0.0	0.0	0.0

TABLE Cumulative (2020) with Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: Barton Road Between La Cadena Drive and Terrace Avenue
NOTES: Grand Terrace Container/Trailer Storage Project - Cumulative (2020) with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 14320 SPEED (MPH): 30 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.14

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	105.3	226.6

TABLE Cumulative (2020) with Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: Barton Road Between Terrace Avenue and La Crosse Avenue
NOTES: Grand Terrace Container/Trailer Storage Project - Cumulative (2020) with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 19495 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.09

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	77.0	165.4	356.1

TABLE Cumulative (2020) with Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: Barton Road Between La Crosse Avenue and I-215 SB Ramps
NOTES: Grand Terrace Container/Trailer Storage Project - Cumulative (2020) with Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 0 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 24.19

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0

TABLE Cumulative (2020) with Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: Barton Road Between I-215 SB Ramps and I-215 NB Ramps
NOTES: Grand Terrace Container/Trailer Storage Project - Cumulative (2020) with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 31690 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.20

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	106.3	228.6	492.3

TABLE Cumulative (2020) with Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: La Cadena Drive North of Barton Road
NOTES: Grand Terrace Container/Trailer Storage Project - Cumulative (2020) with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 27930 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 28 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.73

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
86.1	177.7	379.0	814.6

TABLE Cumulative (2020) with Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: La Cadena Drive South of Barton Road
NOTES: Grand Terrace Container/Trailer Storage Project - Cumulative (2020) with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 28630 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 28 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.84

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
87.4	180.6	385.3	828.1

TABLE Cumulative (2020) with Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 09/03/2019
ROADWAY SEGMENT: Terrace Avenue North of Barton Road
NOTES: Grand Terrace Container/Trailer Storage Project - Cumulative (2020) with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 690 SPEED (MPH): 25 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 5 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 49.22

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	0.0
