NOISE AND VIBRATION IMPACT ANALYSIS

MAPES AND TRUMBLE INDUSTRIAL FACILITY PROJECT

PERRIS, CALIFORNIA

LSA

February 2023

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PERRIS, CALIFORNIA

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TABLE OF CONTENTS

APPENDICES

FIGURES AND TABLES

FIGURES

TABLES

LIST OF ABBREVIATIONS AND ACRONYMS

ADT	average daily traffic
CalEEMod	California Emissions Estimator Model
CEQA	California Environmental Quality Act
City	City of Perris
CNEL	Community Noise Equivalent Level
dB	decibel
dBA	A-weighted decibels
FHWA	Federal Highway Administration
ft	foot/feet
FTA	Federal Transit Administration
HVAC	heating, ventilation, and air conditioning
in/sec	inches per second
L_{dn}	day-night average noise level
L_{eq}	equivalent continuous sound level
L_{max}	maximum instantaneous noise level
mi	mile(s)
PPV	peak particle velocity
project	Mapes and Trumble Industrial Facility Project
RMS	root-mean-square (velocity)
sf	square foot
VdB	vibration velocity decibels

NOISE AND VIBRATION IMPACT ANALYSIS

INTRODUCTION

This Noise and Vibration Impact Analysis has been prepared to evaluate the potential noise and vibration impacts and reduction measures associated with the construction and operation of the proposed Mapes and Trumble Industrial Facility Project (project) in Perris, California. This report is intended to satisfy City of Perris (City) requirements and the California Environmental Quality Act (CEQA) for a project-specific noise and vibration impact analysis by examining the impacts to adjacent land uses and identifying reduction measures that the project requires.

PROJECT LOCATION

The project site is located southwest of the Trumble Road and Mapes Road intersection in Perris. The project site is an undeveloped 19.16-acre lot, consisting of Assessor's Parcel Numbers 329-020-033, -034, -044, and -046. The site has a General Plan Industrial BP-Business Park land use designation and a corresponding BP zoning designation (City of Perris General Plan Map and Zoning Map n.d.). The project location and vicinity are shown in Figure 1.

PROJECT DESCRIPTION

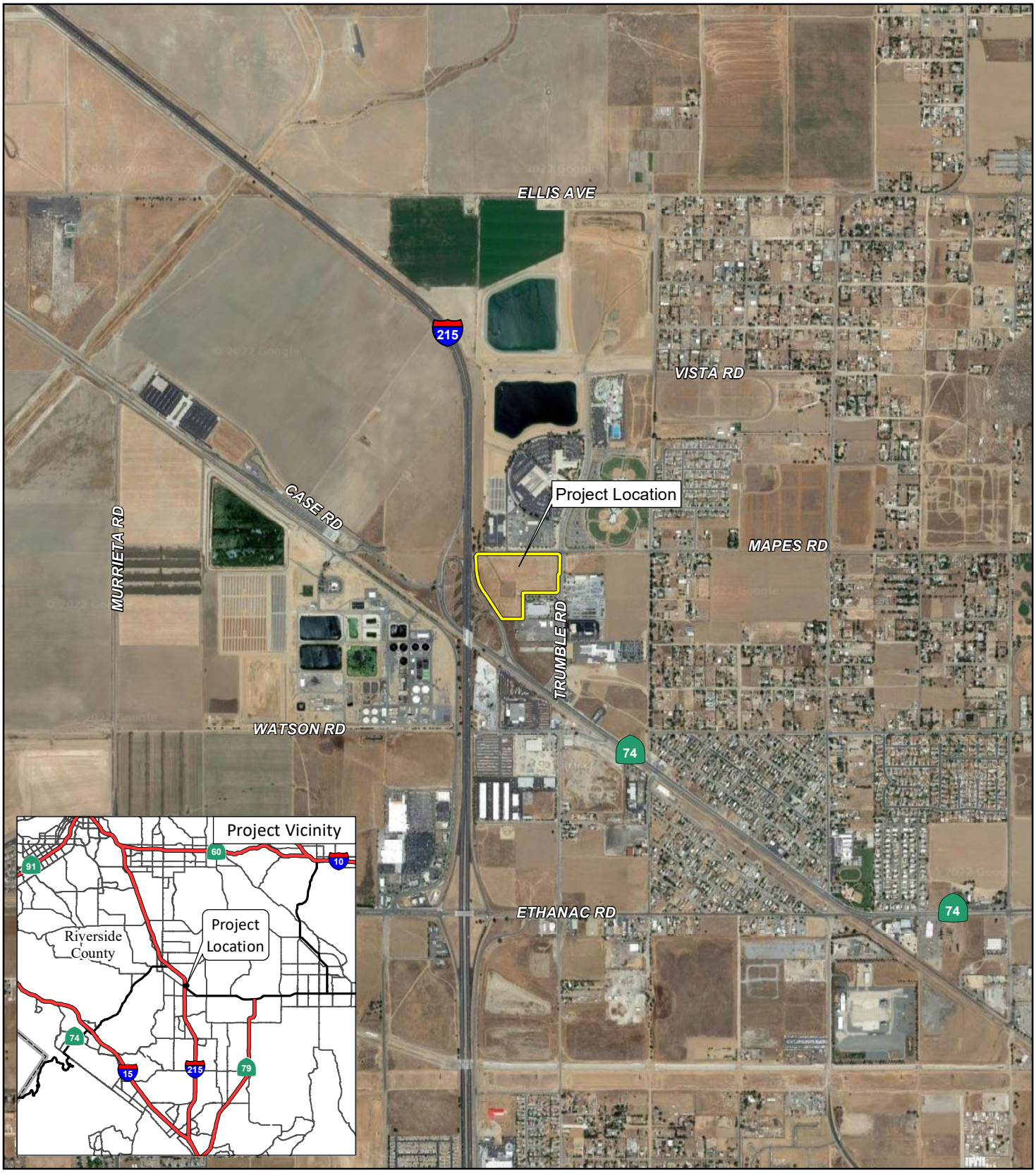
The proposed project would result in the development of the site with a 395,500-square-foot (sf) industrial warehouse building. The proposed warehouse project would include 6,000 sf of general office space, 6,000 sf of mezzanine, tractor trailer loading docks, and both auto and truck parking spaces. As the future tenant of the building is unknown at this time, the analysis assumes that half of the building would operate as a non-refrigerated warehouse and the other half as a refrigerated warehouse and that standard warehouse equipment (e.g., forklifts, material handlers) would be used. 28,891 cubic yards of soil would be imported to raise the site by 12 inches above base flood elevation. The proposed project construction schedule is assumed to begin in March 2023 and be completed in August 2024. Figure 2 shows the site plan.

SENSITIVE LAND USES IN THE PROJECT VICINITY

Existing land uses within the project area include a recreational use associated with the Big League Dreams Perris sports complex, a commercial/industrial use, vacant land, and public utilities. The Big League Dreams Perris sports complex is northeast of the project site across the intersection of Mapes Road and Trumble Road. The commercial/industrial building is immediately south of the project site. Vacant land is located east of the project site across Trumble Road. Public utilities are north of the project site across Mapes Road and east of the project site across Trumble Road. There are no residences in the project area within the city limits of Perris. However, the closest residences are located 1,390 east from the project site in Menifee.

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.



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LEGEND

Project Location

FIGURE 1

N

0 1000 2000

FEET

SOURCE: Google (2021)

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Mapes and Trumble Industrial Facility Project

Regional and Project Location

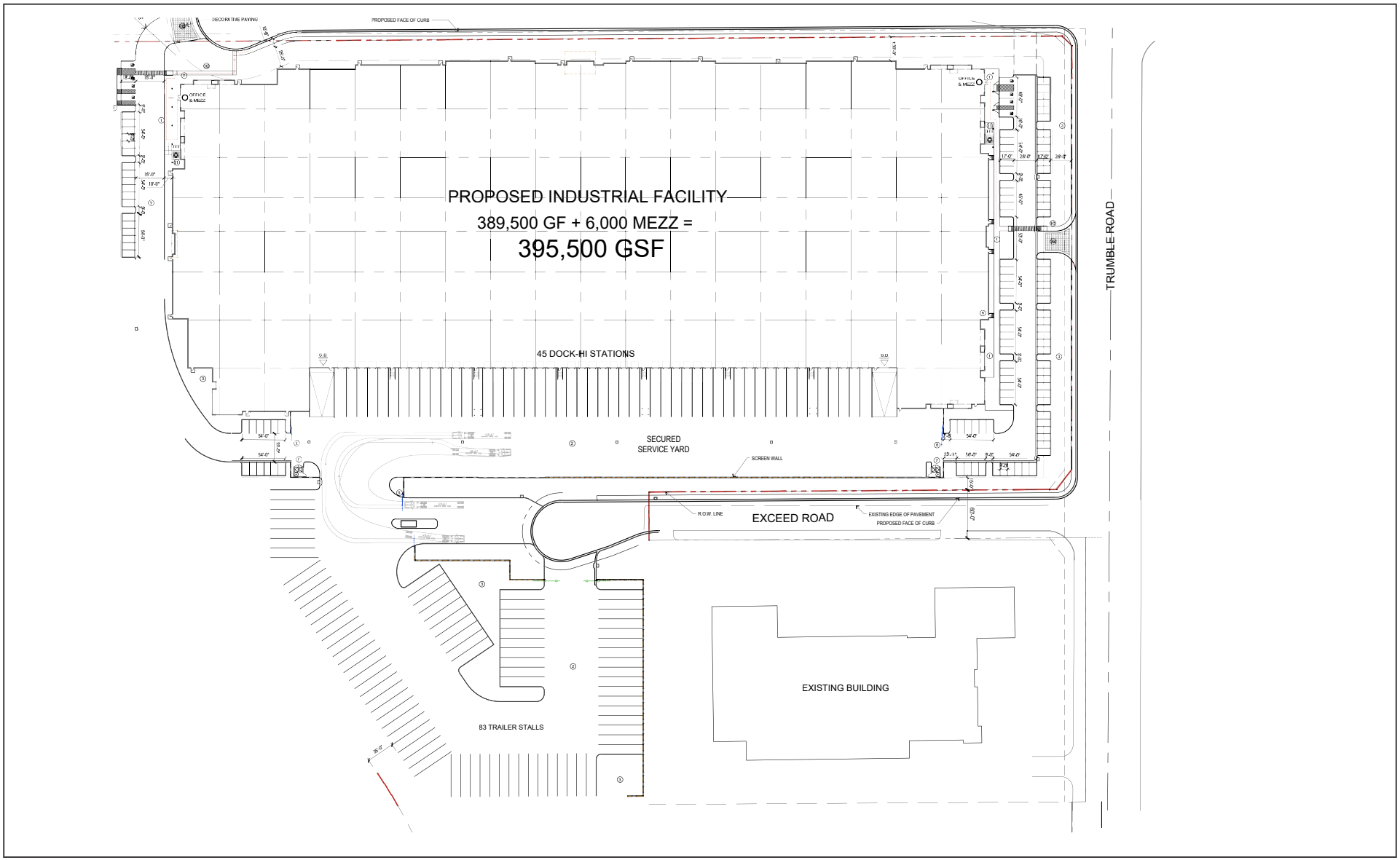

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FIGURE 2

N

0 60 120

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SOURCE: AO Architecture

Mapes and Trumble Industrial Facility Project

Site Plan

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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 wave, resulting in the tone's range from high to low. Loudness is the strength of a sound and 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 waves combined with the reception characteristics of the human ear. Sound intensity refers to how hard the sound wave strikes an object, which in turn produces the sound's effect. 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.

Measurement of Sound

Sound intensity is measured through the A-weighted 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. Unlike units of measurement that use a linear scale (e.g., inches or pounds), decibels use 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 loudness of the sound. Ambient sounds generally range from 30 A-weighted decibels (dBA) (very quiet) to 100 dBA (very loud).

Sound levels are generated from a source, and their decibel level decreases as the distance from that source increases. Sound dissipates exponentially with distance from the noise source. 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, such as highway traffic or railroad operations, the sound decreases 3 dB for each doubling of distance in a hard site environment. Line source noise in a relatively flat environment with absorptive vegetation decreases 4.5 dB for each doubling of distance.

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 California are L_{eq} and the Community Noise Equivalent Level (CNEL) or the day-night average noise level (L_{dn}) based on dBA. CNEL is the time-varying noise over a 24-hour period, with a 5 dBA weighting factor applied to the hourly L_{eq} for noises occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours) and a 10 dBA weighting factor applied to noise occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours). L_{dn} is similar to the CNEL scale but without the adjustment for events occurring during relaxation hours. CNEL and L_{dn} are within 1 dBA of each other and are normally interchangeable. The noise adjustments are added to the noise events occurring during the more sensitive hours.

Other noise rating scales of importance, when assessing the annoyance factor, include the maximum instantaneous noise level (L_{max}), which is the highest exponential time-averaged sound level that occurs during a stated time period. The noise environments discussed in this analysis are specified in terms of L_{max} for short-term noise impacts. L_{max} reflects peak operating conditions and addresses the annoying aspects of intermittent noise.

Another noise scale often used together with L_{max} in noise ordinances for enforcement purposes is noise standards in terms of percentile noise levels. 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 of the time the noise level exceeds this level, and half of 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, L_{eq} and L_{50} are approximately the same.

Noise impacts can be described in three categories. The first category, audible impacts, refers to increases in noise levels noticeable to humans. Audible increases in noise levels generally involve a change of 3 dB or greater because that level has been found to be barely perceptible in exterior environments. The second category, potentially audible impacts, refers to a change in the noise level between 1 and 3 dB. This range of noise levels has been found to be noticeable only in laboratory environments. The last category involves 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 noise levels higher than 85 dBA. Exposure to high noise levels affects the entire system, with prolonged noise exposure in excess of 75 dBA increasing body tensions and thereby affecting blood pressure and functions of the heart and the nervous system. In comparison, extended periods of noise exposure above 90 dBA would result in permanent cell damage. When the noise level reaches 120 dBA, a tickling sensation occurs in the human ear, even with short-term exposure. This level of noise is called the threshold of feeling. As the sound reaches 140 dBA, the tickling sensation is replaced by the feeling of pain in the ear. This is called the threshold of pain. A sound level of 160 to 165 dBA will potentially result in dizziness or loss of equilibrium. The ambient or background noise problem is widespread and generally more concentrated in urban areas than in outlying, less-developed areas.

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

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. Outdoors, 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

Table A: Definitions of Acoustical Terms

Term	Definition
Decibel, dB	A unit of noise 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., 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_2, L_8, L_{50}, L_{90}	The fast A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 2 percent, 8 percent, 50 percent, and 90 percent of a stated time period.
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 dB to sound levels occurring in the evening from 7:00 p.m. to 10:00 p.m. and after the addition of 10 dB 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 dB 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; 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 on its amplitude, duration, frequency, 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 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	½ as loud
Suburban Street	55	Quiet	—
Light Traffic; Soft Radio Music in Apartment	50	Quiet	¼ as loud
Large Transformer	45	Quiet	—
Average Residence without Stereo Playing	40	Faint	⅛ 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 (2004).

motion of building surfaces, the rattling of items 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 feet (ft) from 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 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 (e.g., 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 velocity 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. The vibration velocity level in decibels is defined as the following:

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

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 x 10^{-6} inches/second (in/sec) used in the United States.

REGULATORY SETTING

Federal Guidelines

Federal Transit Administration

Vibration standards included in the Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018) were used in this analysis because the City of Perris does not have vibration standards. Table C provides the criteria for assessing the potential for interference or annoyance from vibration levels in a building while Table D lists the potential vibration building damage criteria associated with construction activities.

Table C: Interpretation of Vibration Criteria for Detailed Analysis

Land Use	Max L_V (VdB)[1]	Description of Use
Workshop	90	Vibration that is distinctly felt. Appropriate for workshops and similar areas not as sensitive to vibration.
Office	84	Vibration that can be felt. Appropriate for offices and similar areas not as sensitive to vibration.
Residential Day	78	Vibration that is barely felt. Adequate for computer equipment and low-power optical microscopes (up to 20X).
Residential Night and Operating Rooms	72	Vibration is not felt, but ground-borne noise may be audible inside quiet rooms. Suitable for medium-power microscopes (100X) and other equipment of low sensitivity.

Source: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).
[1] As measured in 1/3-octave bands of frequency over the frequency range 8 to 80 Hz.
FTA = Federal Transit Administration
Hz = hertz
L_V = vibration velocity in decibels
Max = maximum
VdB = vibration velocity decibels

Table D: 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) is 1 µin/sec.
µin/sec = microinches per second
FTA = Federal Transit Administration
in/sec = inches per second
L_V = vibration velocity in decibels
PPV = peak particle velocity
RMS = root-mean-square
VdB = vibration velocity decibels

Local Regulations

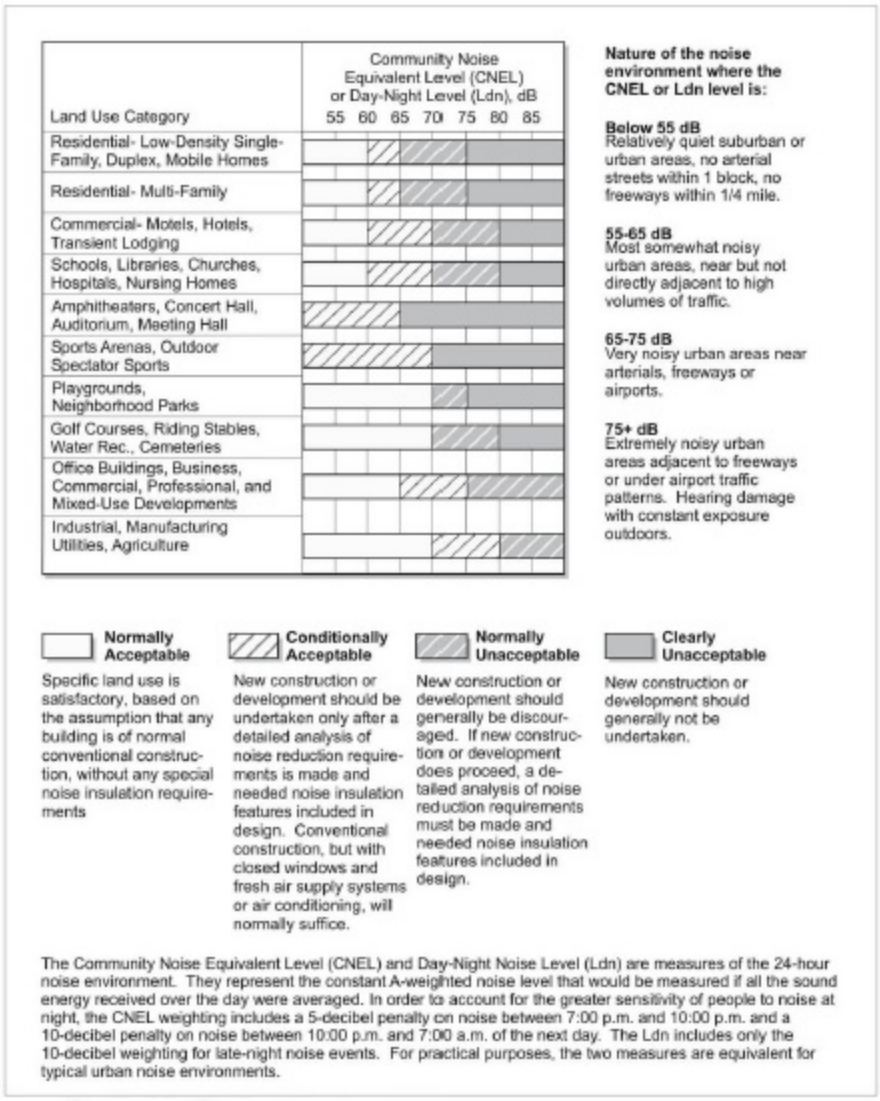
City of Perris

General Plan Noise Element. The City's General Plan Noise Element (City of Perris 2016) lists policies and implementation measures to meet the City's noise-related goals and has established land use/noise compatibility guidelines shown in Table E to evaluate the acceptability of noise levels for each land use category. As shown in Table E, noise levels up to 70 dBA CNEL are normally acceptable and between 70 dBA CNEL and 80 dBA CNEL are conditionally acceptable for industrial land uses. The following are the applicable goals, policies, and implementation measures for the proposed project.

Goal IV – Air Traffic Noise: Future land uses compatible with noise from air traffic

> **Policy IV.A.** Reduce or avoid the existing and potential future impacts from air traffic on new sensitive noise land uses in areas where air traffic noise is 60 dBA CNEL or higher.

Table E: City of Perris Land Use/Noise Compatibility Guidelines



Source: City of Perris General Plan Noise Element, 2016.

Implementation Measures

IV.A.2. All new development proposals in the noise contour areas of 60 dBA and above will be evaluated with respect to the State Noise/Land Use Compatibility Criteria.

Goal V – Stationary Source Noise: Future non-residential land uses compatible with noise sensitive land uses.

Policy V.A. New large scale commercial or industrial facilities located within 160 feet of sensitive land uses shall mitigate noise impacts to attain an acceptable level as required by the State of California Noise/Land Use Compatibility Criteria.

Implementation Measures

V.A.1. An acoustical impact analysis shall be prepared for new industrial and large scale commercial facilities to be constructed within 160 feet of the property line of any existing noise sensitive land use. This analysis shall document the nature of the commercial or industrial facility as well as all interior or exterior facility operations that would generate exterior noise.

The analysis shall document the placement of any existing or proposed noise-sensitive land uses situated within the 160-foot distance. The analysis shall determine the potential noise levels that could be received at these sensitive land uses and specify specific measures to be employed by the large scale commercial or industrial facility to ensure that these levels do not exceed 60 dBA CNEL at the property line of the adjoining sensitive land use.

No development permits or approval of land use applications shall be issued until the acoustic analysis is received and approved by the City Staff.

Municipal Code. Section 7.34.050 of the City's Municipal Code prohibits any person to willfully make, cause or suffer, or permit to be made or caused, any loud excessive or offensive noises or sounds which unreasonably disturb the peace and quiet of any residential neighborhood or which are physically annoying to persons of ordinary sensitivity or which are so harsh, prolonged or unnatural or unusual in their use, time or place as to occasion physical discomfort to the inhabitants of the city, or any section thereof. The noise standards are shown in Table F. To the extent that the noise created causes the noise level at the property line to exceed the ambient noise level by more than 1.0 decibels, it shall be presumed that the noise being created also is in violation of this section.

Table F: Maximum Noise Level Standards

Time Period	Maximum Noise Level
10:01 P.M–7:00 A.M.	60 dBA
7:01 A.M.–10:00 P.M.	80 dBA

Source: City of Perris Municipal Code, Section 7.34.050 (2022).
dBA = A-weighted decibels

Section 7.34.060 of the City's Municipal Code prohibits construction-related activities such as the erection, construction, demolition, excavation, alteration or repairing any building or structure in such a manner as to create disturbing, excessive, or offensive noise to occur between the hours of 7:00 p.m. of any day and 7:00 a.m. of the following day, on Sundays, and legal holidays with the exception of Columbus Day and Washington's birthday. In addition, construction activity shall not exceed 80 dBA in residential zones in the city.

City of Menifee

Noise Element of the General Plan. The Noise Element of the City of Menifee's General Plan (City of Menifee 2013) lists the goals and policies required to meet the City's noise-related goals. Although

the goals and policies listed below are not applicable for the project, they are provided to demonstrate that the project would meet the City of Menifee's noise-related goals.

Goal N-1: Noise-sensitive land uses are protected from excessive noise and vibration exposure.

- **Policy N-1.1:** Assess the compatibility of proposed land uses with the noise environment when preparing, revising, or reviewing development project applications.

- **Policy N-1.2:** Require new projects to comply with the noise standards of local, regional, and state building code regulations, including but not limited to the city's Municipal Code, Title 24 of the California Code of Regulations, the California Green Building Code, and subdivision and development codes.

- **Policy N-1.3:** Require noise abatement measures to enforce compliance with any applicable regulatory mechanisms, including building codes and subdivision and zoning regulations, and ensure that the recommended mitigation measures are implemented.

- **Policy N-1.7:** Mitigate exterior and interior noises to the levels listed in the table[1] below to the extent feasible, for stationary sources adjacent to sensitive receptors.

Table G: Stationary Source Noise Standards

Land Use	Period	Interior	Exterior
Residential	10:00 PM to 7:00 AM	40 dBA L_{eq} (10-minute)	45 dBA L_{eq} (10-minute)
	7:00 AM to 10:00 PM	55 dBA L_{eq} (10-minute)	65 dBA L_{eq} (10-minute)

Source: General Plan Noise Element (City of Menifee 2013) and Development Code (City of Menifee 2022a).
dBA = A-weighted decibel
L_{eq} = equivalent continuous sound level

- **Policy N-1.8:** Locate new development in areas where noise levels are appropriate for the proposed uses. Consider federal, state, and city noise standards and guidelines as a part of new development review.

- **Policy N-1.12:** Minimize potential noise impacts associated with the development of mixed-use projects (vertical or horizontal mixed-use) where residential units are located above or adjacent to noise-generating uses.

- **Policy N-1.13:** Require new development to minimize vibration impacts to adjacent uses during demolition and construction.

[1] Table G.

- **Policy N-1.17:** Prevent the construction of new noise-sensitive land uses within airport noise impact zones. New residential land uses within the 65 dBA CNEL contours of any public-use or military airports, as defined by the Riverside County Airport Land Use Commission, shall be prohibited.

Municipal Code. Section 8.01.010 of the City's Municipal Code (City of Menifee 2022b) permits any construction within the city within 0.25 mile (mi) from an occupied residence Monday through Saturday between the hours of 6:30 a.m. and 7:00 p.m., except on nationally recognized holidays. No construction shall be permitted on Sunday or nationally recognized holidays unless approval is obtained from the City Building Official or City Engineer.

Development Code. Section 9.210.060(B)(10) of the City's Development Code (City of Menifee 2022a) exempts sound emanating from heating and air conditioning equipment in proper repair.

Section 9.210.060(C) of the City's Development Code (City of Menifee 2022a) allows exceptions to be requested from the standards set forth in Section 9.210.060 of the City's Development Code and may be characterized as construction-related, single-event, or continuous-events exceptions:

- Private construction projects, with or without a building permit, located 0.25 mi or more from an inhabited dwelling.

- Private construction projects, with or without a building permit, located within 0.25 mi from an inhabited dwelling, shall be permitted Monday through Saturday, except on nationally recognized holidays, 6:30 a.m. to 7:00 p.m., or as specified in Section 8.01.010 of the Municipal Code (City of Menifee 2022b). There shall be no construction permitted on Sunday or nationally recognized holidays unless approval is obtained from the City Building Official or City Engineer.

- Construction-related exceptions. If construction occurs during off hours or exceeds noise thresholds, an application for a construction-related exception shall be made using the temporary use application provided by the Community Development Director in Chapter 9.110 of the City's Development Code (City of Menifee 2022a). For construction activities on Sunday or nationally recognized holidays, Section 8.01.010 of the Municipal Code shall prevail.

Section 9.210.060(D) of the City's Development Code (City of Menifee 2022a) prohibits the creation of any sound on any property that causes the exterior and interior sound level on any other occupied property to exceed the noise standards shown in Table G (Stationary Source Noise Standards) above.

Section 9.215.070 of the City's Development Code (City of Menifee 2022a) requires that all uses shall be operated so as not to generate vibration discernible without instruments by the average person while on or beyond the lot upon which the source is located or within an adjoining enclosed space if more than one establishment occupies a structure. Vibration caused by motor vehicles, trains, and temporary construction is exempted from this standard.

EXISTING SETTING

Overview of the Existing Ambient Noise Environment

The primary existing noise sources in the project area are transportation facilities. Traffic on Interstate 215 (I-215), CA-74, Trumble Road, Mapes Road, and other local streets within the project vicinity contribute to the ambient noise levels in the project vicinity. Noise from motor vehicles is generated by engines, the interaction between the tires and the road, and the vehicles' exhaust systems. Other sources of noise in the project area include train noise on the San Jacinto Branch rail line located south of the project site along Case Road and CA-74, industrial and public utility activities, and activities from the Big League Dreams Perris sports complex.

Existing Aircraft Noise

Perris Valley Airport, Hemet-Ryan Airport, March Air Reserve Base/Inland Port Airport (MARB/IPA), and French Valley Airport are 1.6 mi west, 9.3 mi east, 8.2 mi northwest, and 12.5 mi south of the project site, respectively. The noise compatibility contours in the *Riverside County Airport Land Use Compatibility Plan* (RCALUC 2004) show that the project site is outside the 55 dBA CNEL noise contours for Perris Valley Airport, Hemet-Ryan Airport, and French Valley Airport, and outside the 60 dBA CNEL noise contours for MARB/IPA. Additionally, there are no helipads or private airstrips within 2 mi of the project area. Therefore, the project would not expose people working in the project area to excessive noise levels, and this topic is not further discussed.

Existing Traffic Noise

The Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA RD-77-108) (FHWA 1977) 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 resulting noise levels are weighted and summed over 24-hour periods to determine the CNEL values. Existing average daily traffic (ADT) volumes in the project area were obtained from the *Mapes and Trumble Industrial Facility Project Traffic Study* (LSA 2022b). In addition, the vehicle mix for each roadway in the project area was obtained from the traffic counts contained in the *Mapes and Trumble Industrial Facility Project Traffic Study* (LSA 2022b). Table H lists the existing traffic noise levels on roadways in the project area. These noise levels represent the worst-case scenario, which assumes that no shielding is provided between traffic and the location where the noise contours are drawn. The specific assumptions used in developing these noise levels and the model printouts are provided in Appendix A.

As shown in Table H, traffic noise levels along Mapes Road are low with the 70 and 65 dBA CNEL impact zones located less than 50 ft from the roadway centerline, and the 60 dBA CNEL impact zone would extend up to 106 ft from the roadway centerline. Traffic noise levels along Trumble Road are moderate with the 70 dBA CNEL impact zone located less than 50 ft from the roadway centerline, and the 65 and 60 dBA CNEL impact zones would extend up to 63 and 128 ft, respectively, from the roadway centerline. Traffic noise levels along CA-74 are moderately high with the 70, 65, and 60 dBA CNEL impact zones extending up to 68, 138, and 294 ft, respectively, from the roadway centerline.

Table H: 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 the Centerline of the Outermost Lane
Mapes Road Between Project Driveway 1 and Trumble Road	100	< 50	< 50	< 50	46.4
Mapes Road East of Trumble Road	4,070	< 50	53	112	63.9
Trumble Road North of Mapes Road	3,060	< 50	< 50	73	59.9
Trumble Road Between Mapes Road and Project Driveway 2	6,050	< 50	68	140	64.4
Trumble Road Between Project Driveway 2 and Exceed Road	6,050	< 50	68	140	64.4
Trumble Road Between Exceed Road and CA-74	6,985	< 50	92	193	66.6
I-215 Southbound Ramps North of Bonnie Drive	11,260	56	121	260	70.0
I-215 Southbound Ramps/CA-74 Between Bonnie Drive and I-215 Northbound Ramps	15,900	65	139	298	70.3
CA-74 Between I-215 Northbound Ramps and Trumble Road	24,810	97	204	437	71.9
CA-74 East of Trumble Road	18,670	70	143	304	69.5

Source: Compiled by LSA (2022).
Note: Traffic noise within 50 ft of the roadway centerline should be evaluated with site-specific information.
ADT = average daily traffic
CA = California State Route
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
ft = foot/feet
I- = Interstate

IMPACTS

Short-Term Construction Noise Impacts

Two types of short-term noise impacts could occur during construction on the project site. First, construction crew commutes and the transport of construction equipment and materials to the site for the project would incrementally increase noise levels on roadways leading to the site. The pieces of construction equipment for construction activities would move on site, would remain for the duration of each construction phase, and would not add to the daily traffic volume in the project vicinity. 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 ambient noise levels would be small because the number of daily construction-related vehicle trips is small compared to existing daily traffic volumes in the project area. The building construction phase would generate the most trips out of all of the construction phases, at 498 trips per day based on the California Emissions Estimator Model (CalEEMod) (Version 2020.4.0) results contained in Appendix A of the *Mapes and Trumble Industrial Project Air Quality, Energy, and Greenhouse Gas Analysis* (LSA 2022a).

Roadways that would be used to access the project site are CA-74, Trumble Road, and Mapes Road. Based on Table H, CA-74, Trumble Road, and Mapes Road have estimated existing daily traffic volumes of 18,670, 3,060, and 100, respectively, near the project site. Based on the information above, construction-related traffic would increase by up to 0.1 dBA, 0.7 dBA, and 7.8 dBA along CA-74, Trumble Road, and Mapes Road, respectively. Although noise increases of less than 3 dBA

would not be perceptible to the human ear in an outdoor environment, a 7.8 dBA noise increase would be considered a substantial noise increase. However, land uses along Mapes Road west of Trumble Road are not considered noise-sensitive. Therefore, no short-term construction-related impacts associated with worker commutes and transport of construction equipment and material to the project site would occur, and no noise reduction measures would be required.

The second type of short-term noise impact is related to noise generated from construction activities. Construction is performed in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. The project anticipates site preparation and grading; building construction; paving; and architectural coating phases of construction. These various sequential phases change the character of the noise generated on a project site. Therefore, the noise levels vary 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 I lists the L_{max} recommended for noise impact assessments for typical construction equipment included in the *FHWA Highway Construction Noise Handbook* (FHWA 2006), based on a distance of 50 ft between the equipment and a noise receptor.

Table I: Typical Construction Equipment Noise Levels

Equipment Description	Acoustical Usage Factor[1]	Maximum Noise Level (L_{max}) at 50 ft[2]
Backhoe	40	80
Compactor (ground)	20	80
Compressor	40	80
Crane	16	85
Dozer	40	85
Dump Truck	40	84
Excavator	40	85
Flatbed 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] The usage factor is the percentage of time during a construction noise operation that a piece of construction equipment is operating at full power.
[2] The maximum noise levels were developed based on Specification 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
FHWA = Federal Highway Administration
ft = foot/feet
L_{max} = maximum instantaneous noise level

The site preparation and grading phase tends to generate the highest noise levels because the noisiest construction equipment is earthmoving equipment. Project construction during these phases of construction is expected to require the use of graders, bulldozers, and water trucks/ pickup trucks. Noise associated with the use of each type of construction equipment for the site preparation and grading 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 I, 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 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.

Table J shows the estimated construction noise level at the recreation area of the sports park to the northeast and the closest residential property line to the east from the project construction boundary along with the noisiest construction noise levels (L_{max} and L_{eq}) at a distance of 50 ft, the distance from the project construction boundary, and the noise level reduction from distance attenuation.

Table J: Construction Noise Levels

Land Use	Direction	Reference Noise Level at 50 ft (dBA)		Distance (ft)	Distance Attenuation (dBA)	Noise Level (dBA)	
		L_{max}	L_{eq}			L_{max}	L_{eq}
Sports Complex	Northeast	88	84	540	21	67	63
Residence	East	88	84	1,390	29	59	55

Source: Compiled by LSA (2022).
dBA = A-weighted decibels
ft = foot/feet
L_{eq} = equivalent continuous sound level
L_{max} = maximum instantaneous noise level

Construction of the project typically would be limited to daytime hours between 7:00 a.m. and 7:00 p.m. Monday through Saturday. However, it is possible that concrete pouring activities may need to occur at night to facilitate proper concrete curing. Pours during hot weather would typically occur between the approximate hours of 1:00 a.m. and 7:00 a.m. Should construction activities need to occur during nighttime hours, the project applicant would coordinate with the City Building Official for authorization as a standard condition of approval due to the protocol necessary to facilitate proper concrete curing.

As shown in Table J, the recreation area of the sports complex to the northeast and the closest residential property line to the east would be subject to short-term construction noise levels reaching 67 dBA L_{max} (63 dBA L_{eq}) and 59 dBA L_{max} (55 dBA L_{eq}), respectively, generated by project construction activities. Although noise generated by project construction activities could be higher than the ambient noise levels and may result in a temporary increase in the ambient noise levels, construction noise levels at the recreation area of the sports complex and the closest residence

would not exceed the City's construction noise standard of 80 dBA pursuant to Section 7.34.060 of the City Municipal Code. It should be noted that the recreation area of the sports complex was evaluated using the City's construction noise standards that apply only to residences for a conservative analysis, and the sports park is not expected to be occupied during nighttime hours during which concrete pouring activities potentially could occur. The closest residences to the east are located in Menifee and evaluating these residences using the City's construction noise standard is a conservative approach because the City of Menifee does not have construction noise standards. Also, the closest residential property line is located approximately 1,390 ft (0.26 mi) from the project construction boundary, which is just beyond 0.25 mi, and the City of Menifee's permitted construction hours would not be applicable. As detailed in Table J, compliance with the permitted construction hours under the City's Municipal Code and implementation of best construction practices listed below would minimize construction noise.

- The construction contractor shall limit construction activities to between the hours of 7:00 a.m. and 7:00 p.m. Monday through Saturday pursuant to Section 7.34.060 of the City's Municipal Code (City of Perris). Construction is prohibited outside these hours, on Sundays, and legal holidays except for Columbus Day and Washington's birthday.

- 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 the 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.

Therefore, no noise impacts from project construction activities would occur. 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). Vibration levels calculated in RMS velocity are best for characterizing human response to building vibration, whereas vibration levels in PPV are best for characterizing damage potential.

Table K shows the reference vibration levels at a distance of 25 ft for each type of standard construction equipment from the *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018). Project construction is expected to require the use of large bulldozers and loaded trucks, which would generate ground-borne vibration levels of up to 87 VdB (0.089 PPV [in/sec]) and 86 VdB (0.076 PPV [in/sec]), respectively, when measured at 25 ft.

The greatest vibration levels are anticipated to occur during the site preparation and grading phase. 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.

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 K: 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

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

Table L lists the projected vibration levels from various construction equipment expected to be used on the project site in the active construction area to the nearest buildings in the project vicinity. As shown in Table L, the office building to the south is approximately 190 ft from the active project construction area and would experience a vibration level of up to 61 VdB. This vibration level would not result in community annoyance because it would not exceed the FTA community annoyance threshold of 84 VdB for office uses and similar areas not as sensitive to vibration. Other building structures that surround the project site would experience lower vibration levels because they are farther away.

Table L: Potential Construction Vibration Annoyance

Land Use	Direction	Equipment/ Activity	Reference Vibration Level (VdB) at 25 ft	Distance to Structure (ft)[1]	Vibration Level (VdB)
Public Utility	North	Large bulldozers	87	440	50
		Loaded trucks	86	440	49
Sports Complex	Northeast	Large bulldozers	87	1,080	38

Table L: Potential Construction Vibration Annoyance

Land Use	Direction	Equipment/ Activity	Reference Vibration Level (VdB) at 25 ft	Distance to Structure (ft)[1]	Vibration Level (VdB)
		Loaded trucks	86	1,080	37
Public Utility	East	Large bulldozers	87	375	52
		Loaded trucks	86	375	51
Office	South	Large bulldozers	87	190	61
		Loaded trucks	86	190	60

Source: Compiled by LSA (2022).
Note: The FTA-recommended annoyance threshold of 84 VdB was used to assess potential construction vibration annoyance for offices and similar areas not as sensitive to vibration.
[1] Distance from the active construction area to the building structure.
ft = foot/feet
VdB = vibration velocity decibels
FTA = Federal Transit Administration

Similarly, Table M lists the projected vibration levels from various construction equipment expected to be used on the project site at the project construction boundary to the nearest buildings in the project vicinity. As shown in Table M, the office building to the south is approximately 60 ft from the project construction boundary and would experience a vibration level of up to 0.024 PPV (in/sec). This vibration level would not result in building damage because the office building would be constructed better than non-engineered timber and masonry and vibration levels would not exceed the FTA vibration damage threshold of 0.20 PPV (in/sec). Other building structures that surround the project site would experience lower vibration levels because they are farther away and would be constructed equivalent to or better than non-engineered timber and masonry. Therefore, no construction vibration impacts would occur during project construction. No vibration reduction measures are required.

Table M: Potential Construction Vibration Damage

Land Use	Direction	Equipment/ Activity	Reference Vibration Level at 25 ft	Distance to Structure (ft)[1]	Vibration Level
			PPV (in/sec)		PPV (in/sec)
Public Utility	North	Large bulldozers	0.089	315	0.002
		Loaded trucks	0.076	315	0.002
Sports Complex	Northeast	Large bulldozers	0.089	910	0.000
		Loaded trucks	0.076	910	0.000
Public Utility	East	Large bulldozers	0.089	245	0.003
		Loaded trucks	0.076	245	0.002
Office	South	Large bulldozers	0.089	60	0.024
		Loaded trucks	0.076	60	0.020

Source: Compiled by LSA (2022).
Note: The FTA-recommended building damage threshold is 94 VdB (0.20 PPV [in/sec]) at the receiving non-engineered timber and masonry building.
[1] Distance from the project construction boundary to the building structure.
ft = foot/feet
PPV = peak particle velocity
FTA = Federal Transit Administration
VdB = vibration velocity decibels
in/sec = inches per second

Long-Term Traffic Noise Impacts

The Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA RD-77-108) (FHWA 1977) 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. Traffic volumes were obtained from the *Mapes and Trumble Industrial Facility Project Traffic Study* (LSA 2022b). In addition, the vehicle mix for each roadway in the project area was obtained from the traffic counts contained in the *Mapes and Trumble Industrial Facility Project Traffic Study* (LSA 2022b). Under the with project condition, the vehicle mix was adjusted based on the project's vehicle mix. Tables N and O show the existing and opening year (2024) traffic noise levels with and without project conditions. These noise levels represent the worst-case scenario, which assumes that no shielding is provided between traffic and the location where the noise contours are drawn. The specific assumptions used in developing these noise levels and the model printouts are provided in Appendix A.

Table N: Existing (2022) 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 (dBA)
Mapes Road Between Project Driveway 1 and Trumble Road	100	< 50	< 50	< 50	46.4	250	< 50	< 50	< 50	54.1	7.7
Mapes Road East of Trumble Road	4,070	< 50	53	112	63.9	4,090	< 50	54	114	64.0	0.1
Trumble Road North of Mapes Road	3,060	< 50	< 50	73	59.9	3,080	< 50	< 50	75	60.1	0.2
Trumble Road Between Mapes Road and Project Driveway 2	6,050	< 50	68	140	64.4	6,160	< 50	73	150	64.9	0.5
Trumble Road Between Project Driveway 2 and Exceed Road	6,050	< 50	68	140	64.4	6,450	< 50	82	171	65.7	1.3
Trumble Road Between Exceed Road and CA-74	6,985	< 50	92	193	66.6	7,865	59	118	250	68.3	1.7
I-215 Southbound Ramps North of Bonnie Drive	11,260	56	121	260	70.0	11,640	61	130	280	70.5	0.5
I-215 Southbound Ramps/CA-74 Between Bonnie Drive and I-215 Northbound Ramps	15,900	65	139	298	70.3	16,310	70	149	319	70.8	0.5
CA-74 Between I-215 Northbound Ramps and Trumble Road	24,810	97	204	437	71.9	25,600	104	220	472	72.4	0.5
CA-74 East of Trumble Road	18,670	70	143	304	69.5	18,760	71	146	312	69.7	0.2

Source: Compiled by LSA (2022).
Note: Traffic noise within 50 ft of the roadway centerline should be evaluated with site-specific information.
ADT = average daily traffic
CA = California Route
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibel
ft = foot/feet
I- = Interstate

Table O: Opening Year (2024) 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 (dBA)
Mapes Road Between Project Driveway 1 and Trumble Road	100	< 50	< 50	< 50	46.4	250	< 50	< 50	< 50	54.1	7.7
Mapes Road East of Trumble Road	8,500	< 50	85	182	67.1	8,520	< 50	85	182	67.1	0.0
Trumble Road North of Mapes Road	3,860	< 50	< 50	84	60.9	3,880	< 50	< 50	88	61.2	0.3
Trumble Road Between Mapes Road and Project Driveway 2	11,210	< 50	100	209	67.1	11,320	< 50	103	217	67.3	0.2
Trumble Road Between Project Driveway 2 and Exceed Road	11,220	< 50	100	210	67.1	11,620	56	111	235	67.9	0.8
Trumble Road Between Exceed Road and CA-74	12,895	67	136	289	69.2	13,775	76	157	335	70.2	1.0
I-215 Southbound Ramps North of Bonnie Drive	17,440	75	162	348	71.9	17,820	79	170	366	72.3	0.4
I-215 Southbound Ramps/CA-74 Between Bonnie Drive and I-215 Northbound Ramps	23,850	85	181	390	72.1	24,260	89	190	409	72.4	0.3
CA-74 Between I-215 Northbound Ramps and Trumble Road	37,160	125	266	571	73.7	37,950	132	281	603	74.0	0.3
CA-74 East of Trumble Road	29,320	91	192	410	71.5	29,410	92	194	415	71.6	0.1

Source: Compiled by LSA (2022).
Note: Traffic noise within 50 ft of the roadway centerline should be evaluated with site-specific information.
ADT = average daily traffic
CA = California Route
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibel
ft = foot/feet
I- = Interstate

Tables N and O show that the proposed project would result in a project-related traffic noise increase of up to 7.7 dBA along Mapes Road between Project Driveway 1 and Trumble Road. Although this noise increase is perceptible to the human ear in an outdoor environment, there are no noise-sensitive land uses located adjacent to this roadway segment. The project-related traffic noise increase on other roadway segments within the project area is less than 3 dBA, and a noise increase of less than 3 dBA would not be perceptible to the human ear in an outdoor environment. Therefore, no off-site traffic noise impacts would occur, and no noise reduction measures are required.

Long-Term Stationary-Source Noise Impacts

Truck delivery and truck loading and unloading activities; automobile activities; and heating, ventilation, and air conditioning (HVAC) equipment associated with the project would potentially affect the existing off-site sensitive land uses. The following provides a detailed noise analysis and discussion of each stationary noise source.

Truck Delivery and Truck Loading and Unloading Activities

Truck delivery and truck loading and unloading activities for the project would take place at the loading docks on the south side of the proposed building, as Figure 2 shows. These activities would take place both during daytime and nighttime hours. Noise levels generated from these activities include truck movement, docking at loading dock doors, backup alarms, air brakes, idling, and unloading activities. These activities would result in a maximum noise similar to noise readings from truck delivery and truck-unloading activities for other projects, which would generate a noise level of 75 dBA L_{max} at 50 ft. As a worst-case scenario, truck delivery and truck-unloading activities would generate the maximum noise level for an entire 1-hour period during both daytime and nighttime hours, which would be a noise level of 75 dBA L_{eq} at 50 ft.

The proposed building would completely shield the truck loading dock area to the recreation area of the sports complex to the northeast and would provide a minimum noise reduction of 15 dBA. Also, the proposed building would partially shield the truck loading dock area to the residences to the east and would provide a minimum noise reduction of 3 dBA. The recreation area at the sports complex to the northeast and residential property lines to the east are approximately 965 ft and 1,615 ft east, respectively, of the truck delivery and truck-unloading activities on the project site.

Parking Activities

The project would include surface parking for automobiles and truck parking. 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. In addition, noise generated from truck parking would include backup alarms and air brakes. Representative parking activities would generate approximately 60 to 70 dBA L_{max} at 50 ft. The project trip generation from the *Mapes and Trumble Industrial Facility Project Traffic Study* (LSA 2022b) was used to estimate daytime and nighttime parking activities. During daytime hours, it is estimated that parking activities for automobiles and trucks would generate the maximum noise level for a cumulative period of 15 minutes in any hour, which would be 64.0 dBA L_{eq} at 50 ft. During nighttime hours, it is estimated that automobiles would generate the maximum noise level for a cumulative period of 5 minutes in

any hour and trucks would generate the maximum noise level for a cumulative period of 10 minutes in any hour, which would be 59.2 dBA L_{eq} and 62.2 dBA L_{eq}, respectively, at 50 ft.

The proposed building would provide a minimum noise reduction of 10 dBA for the recreation area at the sports complex to the northeast of the project site from truck parking activities. The recreation area at the sports complex to the northeast and residential property lines to the east are approximately 590 ft and 1,425 ft east, respectively, from automobile parking activities on the project site. Also, the recreation area at the sports complex to the northeast and residential property lines to the east are approximately 1,380 ft and 1,925 ft east, respectively, from truck parking activities on the project site.

Heating, Ventilation, and Air Conditioning Noise

The project would include up to four rooftop HVAC units for the office portions of the proposed building on the ground floor and mezzanine level (two rooftop HVAC units for each office location). The office portions of the proposed building are located in the northwest and northeast sections of the building, as shown in Figure 2. The HVAC equipment could operate 24 hours per day. Each HVAC unit would generate a noise level of 44.4 dBA L_{eq} at a distance of 50 ft. The specifications of typical HVAC equipment is provided in Appendix B.

A total of two HVAC units operating simultaneously would generate a noise level of 47.4 dBA L_{eq} at a distance of 50 ft. Table P shows the HVAC noise levels at the recreational area at the sports complex and residential property line along with reference HVAC noise levels at 50 ft for two units in the northwest and northeast sections of the proposed building, the distance from HVAC equipment, noise reduction from distance attenuation, and shielding from the parapet and roofline. As shown in Table P, the HVAC noise level at the recreation area at the sports complex is 23.7 dBA L_{eq} and is 19.2 dBA L_{eq} at the residential property line.

Table P: HVAC Noise Levels

Land Use	Direction	Noise Source	Reference Noise Level at 50 ft (dBA L_{eq})	Distance[1] (ft)	Distance Attenuation (dBA)	Noise Level (dBA L_{eq})	Combined Noise Level (dBA L_{eq})
Sports Park	Northeast	Northwest Units	47.4	1,550	29.8	17.6	23.7
		Northeast Units	47.4	880	24.9	22.5	
Residence	East	Northwest Units	47.4	2,470	33.9	13.5	19.2
		Northeast Units	47.4	1,505	29.6	17.8	

Source: Compiled by LSA (2022).
[1] The distance from HVAC equipment to the recreation area at the sports complex and residential property line.
[2] The parapet and roofline would provide a minimum noise reduction of 8 dBA.
dBA = A-weighted decibels
ft = foot/feet
HVAC = heating ventilation, and air conditioning
L_{eq} = equivalent continuous sound level

Stationary-Source Noise Impacts Summary

Tables Q and R show the daytime and nighttime individual stationary-source noise from truck delivery and truck loading and unloading activities, automobile and truck parking activities, and rooftop HVAC equipment at the recreation area at the sports complex and residential property line along with the reference noise levels (L_{max} and L_{eq}) at a distance of 50 ft, distance from the source, noise reduction from distance attenuation, noise reduction from shielding, and combined stationary-source noise levels.

As shown in Tables Q and R, the combined daytime and nighttime stationary-source noise levels at the recreation area of the sports complex are 48.8 dBA L_{max} (43.3 dBA L_{eq}) and 48.8 dBA L_{max} (39.6 dBA L_{eq}), respectively. At the residential property line, the combined daytime and nighttime stationary-source noise levels are 45.4 dBA L_{max} (43.0 dBA L_{eq}) and 45.4 dBA L_{max} (42.4 dBA L_{eq}), respectively. Noise levels at the recreation area of the sports complex would not exceed the City's maximum daytime and nighttime noise standards of 80 dBA and 60 dBA, respectively. The recreation area of the sports complex was evaluated using the City's residential noise standards for a conservative analysis. Noise levels at the closest residence in Menifee would not exceed the City's maximum daytime and nighttime noise standards of 80 dBA and 60 dBA, respectively. In addition, noise levels at the closest residence in Menifee would not exceed the City of Menifee's daytime and nighttime 10-minute noise standards of 65 dBA L_{eq} and 45 dBA L_{eq}, respectively. Therefore, no noise impacts from project operations would occur. No noise reduction measures are required.

Long-Term Ground-Borne Noise and Vibration from Vehicular Traffic

The project would not generate vibration. In addition, vibration levels generated from project-related traffic on the adjacent roadways (CA-74, Trumble Road, and Mapes Road) would be unusual for on-road vehicles because the rubber tires and suspension systems of on-road vehicles provide vibration isolation. Therefore, no vibration impacts from project-related operations would occur, and no vibration reduction measures are required.

MINIMIZATION MEASURES

The following measures would minimize construction noise:

- The construction contractor shall limit construction activities to between the hours of 7:00 a.m. and 7:00 p.m. Monday through Saturday pursuant to Section 7.34.060 of the City's Municipal Code (City of Perris). Construction is prohibited outside these hours, on Sundays, and legal holidays except for Columbus Day and Washington's birthday.

- 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 the noise-sensitive receptors nearest the project site during all project construction.

Table Q: Daytime Stationary-Source Noise Levels

Land Use	Direction	Noise Source	Reference Noise Level at 50 ft (dBA)		Distance[1] (ft)	Distance Attenuation (dBA)	Shielding (dBA)	Noise Level (dBA L_{eq})		Combined Noise Level (dBA)	
			L_{max}	L_{eq}				L_{max}	L_{eq}	L_{max}	L_{eq}
Sports Complex	Northeast	Truck Delivery and Truck Loading/ Unloading Activities	75.0	75.0	965	25.7	15[2]	34.3	34.2	48.8	43.3
		Auto Parking Activities	70.0	64.0	590	21.4	0	48.6	42.6		
		Truck Parking Activities	70.0	64.0	1,380	28.8	10[2]	31.2	25.2		
		HVAC[3]	--	--	--	--	--	--	23.7		
Residence	East	Truck Delivery and Truck Loading/ Unloading Activities	75.0	75.0	1,615	30.2	3[4]	41.8	41.8	45.4	43.0
		Auto Parking Activities	70.0	64.0	1,425	29.1	0	40.9	34.9		
		Truck Parking Activities	70.0	64.0	1,925	31.7	0	38.3	32.3		
		HVAC[3]	--	--	--	--	--	--	19.2		

Source: Compiled by LSA (2022).

[1] Distance from the source to the recreation area at the sports complex and residential property line.

[2] The proposed building would completely shield the truck loading dock area to the recreation area of the sports complex to the northeast and would provide a minimum noise reduction of 15 dBA.

[3] The HVAC noise levels are shown in Table O.

[4] The proposed building would partially shield the truck loading dock area to the residences to the east and would provide a minimum noise reduction of 3 dBA.

dBA = A-weighted decibels
ft = foot/feet
HVAC = heating, ventilation, and air conditioning
L_{eq} = equivalent continuous sound level
L_{max} = maximum instantaneous noise level

Table R: Nighttime Stationary-Source Noise Levels

Land Use	Direction	Noise Source	Reference Noise Level at 50 ft (dBA)		Distance[1] (ft)	Distance Attenuation (dBA)	Shielding (dBA)	Noise Level (dBA L_{eq})		Combined Noise Level (dBA)	
			L_{max}	L_{eq}				L_{max}	L_{eq}	L_{max}	L_{eq}
Sports Complex	Northeast	Truck Delivery and Truck-Load/Unloading Activities	75.0	75.0	965	25.7	15[2]	34.3	34.3	48.8	39.6
		Auto Parking Activities	70.0	59.2	590	21.4	0	48.6	37.8		
		Truck Parking Activities	70.0	62.2	1,380	28.8	10[2]	31.2	23.4		
		HVAC[3]	--	--	--	--	--	--	23.7		
Residence	East	Truck Delivery and Truck-Load/Unloading Activities	75.0	75.0	1,615	30.2	3[4]	41.8	41.8	45.4	42.4
		Auto Parking Activities	70.0	59.2	1,425	29.1	0	40.9	30.1		
		Truck Parking Activities	70.0	62.2	1,925	31.7	0	38.3	30.5		
		HVAC[3]	--	--	--	--	--	--	19.2		

Source: Compiled by LSA (2022).

[1] Distance from the source to the recreation area at the sports complex and residential property line.

[2] The proposed building would completely shield the truck loading dock area to the recreation area of the sports complex to the northeast and would provide a minimum noise reduction of 15 dBA.

[3] The HVAC noise levels are shown in Table O.

[4] The proposed building would partially shield the truck loading dock area to the residences to the east and would provide a minimum noise reduction of 3 dBA.

dBA = A-weighted decibels
ft = foot/feet
HVAC = heating, ventilation, and air conditioning
L_{eq} = equivalent continuous sound level
L_{max} = maximum instantaneous noise level

- 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.

REDUCTION MEASURES

Short-Term Construction Noise Impacts

No noise reduction measures are required.

Short-Term Construction Vibration Impacts

No vibration 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 Stationary-Source Noise Impacts

No noise reduction measures are required.

Long-Term Vibration Impacts

No vibration reduction measures are required.

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APPENDIX A

FHWA HIGHWAY TRAFFIC NOISE MODEL PRINTOUTS

TABLE Existing No Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: Mapes Road Between Project Driveway 1 and Trumble Road
NOTES: Mapes and Trumble Industrial Facility - Existing No Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 100 SPEED (MPH): 25 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	49.45	8.23	6.12
M-TRUCKS	28.49	1.64	3.47
H-TRUCKS	2.25	0.07	0.28

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 46.43

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 No Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: Mapes Road East of Trumble Road
NOTES: Mapes and Trumble Industrial Facility - Existing No Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 4070 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	74.64	12.43	9.23
M-TRUCKS	2.46	0.14	0.30
H-TRUCKS	0.69	0.02	0.09

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 63.94

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	53.0	112.0	240.1

TABLE Existing No Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: Trumble Road North of Mapes Road
NOTES: Mapes and Trumble Industrial Facility - Existing No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3060 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
AUTOS	76.11	12.67	9.41
M-TRUCKS	1.10	0.06	0.13
H-TRUCKS	0.43	0.01	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 59.92

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	73.2	150.8

TABLE Existing No Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: Trumble Road Between Mapes Road and Project Driveway 2
NOTES: Mapes and Trumble Industrial Facility - Existing No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6050 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	73.09	12.17	9.04
M-TRUCKS	3.73	0.22	0.45
H-TRUCKS	1.12	0.04	0.14

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.42

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	68.4	140.0	298.1

TABLE Existing No Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: Trumble Road Between Project Driveway 2 and Exceed Road
NOTES: Mapes and Trumble Industrial Facility - Existing No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6050 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	73.09	12.17	9.04
M-TRUCKS	3.73	0.22	0.45
H-TRUCKS	1.12	0.04	0.14

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.42

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	68.4	140.0	298.1

TABLE Existing No Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: Trumble Road Between Exceed Road and CA-74
NOTES: Mapes and Trumble Industrial Facility - Existing No Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6985 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES DAY	EVENING	NIGHT
AUTOS	69.76	11.61	8.63
M-TRUCKS	6.19	0.36	0.75
H-TRUCKS	2.34	0.07	0.29

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.55

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL 70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	92.0	192.8	412.7

TABLE Existing No Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: I-215 Southbound Ramps North of Bonnie Drive
NOTES: Mapes and Trumble Industrial Facility - Existing No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 11260 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	70.92	11.81	8.77
M-TRUCKS	4.58	0.26	0.56
H-TRUCKS	2.68	0.08	0.34

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.04

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
56.3	120.8	259.9	559.7

TABLE Existing No Project-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: I-215 Southbound Ramps/CA-74 Between Bonnie Drive and I-215 Northbound Ramps
NOTES: Mapes and Trumble Industrial Facility - Existing No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 15900 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	70.61	11.75	8.73
M-TRUCKS	5.93	0.34	0.72
H-TRUCKS	1.73	0.05	0.14

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.34

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
65.2	138.5	297.6	640.5

TABLE Existing No Project-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: CA-74 Between I-215 Northbound Ramps and Trumble Road
NOTES: Mapes and Trumble Industrial Facility - Existing No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 24810 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	71.85	11.96	8.89
M-TRUCKS	3.65	0.21	0.44
H-TRUCKS	2.51	0.08	0.41

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.92

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
97.0	203.8	436.7	939.4

TABLE Existing No Project-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: CA-74 East of Trumble Road
NOTES: Mapes and Trumble Industrial Facility - Existing No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 18670 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES DAY	EVENING	NIGHT
AUTOS	73.63	12.26	9.11
M-TRUCKS	2.46	0.14	0.30
H-TRUCKS	1.82	0.06	0.22

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.55

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL 70 CNEL	65 CNEL	60 CNEL	55 CNEL
69.6	142.7	303.9	653.0

TABLE Existing + Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: Mapes Road Between Project Driveway 1 and Trumble Road
NOTES: Mapes and Trumble Industrial Facility - Existing + Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 250 SPEED (MPH): 25 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	51.60	8.40	6.40
M-TRUCKS	14.80	0.80	1.60
H-TRUCKS	13.60	0.40	2.40

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 54.11

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	54.4

TABLE Existing + Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: Mapes Road East of Trumble Road
NOTES: Mapes and Trumble Industrial Facility - Existing + Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 4090 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	74.55	12.42	9.22
M-TRUCKS	2.47	0.15	0.29
H-TRUCKS	0.78	0.02	0.10

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.03

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	53.8	113.5	243.4

TABLE Existing + Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: Trumble Road North of Mapes Road
NOTES: Mapes and Trumble Industrial Facility - Existing + Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3080 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.97	12.66	9.38
M-TRUCKS	1.14	0.06	0.13
H-TRUCKS	0.55	0.01	0.10

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.13

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	75.3	155.6

TABLE Existing + Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: Trumble Road Between Mapes Road and Project Driveway 2
NOTES: Mapes and Trumble Industrial Facility - Existing + Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6160 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	72.74	12.11	8.99
M-TRUCKS	3.77	0.21	0.45
H-TRUCKS	1.48	0.05	0.20

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.87

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	72.7	149.7	319.1

TABLE Existing + Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: Trumble Road Between Project Driveway 2 and Exceed Road
NOTES: Mapes and Trumble Industrial Facility - Existing + Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6450 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	71.86	11.97	8.88
M-TRUCKS	3.86	0.22	0.47
H-TRUCKS	2.36	0.08	0.30

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.75

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	82.1	170.8	365.0

TABLE Existing + Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: Trumble Road Between Exceed Road and CA-74
NOTES: Mapes and Trumble Industrial Facility - Existing + Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 7865 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	67.93	11.30	8.40
M-TRUCKS	6.14	0.36	0.74
H-TRUCKS	4.42	0.14	0.57

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.27

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
58.8	118.0	250.0	536.5

TABLE Existing + Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: I-215 Southbound Ramps North of Bonnie Drive
NOTES: Mapes and Trumble Industrial Facility - Existing + Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 11640 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	70.35	11.72	8.70
M-TRUCKS	4.62	0.26	0.57
H-TRUCKS	3.28	0.10	0.40

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.53

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
60.7	130.3	280.4	603.8

TABLE Existing + Project-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: I-215 Southbound Ramps/CA-74 Between Bonnie Drive and I-215 Northbound Ramps
NOTES: Mapes and Trumble Industrial Facility - Existing + Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 16310 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	70.18	11.67	8.68
M-TRUCKS	5.93	0.34	0.72
H-TRUCKS	2.21	0.07	0.20

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.80

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
69.8	148.7	319.5	687.7

TABLE Existing + Project-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: CA-74 Between I-215 Northbound Ramps and Trumble Road
NOTES: Mapes and Trumble Industrial Facility - Existing + Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 25600 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	71.28	11.86	8.82
M-TRUCKS	3.72	0.21	0.45
H-TRUCKS	3.08	0.10	0.48

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.43

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
104.4	220.2	472.1	1016.0

TABLE Existing + Project-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: CA-74 East of Trumble Road
NOTES: Mapes and Trumble Industrial Facility - Existing + Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 18760 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	73.53	12.24	9.10
M-TRUCKS	2.47	0.14	0.30
H-TRUCKS	1.91	0.06	0.25

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.71

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
71.1	146.2	311.6	669.6

TABLE 2024 No Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: Mapes Road Between Project Driveway 1 and Trumble Road
NOTES: Mapes and Trumble Industrial Facility - 2024 No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 100 SPEED (MPH): 25 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	49.45	8.23	6.12
M-TRUCKS	28.49	1.64	3.47
H-TRUCKS	2.25	0.07	0.28

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 46.43

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

TABLE 2024 No Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: Mapes Road East of Trumble Road
NOTES: Mapes and Trumble Industrial Facility - 2024 No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8500 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	74.64	12.43	9.23
M-TRUCKS	2.46	0.14	0.30
H-TRUCKS	0.69	0.02	0.09

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.14

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	85.3	182.3	391.9

TABLE 2024 No Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: Trumble Road North of Mapes Road
NOTES: Mapes and Trumble Industrial Facility - 2024 No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3860 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	76.11	12.67	9.41
M-TRUCKS	1.10	0.06	0.13
H-TRUCKS	0.43	0.01	0.08

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.93

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	84.2	175.5

TABLE 2024 No Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: Trumble Road Between Mapes Road and Project Driveway 2
NOTES: Mapes and Trumble Industrial Facility - 2024 No Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 11210 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	73.09	12.17	9.04
M-TRUCKS	3.73	0.22	0.45
H-TRUCKS	1.12	0.04	0.14

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.10

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	99.5	209.5	448.8

TABLE 2024 No Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: Trumble Road Between Project Driveway 2 and Exceed Road
NOTES: Mapes and Trumble Industrial Facility - 2024 No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 11220 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	73.09	12.17	9.04
M-TRUCKS	3.73	0.22	0.45
H-TRUCKS	1.12	0.04	0.14

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.10

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	99.6	209.6	449.1

TABLE 2024 No Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: Trumble Road Between Exceed Road and CA-74
NOTES: Mapes and Trumble Industrial Facility - 2024 No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12895 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	69.76	11.61	8.63
M-TRUCKS	6.19	0.36	0.75
H-TRUCKS	2.34	0.07	0.29

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.21

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
66.5	135.7	288.8	620.3

TABLE 2024 No Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: I-215 Southbound Ramps North of Bonnie Drive
NOTES: Mapes and Trumble Industrial Facility - 2024 No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 17440 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	70.92	11.81	8.77
M-TRUCKS	4.58	0.26	0.56
H-TRUCKS	2.68	0.08	0.34

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.94

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
75.2	161.6	347.9	749.3

TABLE 2024 No Project-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: I-215 Southbound Ramps/CA-74 Between Bonnie Drive and I-215 Northbound Ramps
NOTES: Mapes and Trumble Industrial Facility - 2024 No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 23850 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	70.61	11.75	8.73
M-TRUCKS	5.93	0.34	0.72
H-TRUCKS	1.73	0.05	0.14

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.10

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
84.8	181.3	389.8	839.2

TABLE 2024 No Project-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: CA-74 Between I-215 Northbound Ramps and Trumble Road
NOTES: Mapes and Trumble Industrial Facility - 2024 No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 37160 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	71.85	11.96	8.89
M-TRUCKS	3.65	0.21	0.44
H-TRUCKS	2.51	0.08	0.41

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.67

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
125.3	266.1	571.3	1229.6

TABLE 2024 No Project-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: CA-74 East of Trumble Road
NOTES: Mapes and Trumble Industrial Facility - 2024 No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 29320 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	73.63	12.26	9.11
M-TRUCKS	2.46	0.14	0.30
H-TRUCKS	1.82	0.06	0.22

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.51

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
91.4	191.5	410.0	882.0

TABLE 2024 + Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: Mapes Road Between Project Driveway 1 and Trumble Road
NOTES: Mapes and Trumble Industrial Facility - 2024 + Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 250 SPEED (MPH): 25 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	51.60	8.40	6.40
M-TRUCKS	14.80	0.80	1.60
H-TRUCKS	13.60	0.40	2.40

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 54.11

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	54.4

TABLE 2024 + Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: Mapes Road East of Trumble Road
NOTES: Mapes and Trumble Industrial Facility - 2024 + Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8520 SPEED (MPH): 50 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	74.59	12.43	9.23
M-TRUCKS	2.46	0.14	0.31
H-TRUCKS	0.74	0.02	0.08

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.14

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	85.3	182.4	392.1

TABLE 2024 + Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: Trumble Road North of Mapes Road
NOTES: Mapes and Trumble Industrial Facility - 2024 + Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3880 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	76.01	12.65	9.38
M-TRUCKS	1.11	0.05	0.13
H-TRUCKS	0.54	0.01	0.12

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 61.22

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	87.7	183.4

TABLE 2024 + Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: Trumble Road Between Mapes Road and Project Driveway 2
NOTES: Mapes and Trumble Industrial Facility - 2024 + Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 11320 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	72.90	12.14	9.01
M-TRUCKS	3.75	0.22	0.45
H-TRUCKS	1.32	0.04	0.17

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.33

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	103.0	217.0	465.2

TABLE 2024 + Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: Trumble Road Between Project Driveway 2 and Exceed Road
NOTES: Mapes and Trumble Industrial Facility - 2024 + Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 11620 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	72.41	12.06	8.95
M-TRUCKS	3.80	0.22	0.46
H-TRUCKS	1.81	0.06	0.23

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.87

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
55.9	111.3	235.4	504.9

TABLE 2024 + Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: Trumble Road Between Exceed Road and CA-74
NOTES: Mapes and Trumble Industrial Facility - 2024 + Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 13775 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	68.72	11.43	8.50
M-TRUCKS	6.16	0.36	0.75
H-TRUCKS	3.54	0.11	0.43

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.19

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
75.9	156.9	334.9	720.0

TABLE 2024 + Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: I-215 Southbound Ramps North of Bonnie Drive
NOTES: Mapes and Trumble Industrial Facility - 2024 + Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 17820 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	70.54	11.75	8.72
M-TRUCKS	4.61	0.26	0.57
H-TRUCKS	3.07	0.10	0.38

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.28

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
79.2	170.1	366.3	788.9

TABLE 2024 + Project-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: I-215 Southbound Ramps/CA-74 Between Bonnie Drive and I-215 Northbound Ramps
NOTES: Mapes and Trumble Industrial Facility - 2024 + Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 24260 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	70.32	11.70	8.69
M-TRUCKS	5.93	0.34	0.72
H-TRUCKS	2.06	0.06	0.18

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 72.41

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
88.9	190.1	408.9	880.4

TABLE 2024 + Project-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: CA-74 Between I-215 Northbound Ramps and Trumble Road
NOTES: Mapes and Trumble Industrial Facility - 2024 + Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 37950 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	71.47	11.89	8.84
M-TRUCKS	3.69	0.21	0.45
H-TRUCKS	2.90	0.09	0.46

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 74.03

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
132.1	280.9	603.2	1298.5

TABLE 2024 + Project-10
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/28/2022
ROADWAY SEGMENT: CA-74 East of Trumble Road
NOTES: Mapes and Trumble Industrial Facility - 2024 + Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 29410 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	73.57	12.25	9.10
M-TRUCKS	2.47	0.14	0.30
H-TRUCKS	1.88	0.06	0.23

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 71.58

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
92.4	193.6	414.6	891.9

APPENDIX B

HVAC EQUIPMENT SPECIFICATIONS

The new degree of comfort.™

Rheem *Classic*® Series Air Conditioners

RA14 Series

Efficiencies up to 14 SEER/11.5 EER
Nominal Sizes 1½ to 5 Ton [5.28 to 17.6 kW]
Cooling Capacities 17.3 to 60.5 kBTU
[5.7 to 17.7 kW]

"Proper sizing and installation of equipment is critical to achieve optimal performance. Split system air conditioners and heat pumps must be matched with appropriate coil components to meet Energy Star. Ask your Contractor for details or visit www.energystar.gov."

- Composite base pan – dampens sound, captures louver panels, eliminates corrosion and reduces number of fasteners needed
- Powder coat paint system – for a long lasting professional finish
- Scroll compressor – uses 70% fewer moving parts for higher efficiency and increased reliability
- Modern cabinet aesthetics – increased curb appeal with visually appealing design
- Curved louver panels – provide ultimate coil protection, enhance cabinet strength, and increased cabinet rigidity
- Optimized fan orifice – optimizes airflow and reduces unit sound
- Rust resistant screws – confirmed through 1500-hour salt spray testing
- PlusOne™ **Expanded Valve Space** – 3"-4"-5" service valve space – provides a minimum working area of 27-square inches for easier access
- PlusOne™ **Triple Service Access** – 15" wide, industry leading corner service access – makes repairs easier and faster. The two fastener removable corner allows optimal access to internal unit components. Individual louver panels come out once fastener is removed, for faster coil cleaning and easier cabinet reassembly
- Diagnostic service window with two-fastener opening – provides access to the high and low pressure.
- External gauge port access – allows easy connection of "low-loss" gauge ports
- Single-row condenser coil – makes unit lighter and allows thorough coil cleaning to maintain "out of the box" performance
- 35% fewer cabinet fasteners and fastener-free base – allow for faster access to internal components and hassle-free panel removal
- Service trays – hold fasteners or caps during service calls
- QR code – provides technical information on demand for faster service calls
- Fan motor harness with extra long wires allows unit top to be removed without disconnecting fan wire.

TABLE OF CONTENTS

Standard Feature Table

STANDARD FEATURES							
Feature	**18**	**24**	**30**	**36**	**42**	**48**	**60**
R-410a Refrigerant	√	√	√	√	√	√	√
Maximum SEER	15.5	15	15.5	15.5	15	15	14
Maximum EER	13	13	13	13	13	13	12
Scroll Compressor	√	√	√	√	√	√	√
Field Installed Filter Drier	√	√	√	√	√	√	√
Front Seating Service Valves	√	√	√	√	√	√	√
Internal Pressure Relief Valve	√	√	√	√	√	√	√
Internal Thermal Overload	√	√	√	√	√	√	√
Long Line capability	√	√	√	√	√	√	√
Low Ambient capability with Kit	√	√	√	√	√	√	√
3-4-5 Expanded Valve Space	√	√	√	√	√	√	√
Composite Basepan	√	√	√	√	√	√	√
2 Screw Control Box Access	√	√	√	√	√	√	√
15" Access to Internal Components	√	√	√	√	√	√	√
Quick release louver panel design	√	√	√	√	√	√	√
No fasteners to remove along bottom	√	√	√	√	√	√	√
Optimized Venturi Airflow	√	√	√	√	√	√	√
Single row condenser coil	√	√	√	√	√	√	√
Powder coated paint	√	√	√	√	√	√	√
Rust resistant screws	√	√	√	√	√	√	√
QR code	√	√	√	√	√	√	√
External gauge ports	√	√	√	√	√	√	√
Service trays	√	√	√	√	√	√	√

√ = Standard

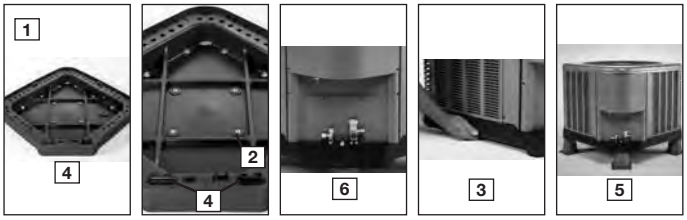
Available SKUs

Available Models	Description
RA1418AJ1NA	*Classic*® Series 1 1/2 ton 14 SEER Single-Stage Air Conditioner-208/230/1/60
RA1418AJ1NB	*Classic*® Series 1 1/2 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1424BJ1NA	*Classic*® Series 2 ton 14 SEER Single-Stage Air Conditioner-208/230/1/60
RA1424BJ1NB	*Classic*® Series 2 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1430AJ1NA	*Classic*® Series 2 1/2 ton 14 SEER Single-Stage Air Conditioner-208/230/1/60
RA1430AJ1NB	*Classic*® Series 2 1/2 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1436AC1NB	*Classic*® Series 3 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1436AD1NB	*Classic*® Series 3 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-460/3/60
RA1436AJ1NA	*Classic*® Series 3 ton 14 SEER Single-Stage Air Conditioner-208/230/1/60
RA1436AJ1NB	*Classic*® Series 3 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1442AD1NB	*Classic*® Series 3 1/2 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-460/3/60
RA1442CC1NB	*Classic*® Series 3 1/2 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1442CJ1NA	*Classic*® Series 3 1/2 ton 14 SEER Single-Stage Air Conditioner-208/230/1/60
RA1442CJ1NB	*Classic*® Series 3 1/2 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1448AC1NB	*Classic*® Series 4 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1448AD1NB	*Classic*® Series 4 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-460/3/60
RA1448AJ1NA	*Classic*® Series 4 ton 14 SEER Single-Stage Air Conditioner-208/230/1/60
RA1448AJ1NB	*Classic*® Series 4 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1460AD1NB	*Classic*® Series 5 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-460/3/60
RA1460BC1NB	*Classic*® Series 5 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1460BJ1NA	*Classic*® Series 5 ton 14 SEER Single-Stage Air Conditioner-208/230/1/60
RA1460BJ1NB	*Classic*® Series 5 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1460CC1NB	*Classic*® Series 5 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60
RA1460CD1NB	*Classic*® Series 5 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-460/3/60
RA1460CJ1NA	*Classic*® Series 5 ton 14 SEER Single-Stage Air Conditioner-208/230/1/60
RA1460CJ1NB	*Classic*® Series 5 ton 14 SEER Single-Stage Air Conditioner w/ High/Low Pressure-208/230/1/60

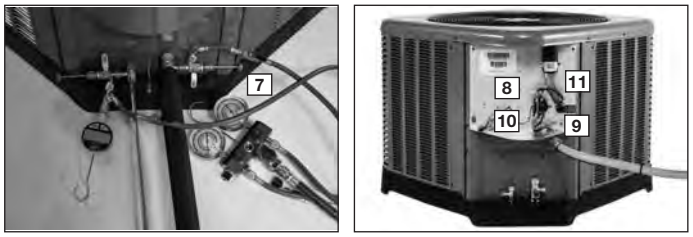
Introduction to RA14 Air Conditioner

The RA14 is our 14 SEER air conditioner and is part of the Rheem air conditioner product line that extends from 13 to 20 SEER. This highly featured and reliable air conditioner is designed for years of reliable, efficient operation when matched with Rheem indoor aluminum evaporator coils and furnaces or air handler units with aluminum evaporators.

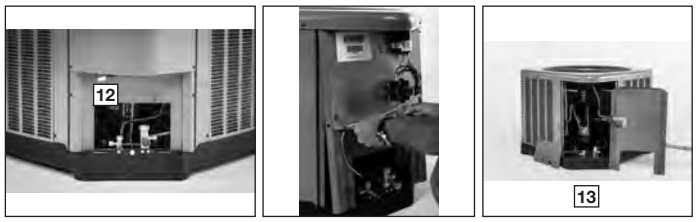
Our unique composite base (1) reduces sound emission, eliminates rattles, significantly reduces fasteners, eliminates corrosion and has integrated brass compressor attachment inserts (2). Furthermore it has incorporated into the design, water management features, means for hand placement (3) for unit maneuvering, screw trays (4) and inserts for lifting off unit pad. (5)



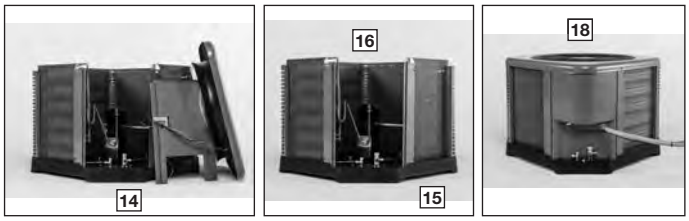
Service Valves (6) are rigidly mounted in the composite base with 3" between suction and discharge valves, 4" clearance below service valves and a minimum of 5" above the service valves, creating industry leading installation ease. The minimum 27 square-inches around the service valves allows ample room to remove service valve schrader prior to brazing, plenty of clearance for easy brazing of the suction and discharge lines to service valve outlets, easy access and hookup of low loss refrigerant gauges (7), and access to the service valve caps for opening. For applications with long-line lengths up to 250 feet total equivalent length, up to 200 feet condenser above evaporator, or up to 80 feet evaporator above condenser, the long-line instructions in the installation manual should be followed.



Controls are accessed from the corner of the unit by removing only two fasteners from the control access cover, revealing the industry's largest 15" wide and 14" tall control area (8). With all this room in the control area the high voltage electrical whip (9) can easily be inserted through the right size opening in the bottom of the control area. Routing it leads directly to contractor lugs for connection. The low voltage control wires (10) are easily connected to units low voltage wiring. If contactor or capacitor (11) needs to be replaced there is more than adequate space to make the repair. Furthermore, if high pressure and low pressure model was not purchased but is desired to be installed in the field, the service window (12) can be removed by removing two screws, to access the high and low side schrader fittings for easy field installation. The entire corner can be removed providing ultimate access to install the high and low pressure switch. (13)



If in the rare event, greater access is needed to internal components, such as the compressor, the entire corner of the unit can be removed along with the top cover assembly to have unprecedented access to interior of the unit (14). Extra wire length is incorporated into each outdoor fan and compressor so top cover and control panel can be positioned next to the unit. With minimal effort the plug can be removed from the compressor and the outdoor fan wires can be removed from the capacitor to allow even more uncluttered access to the interior of the unit (15). Outdoor coil heights range from as short as 22" to 32", aiding access to the compressor. Disassembly to this degree and complete reassembly only takes a first time service technician less than 10 minutes. (15)

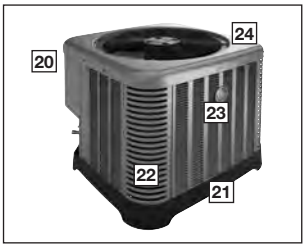


All units utilize strong formed louver panels which provide industry leading coil protection. Louver removal for coil cleaning is accomplished by removing one screw and lifting the panel out of the composite base pan. (17) All RA14 units utilize single row coils (16) making cleaning easy and complete, restoring the performance of the air conditioner back to out of the box performance levels year after year.

The outdoor fan motor has sleeve bearings and is inherently protected. The motor is totally enclosed for maximum protection from weather, dust and corrosion. Access to the outdoor fan is made by removing four fasteners from the fan grille. The outdoor fan can be removed from the fan grille by removing 4 fasteners in the rare case outdoor fan motor fails.

Each cabinet has optimized composite (19) fan orifice assuring efficient and quiet airflow.

The entire cabinet has powder post paint (20) achieving 1000 hour salt spray rating, allowing the cabinet to retain its aesthetics throughout its life.



Scroll compressors with standard internal pressure relief and internal thermal overload are used on all capacities assuring longevity of high efficient and quiet operation for the life of the product.

Each unit is shipped with filter drier for field installation and will trap any moisture or dirt that could contaminate the refrigerant system.

All cabinets have industry leading structural strength due to the composite base pan (21), interlocking corner post (22), formed curved louver panels (23) and drawn top cover (24) making it the most durable cabinet on the market today.

Each RA14 capacity has undergone rigorous psychometric testing to assure performance ratings of capacity, SEER and EER per AHRI Standard 210/240 rating conditions. Also each unit bears the UL mark and each unit is certified to UL 1995 safety standards.

Each unit has undergone specific strain and modal testing to assure tubing (25) is outside the units natural frequency and that the suction and discharge lines connected to the compressor withstand any starting, steady state operation or shut down forces imposed by the compressor.

All units have been sound tested in sound chamber to AHRI 270 rating conditions, and A-weighted Sound Power Level tables produced, assuring units have acceptable noise qualities (see page 9). Each unit has been ran in cooling operation at 95°F and 82°F and sound ratings for the RA14 range from as low as 74 dBA to 77 dBA.

All units have been ship tested to assure units meet stringent “over the road” shipping conditions.

As manufactured all units in the RA14 family have cooling capability to 55 °F. Addition of low ambient control will allow the unit to operate down to 0°F. Factory testing is performed on each unit. All component parts meet well defined specification and continually go through receiving inspections. Each component installed on a unit is scanned, assuring correct component utilization for a given unit capacity and voltage. All condenser coils are leak tested with pressurization test to 550#’s and once installed and assembled, each units’ complete refrigerant system is helium leak tested. All units are fully charged from the factory for up to 15 feet of piping. All units are factory run tested. The RA14 has a 10-year conditional compressor and parts warranty (registration required).

Optional Accessories
(Refer to accessory chart for model #)

Compressor Crankcase Heater
Protects against refrigerant migration that can occur during low ambient operation

Compressor Sound Cover
- Reinforced vinyl compressor cover containing a 1½ inch thick batt of fiberglass insulation
- Open edges are sealed with a one-inch wide hook and loop fastening tape

Compressor Hard Start Kit
- Single-phase units are equipped with a PSC compressor motor, this type of motor normally does not need a potential relay and start capacitor
- Kit may be required to increase the compressor starting torque, in conditions such as low voltage

Low Ambient Kit
- Air conditioners operate satisfactorily in the cooling mode down to 55°F outdoor air temperature without any additional controls
- This Kit can be added in the field enabling unit to operate properly down to 0° in the cooling mode
- Crankcase heater and freezestat should be installed on compressors equipped with a low ambient kit

3"/6"/12"
- Gray high density polyethylene feet are available to raise unit off of mounting surface away from moisture

Low Pressure
- Can be added in field enabling the unit to shut off compressor on loss of charge

NOTE: Unit can be purchased with high and low pressure installed at factory. (Refer to SKU list)

High Pressure
- Can be added in field enabling unit to shut off compressor if unit loses outdoor fan operation.

NOTE: Unit can be purchased with high and low pressure installed at factory. (Refer to SKU list)

Decorative Top
- Can be installed on fan grille

Air Conditioners*

R	A	14	24	A	J	1	N	A	*
Brand	**Product Category**	**SEER**	**Capacity BTU/HR**	**Major Series***	**Voltage**	**Type**	**Controls**	**Minor Series****	**Option Code**
Rheem	A - Air Conditioners	14 - 14 SEER	18 - 18,000 [5.28 kW] 24 - 24,000 [7.03 kW] 30 - 30,000 [8.79 kW] 36 - 36,000 [10.55 kW] 42 - 42,000 [12.31 kW] 48 - 48,000 [14.07 kW] 60 - 60,000 [17.58 kW]	A - 1st Design B - 2nd Design	J - 1ph, 208-230/60 C - 3ph, 208-230/60 D - 3ph, 460/60	1 - Single-stage	N - Non-Communicating	A - 1st Design B - 2nd Design	N/A

*See page 3 for available SKU's.

Heat Pumps (For Reference)**

R	P	14	24	A	J	1	N	A	*
Brand	**Product Category**	**SEER**	**Capacity BTU/HR**	**Major Series***	**Voltage**	**Type**	**Controls**	**Minor Series****	**Option Code**
Rheem	P - Heat Pump	13 - 13 SEER 14 - 14 SEER 16 - 16 SEER 17 - 17 SEER 20 - 20 SEER	18 - 18,000 [5.28 kW] 24 - 24,000 [7.03 kW] 30 - 30,000 [8.79 kW] 36 - 36,000 [10.55 kW] 42 - 42,000 [12.31 kW] 48 - 48,000 [14.07 kW] 60 - 60,000 [17.58 kW]	A - 1st Design	J - 1ph, 208-230/60 C - 3ph, 208-230/60 D - 3ph, 460/60	1 - Single-stage 2 - Two-stage V - Inverter P - Piston	C - Communicating N - Non-Communicating	A - 1st Design	N/A

Furnace Coils (For Reference)**

R	C	F	24	17	S	T	A	M	C	A	*
Brand	**Product Category**	**Type**	**Capacity BTU/HR**	**Width**	**Efficiency**	**Metering Device**	**Major Series***	**Orientation**	**Casing**	**Minor Series****	**Option Code**
Rheem	C - Evap Coil	F - Furn Coil H - Air-Handler Coil	24 - 24,000 [7.03 kW] 36 - 36,000 [10.55 kW] 48 - 48,000 [14.07 kW] 60 - 60,000 [17.58 kW]	14 - 14" 17 - 17.5" 21 - 21" 24 - 24.5"	S- Standard Eff. M- Mid Eff. H- High Eff.	T-TXV E-EEV P-Piston	A - 1st Design	M - Multipoise V - Vertical only/ convertible H - Ded. Horizontal only	C - Cased U - Uncased	A - 1st Design	N/A

**Model number ID's are for reference only. Available SKU's are listed on the standard features/available SKU page of model spec sheets.

[ ] Designates Metric Conversions

90%+ AFUE Gas Furnaces (For Reference)**

R	96	V	A	70	2	3	17	M	S	A
Brand	**Series**	**Motor**	**Major Rev**	**Input BTU/HR**	**Stages**	**Air Flow**	**Cabinet Width**	**Configuration**	**Nox**	**Minor Rev**
Rheem	90 - 90 AFUE 92 - 92 AFUE 95 - 95 AFUE 96 - 96 AFUE 97 - 97 AFUE	V - Variable speed T - Constant Torque (X-13) P - PSC	A - 1st Design	040 - 42,000 [12.31 kW] 060 - 56,000 [16.41 kW] 070 - 70,000 [20.51 kW] 085 - 84,000 [24.62 kW] 100 - 98,000 [28.72 kW] 115 - 112,000 [32.82 kW]	1 - Single-stage 2 - Two-stage M - Modulating	3 - up to 3 ton 5 - 3 1/2 up to 5 ton	14 - 14" 17 - 17.5" 21 - 21" 24 - 24.5"	M - Multi	X - Low Nox S - Standard	A - 1st Design

80% AFUE Gas Furnaces (For Reference)**

R	80	2	V	A	075	3	17	M	S	A
Brand	**Series**	**Stages**	**Motor**	**Major Rev**	**Input BTU/HR**	**Air Flow**	**Cabinet Width**	**Configuration**	**Nox**	**Minor Rev**
Rheem	80 - 80+ AFUE	1 - Single-stage 2 - Two-stage	V - Variable speed T - Constant Torque (X-13) P - PSC premium S - PSC standard	A - 1st Design	050 - 50,000 [15 kW] 075 - 75,000 [22 kW] 100 - 100,000 [29 kW] 125 - 125,000 [37 kW] 150 - 150,000 [44 kW]	3 - up to 3 ton 4 - 2 1/2 to 4 ton 5 - 3 1/2 up to 5 ton	14 - 14" 17 - 17.5" 21 - 21" 24 - 24.5"	M - Multi D - Down Z - Down & zero clearance down flow	X - Low Nox S - Standard	A - 1st Design

Air Handlers (For Reference)**

R	H	1	T	36	17	S	T	A	N	A	A	000	*
Brand	**Product Category**	**Stages of Airflow**	**Motor Type**	**Capacity BTU/HR**	**Width**	**Coil Size**	**Metering Device**	**Major Series***	**Controls**	**Voltage**	**Minor Series****	**Factory Heat Cap**	**Option Code**
Rheem	H - Air Handler	1 - Single-Stage 2 - Two-Stage M - Modulating	V - Variable Speed T - Constant Torque P - PSC	24 - 24,000 [7.03 kW] 36 - 36,000 [10.55 kW] 48 - 48,000 [14.07 kW] 60 - 60,000 [17.58 kW]	14 - 14" 17 - 17.5" 21 - 21" 24 - 24.5"	S - Standard Eff. M - Mid Eff. H - High Eff.	T - TEV E - EEV P - Piston	A - 1st Design	C -Communicating N -Non-comm	A - 1ph, 115/60 J - 1ph, 208-240/60 D - 3ph, 480/60	A - 1st Design	00 - no factory heat with option code	*TBD

**Model number ID's are for reference only. Available SKU's are listed on the standard features/available SKU page of model spec sheets.

[ ] Designates Metric Conversions

Physical Data

PHYSICAL DATA							
Model No.	**RA1418**	**RA1424**	**RA1430**	**RA1436**	**RA1442**	**RA1448**	**RA1460**
Nominal Tonnage	1.5	2.0	2.5	3.0	3.5	4.0	5.0
Valve Connections							
Liquid Line O.D. – in.	3/8	3/8	3/8	3/8	3/8	3/8	3/8
Suction Line O.D. – in.	3/4	3/4	3/4	3/4	7/8	7/8	7/8
Refrigerant (R410A) furnished oz.[1]	68	80	87	106	134	129	201
Compressor Type	Scroll						
Outdoor Coil							
Net face area – Outer Coil	9.1	11.1	12.1	14.8	17.3	18.9	32.3
Net face area – Inner Coil	—	—	—	—	—	—	—
Tube diameter – in.	3/8	3/8	3/8	3/8	3/8	3/8	3/8
Number of rows	1	1	1	1	1	1	1
Fins per inch	22	22	22	22	22	22	22
Outdoor Fan							
Diameter – in.	20	20	20	24	24	26	26
Number of blades	2	2	2	3	3	2	3
Motor hp	1/10	1/8	1/8	1/6	1/5	1/5	1/3
CFM	2225	2295	2605	3105	4105	4264	4775
RPM	1075	1121	1075	850	833	820	795
watts	130	138	142	173	236	236	239
Shipping weight – lbs.	143	148	158	178	207	232	247
Operating weight – lbs.	122	141	151	171	200	221	240

Electrical Data

Line Voltage Data (Volts-Phase-Hz)	**208/230-1-60**	**208/230-1-60**	**208/230-1-60**	**208/230-1-60**	**208/230-1-60**	**208/230-1-60**	**208/230-1-60**
Maximum overcurrent protection (amps)[2]	20	25	25	30	35	45	50
Minimum circuit ampacity[3]	13	15	17	19	23	27	34
Compressor							
Rated load amps	9.7	10.9	12.8	14.1	16.7	19.9	23.7
Locked rotor amps	48	62.9	64	77	109	109	152.5
Condenser Fan Motor							
Full load amps	0.6	0.8	0.8	0.8	1.2	1.2	3.5
Locked rotor amps	1.1	1.5	1.4	1.5	2.0	2.3	-
Line Voltage Data (Volts-Phase-Hz)	—	—	—	**208/230-3-60**	**208/230-3-61**	**208/230-3-62**	**208/230-3-63**
Maximum overcurrent protection (amps)[2]	—	—	—	20	25	30	35
Minimum circuit ampacity[3]	—	—	—	13	16	18	24
Compressor							
Rated load amps	—	—	—	9	11.2	13.1	15.9
Locked rotor amps	—	—	—	71	84	83.1	110
Condenser Fan Motor							
Full load amps	—	—	—	0.8	1.2	1.2	3.5
Locked rotor amps	—	—	—	1.5	3.0	2.3	-
Line Voltage Data (Volts-Phase-Hz)	—	—	—	**480-3-60**	**480-3-60 RA1442AD**	**480-3-60**	**480-3-60 RA1460AD**
Maximum overcurrent protection (amps)[2]	—	—	—	15	—	15	15
[3]Minimum circuit ampacity	—	—	—	8	—	9	10
Compressor							
Rated load amps	—	—	—	5.6	—	6.1	7.1
Locked rotor amps	—	—	—	38	—	41	52
Condenser Fan Motor							
Full load amps	—	—	—	0.5	—	0.6	0.5
Locked rotor amps	—	—	—	1.1	—	1.6	1.4

[1]Refrigerant charge sufficient for 15 ft. length of refrigerant lines. For longer line set requirements see the installation instructions for information about set length and additional refrigerant charge required.
[2]HACR type circuit breaker of fuse.
[3]Refer to National Electrical Code manual to determine wire, fuse and disconnect size requirements.

Accessories

Model No.		RA1418	RA1424	RA1430	RA1436	RA1442	RA1448	RA1460
Compressor crankcase heater*		44-17402-44	44-17402-44	44-17402-44	44-17402-44	44-17402-45	44-17402-45	44-17402-45
Low ambient control		RXAD-A08	RXAD-A08	RXAD-A08	RXAD-A08	RXAD-A08	RXAD-A08	RXAD-A08
Compressor sound cover		68-23427-26	68-23427-26	68-23427-26	68-23427-26	68-23427-25	68-23427-25	68-23427-25
Compressor hard start kit		SK-A1	SK-A1	SK-A1	SK-A1	SK-A1	SK-A1	SK-A1
Compressor time delay		RXMD-B01	RXMD-B01	RXMD-B01	RXMD-B01	RXMD-B01	RXMD-B01	RXMD-B01
Low pressure control		RXAC-A07	RXAC-A07	RXAC-A07	RXAC-A07	RXAC-A07	RXAC-A07	RXAC-A07
High pressure control		RXAB-A07	RXAB-A07	RXAB-A07	RXAB-A07	RXAB-A07	RXAB-A07	RXAB-A07
Liquid Line Solenoid (24 VAC, 50/60 Hz)	Solenoid Valve	200RD2T3TVLC	200RD2T3TVLC	200RD2T3TVLC	200RD2T3TVLC	200RD2T3TVLC	200RD3T3TVLC	200RD3T3TVLC
	Solenoid Coil	61-AMG24V	61-AMG24V	61-AMG24V	61-AMG24V	61-AMG24V	61-AMG24V	61-AMG24V
Liquid Line Solenoid (120/240 VAC, 50/60 Hz)	Solenoid Valve	200RD2T3TVLC	200RD2T3TVLC	200RD2T3TVLC	200RD2T3TVLC	200RD2T3TVLC	200RD3T3TVLC	200RD3T3TVLC
	Solenoid Coil	61-AMG120/240V	61-AMG120/240V	61-AMG120/240V	61-AMG120/240V	61-AMG120/240V	61-AMG120/240V	61-AMG120/240V
Classic Top Cap w/Label		91-101123-21	91-101123-21	91-101123-21	91-101123-21	91-101123-21	91-101123-21	91-101123-21

*Crankcase Heater recommended with Low Ambient Kit.

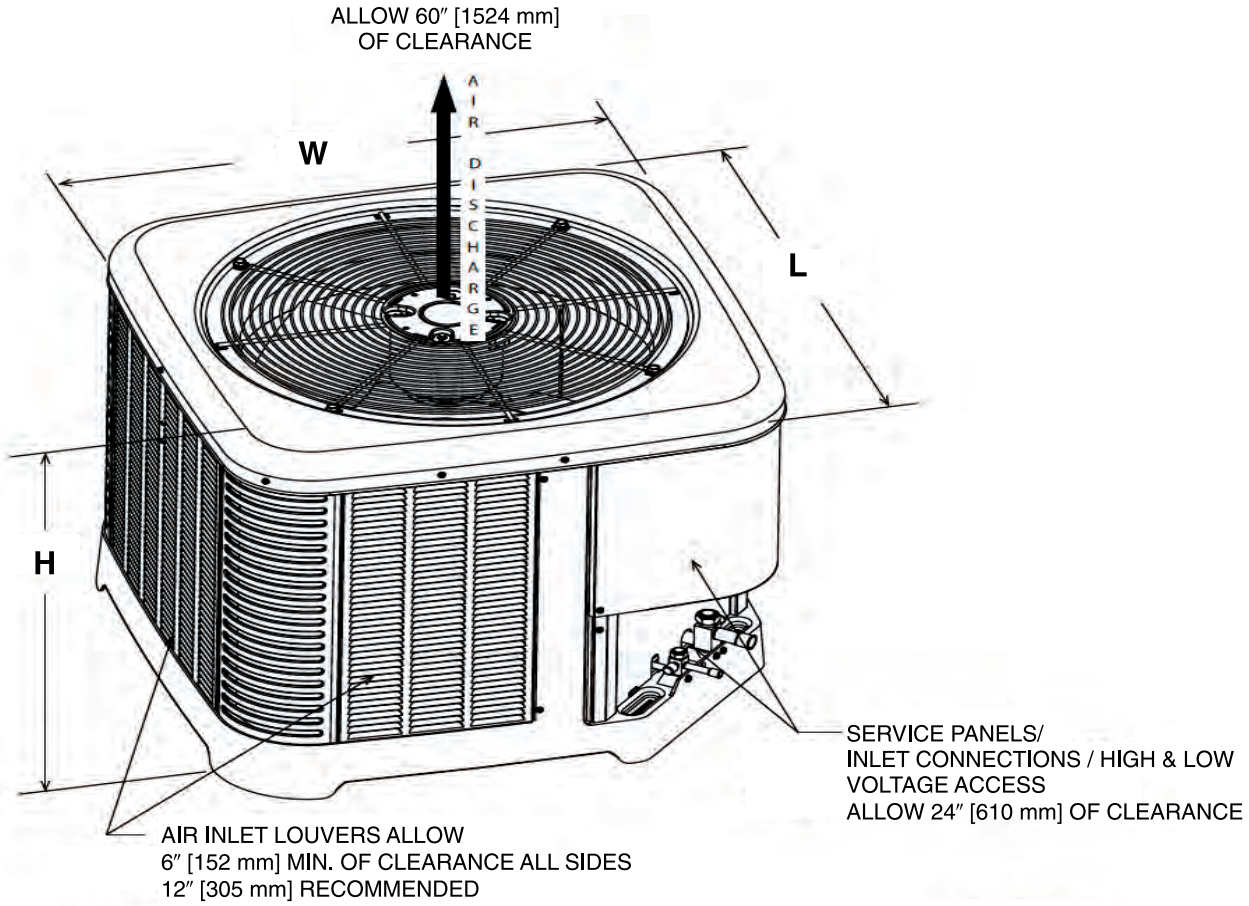
Weighted Sound Power Level (dBA)

A-WEIGHTED SOUND POWER LEVEL (dBA)								
Unit Size - Voltage, Series	Standard Rating (dBA)	TYPICAL OCTAVE BAND SPECTRUM (dBA without tone adjustment)						
		125	250	500	1000	2000	4000	8000
RA1418	76.0	51.4	59.6	65.2	65.9	64.3	58.5	53.7
RA1424	75.0	50.0	59.5	63.2	64.4	61.4	56.8	52.6
RA1430	74.0	48.8	57.5	63.5	64	61.9	56.1	51
RA1436	76.0	52.2	61.3	65.4	65.3	62.4	57.3	53.1
RA1442	73.0	51.5	54.7	63.5	63.3	59.4	54.9	48.4
RA1448	76.0	52.3	59.1	66.7	65.7	62.4	59.3	55.9
RA1460	74.6	50.1	55.1	65.6	64.8	63.2	57.4	56.4

NOTE: Tested in accordance with AHRI Standard 270-08 (not listed in AHRI)

Unit Dimensions

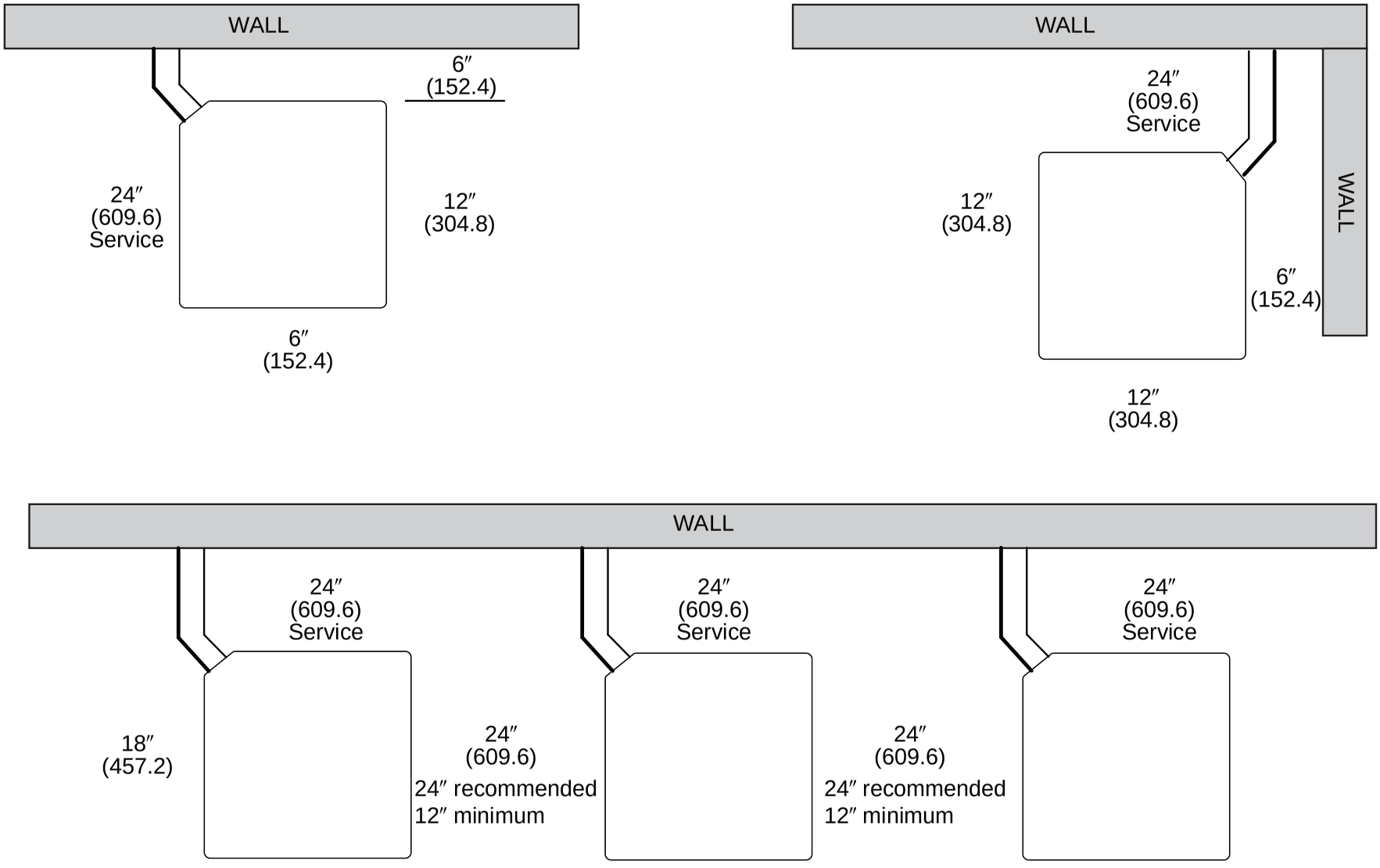
MODEL NO.	OPERATING						SHIPPING					
	H (Height)		L (Length)		W (Width)		H (Height)		L (Length)		W (Width)	
	INCHES	mm	INCHES	mm	INCHES	mm	INCHES	mm	INCHES	mm	INCHES	mm
RA1418	25	635	29.75	755	29.75	755	26.75	679	32.38	822	32.38	822
RA1424	25	635	29.75	755	29.75	755	26.75	679	32.38	822	32.38	822
RA1430	27	685	29.75	755	29.75	755	28.75	730	32.38	822	32.38	822
RA1436	27	685	33.75	857	33.75	857	28.75	730	36.38	924	36.38	924
RA1442	35	889	33.75	857	33.75	857	36.75	933	36.38	924	36.38	924
RA1448	31	787	35.75	908	35.75	908	32.75	832	38.38	975	38.38	975
RA1460	51	1295	35.75	908	35.75	908	51.38	1305	38.38	975	38.38	975



[ ] Designates Metric Conversions

ST-A1226-02-00

CLEARANCES



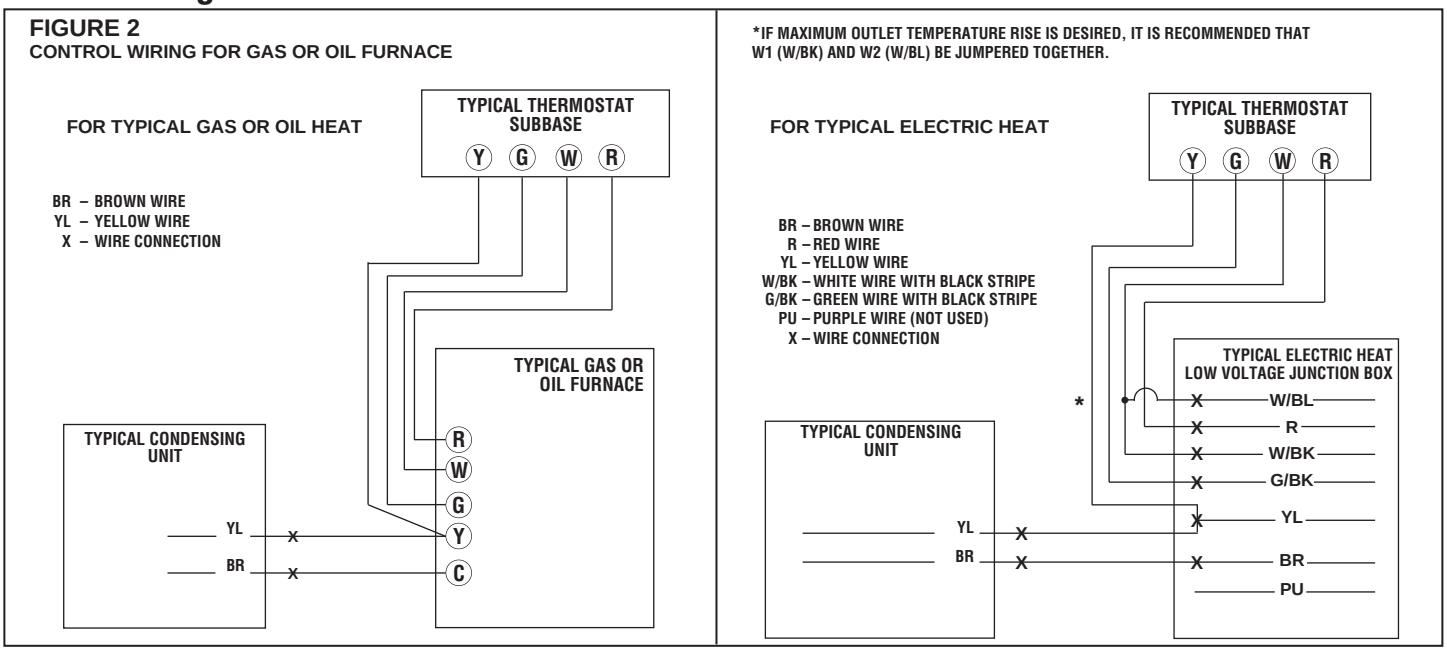
NOTE: NUMBERS IN () = mm

IMPORTANT: When installing multiple units in an alcove, roof well or partially enclosed area, ensure there is adequate ventillation to prevent re-circulation of discharge air.

ST-A1225-01-00

Control Wiring

FIGURE 2
CONTROL WIRING FOR GAS OR OIL FURNACE



Application Guidelines

1. Intended for outdoor installation with free air inlet and outlet. Outdoor fan external static pressure available is less than 0.01 -in. wc.
2. Minimum outdoor operation air temperature for cooling mode without low-ambient operation accessory is 55°F (12.8°C).
3. Maximum outdoor operating air temperature is 125°F (51.7°C).
4. For reliable operation, unit should be level in all horizontal planes.
5. Use only copper wire for electric connections at unit. Aluminum and clad aluminum are not acceptable for the type of connector provided.
6. Do not apply capillary tube indoor coils to these units.
7. Factory – supplied filter drier must be installed.

Refrigerant Line Size Information

13 - 16 SEER Single-Stage Air-Conditioners																
Unit Size	Allowable Liquid Line Size	Allowable Suction Line Size	Apply Long Line Guidelines if Linear Line Length Exceeds Those Shown Below (Feet)				Equivalent Length (Feet)									
							< 25	26-50	51-75	76-100	101-125	126-150	151-175	176-200	201-225	226-250
			(-)A13	(-)A14 A/B	(-)A14 W	(-)A16	Maximum Vertical Rise (Outdoor Unit Below Indoor Unit) * / Capacity Multiplier									
1.5 Ton **SEE NOTE 3	1/4"	5/8"	N/R	N/R	N/R	N/R	25 / 1.00	50 / 0.99	62 / 0.98	43 / 0.98	24 / 0.97	5 / 0.97	N/R	N/R	N/R	N/R
	5/16"	5/8"	N/R	223	198	188	25 / 1.00	50 / 0.99	75 / 0.98	98 / 0.98	93 / 0.97	88 / 0.97	83 / 0.96	78 / 0.96	73 / 0.95	68 / 0.94
	3/8"	5/8"	178	148	132	125	25 / 1.00	50 / 0.99	75 / 0.98	100 / 0.98	100 / 0.97	100 / 0.97	100 / 0.96	100 / 0.96	100 / 0.95	100 / 0.94
	1/4"	3/4"**	N/R	N/R	N/R	N/R	25 / 1.00	50 / 1.00	62 / 0.99	43 / 0.99	24 / 0.99	5 / 0.99	N/R	N/R	N/R	N/R
	5/16"	3/4"**	N/R	223	198	188	25 / 1.00	50 / 1.00	75 / 0.99	98 / 0.99	93 / 0.99	88 / 0.99	83 / 0.99	78 / 0.98	73 / 0.98	68 / 0.98
	3/8"	3/4"**	178	148	132	125	25 / 1.00	50 / 1.00	75 / 1.00	100 / 0.99	100 / 0.99	100 / 0.99	100 / 0.99	100 / 0.98	100 / 0.98	100 / 0.98
2 Ton	1/4"	5/8"	N/R	N/R	N/R	N/R	25 / 0.99	50 / 0.98	21 / 0.97	N/R	N/R	N/R	N/R	N/R	N/R	N/R
	5/16"	5/8"	243	193	175	175	25 / 0.99	50 / 0.98	75 / 0.97	87 / 0.96	77 / 0.95	69 / 0.94	61 / 0.93	53 / 0.92	45 / 0.91	37 / 0.90
	3/8"	5/8"	162	128	117	117	25 / 0.99	50 / 0.98	75 / 0.97	100 / 0.96	100 / 0.95	100 / 0.94	98 / 0.93	95 / 0.92	92 / 0.91	89 / 0.90
	1/4"	3/4"	N/R	N/R	N/R	N/R	25 /1.00	50 / 1.00	21 / 0.99	N/R	N/R	N/R	N/R	N/R	N/R	N/R
	5/16"	3/4"	243	193	175	175	25 /1.00	50 / 1.00	75 / 0.99	87 / 0.99	77 / 0.98	69 / 0.98	61 / 0.98	53 / 0.97	45 / 0.97	37 / 0.96
	3/8"	3/4"	162	128	117	117	25 / 1.00	50 / 1.00	75 / 0.99	100 / 0.99	100 / 0.98	100 / 0.98	98 / 0.98	95 / 0.97	93 / 0.97	90 / 0.96
2.5 Ton	5/16"	5/8"	N/R	N/R	110	110	25 / 0.99	50 / 0.98	75 / 0.96	70 / 0.94	59 / 0.93	48 / 0.91	36 / 0.90	N/R	N/R	N/R
	3/8"	5/8"	142	117	73	73	25 / 0.99	50 / 0.98	75 / 0.96	100 / 0.94	98 / 0.93	94 / 0.91	90 / 0.90	N/R	N/R	N/R
	5/16"	3/4"	213	175	110	110	25 / 1.00	50 / 0.99	75 / 0.99	70 / 0.98	59 / 0.98	48 / 0.97	36 / 0.96	25 / 0.96	13 / 0.95	N/R
	3/8"	3/4"	142	117	73	73	25 / 1.00	50 / 0.99	75 / 0.99	100 / 0.98	98 / 0.98	94 / 0.97	90 / 0.96	86 / 0.96	82 / 0.95	78 / 0.95
3 Ton	5/16"	5/8"	N/R	N/R	N/R	N/R	25 / 0.99	50 / 0.97	66 / 0.94	49 / 0.92	32 / 0.90	N/R	N/R	N/R	N/R	N/R
	3/8"	5/8"	108	85	90	82	25 / 0.99	50 / 0.97	75 / 0.94	95 / 0.92	89 / 0.90	N/R	N/R	N/R	N/R	N/R
	5/16"	3/4"	N/R	128	135	123	25 / 1.00	50 / 0.99	66 / 0.98	49 / 0.98	32 / 0.97	15 / 0.96	N/R	N/R	N/R	N/R
	3/8"	3/4"	108	85	90	82	25 / 1.00	50 / 0.99	75 / 0.98	95 / 0.98	89 / 0.97	84 / 0.96	78 / 0.95	72 / 0.94	67 / 0.93	61 / 0.93
	1/2"	3/4"	54	43	45	41	25 / 1.00	50 / 0.99	75 / 0.98	100 / 0.98	100 / 0.97	100 / 0.96	100 / 0.95	100 / 0.94	100 / 0.93	100 / 0.93
	5/16"	7/8"	N/R	128	135	123	25 / 1.00	50 / 1.00	66 / 1.00	49 / 0.99	32 / 0.99	15 / 0.99	N/R	N/R	N/R	N/R
	3/8"	7/8"	108	85	90	82	25 / 1.00	50 / 1.00	75 / 1.00	95 / 0.99	89 / 0.99	84 / 0.99	78 / 0.98	72 / 0.98	67 / 0.98	61 / 0.97
	1/2"	7/8"	54	43	45	41	25 / 1.00	50 / 1.00	75 / 1.00	100 / 0.99	100 / 0.99	100 / 0.99	100 / 0.98	100 / 0.98	100 / 0.98	100 / 0.97
3.5 Ton	3/8"	3/4"	150	102	75	75	25 / 0.99	50 / 0.98	75 / 0.97	88 / 0.96	80 / 0.95	72 / 0.94	65 / 0.92	57 / 0.91	49 / 0.90	N/R
	1/2"	3/4"	75	51	38	38	25 / 0.99	50 / 0.98	75 / 0.97	100 / 0.96	100 / 0.95	100 / 0.94	100 / 0.92	100 / 0.91	100 / 0.90	N/R
	3/8"	7/8"	150	102	75	75	25 / 1.00	50 / 1.00	75 / 0.99	88 / 0.99	80 / 0.99	72 / 0.98	65 / 0.97	57 / 0.97	49 / 0.96	42 / 0.96
	1/2"	7/8"	75	51	38	38	25 / 1.00	50 / 1.00	75 / 0.99	100 / 0.99	100 / 0.99	100 / 0.98	100 / 0.97	100 / 0.97	100 / 0.96	100 / 0.96

NOTES:
1. Do not exceed 200 ft linear line length.
2. *Do not exceed 100 ft vertical separation if outdoor unit is above indoor unit.
3. **3/4" suction line should only be used for 1.5 ton systems if outdoor unit is below or at same level as indoor to assure proper oil return.
4. Always use the smallest liquid line allowable to minimize refrigerant charge.
5. Applications shaded in light gray indicate capacity multipliers between 0.90 and 0.96 which are not recommended, but are allowed.
6. Applications shaded in dark gray are not recommended due to excessive liquid or suction pressure drop.

NOTE: Values based on 105°F liquid temperature and 45°F evaporator temperature in cooling mode depending on size

Refrigerant Line Size Information (con't.)

13 - 16 SEER Single-Stage Air-Conditioners																
Unit Size	Allowable Liquid Line Size	Allowable Suction Line Size	Apply Long Line Guidelines if Linear Line Length Exceeds Those Shown Below (Feet)				Equivalent Length (Feet)									
							< 25	26-50	51-75	76-100	101-125	126-150	151-175	176-200	201-225	226-250
			(-)A13	(-)A14 A/B	(-)A14 W	(-)A16	Maximum Vertical Rise (Outdoor Unit Below Indoor Unit) * / Capacity Multiplier									
4 Ton	3/8"	3/4"	148	110	N/R	35	25 / 0.99	50 / 0.98	75 / 0.96	77 / 0.95	67 / 0.93	57 / 0.92	46 / 0.91	N/R	N/R	N/R
	1/2"	3/4"	74	55	N/R	18	25 / 0.99	50 / 0.98	75 / 0.96	100 / 0.95	100 / 0.93	100 / 0.92	100 / 0.91	N/R	N/R	N/R
	3/8"	7/8"	148	110	N/R	35	25 / 1.00	50 / 0.99	75 / 0.99	77 / 0.98	67 / 0.97	57 / 0.97	46 / 0.96	36 / 0.96	26 / 0.95	15 / 0.95
	1/2"	7/8"	74	55	N/R	18	25 / 1.00	50 / 0.99	75 / 0.99	100 / 0.98	100 / 0.97	100 / 0.97	100 / 0.96	100 / 0.96	99 / 0.95	97 / 0.95
5 Ton	3/8"	3/4"	78	0	N/R	0	25 / 0.99	50 / 0.97	75 / 0.94	61 / 0.92	46 / 0.90	N/R	N/R	N/R	N/R	N/R
	1/2"	3/4"	39	0	N/R	0	25 / 0.99	50 / 0.97	75 / 0.94	100 / 0.92	100 / 0.90	N/R	N/R	N/R	N/R	N/R
	3/8"	7/8"	78	0	N/R	0	25 / 1.00	50 / 0.99	75 / 0.98	61 / 0.97	46 / 0.96	32 / 0.95	18 / 0.94	N/R	N/R	N/R
	1/2"	7/8"	39	0	N/R	0	25 / 1.00	50 / 0.99	75 / 0.98	100 / 0.97	100 /0.96	100 / 0.95	97 / 0.94	95 / 0.94	92 / 0.93	89 / 0.92
	3/8"	1-1/8"	78	0	N/R	0	25 / 1.01	50 / 1.01	75 / 1.00	61 / 1.00	46 / 0.99	32 / 0.99	18 / 0.99	N/R	N/R	N/R
	1/2"	1-1/8"	39	0	N/R	0	25 / 1.01	50 / 1.01	75 / 1.00	100 /1.00	100 / 0.99	100 / 0.99	97 / 0.99	95 / 0.99	92 / 0.99	89 / 0.98

NOTES:
1. Do not exceed 200 ft linear line length.
2. *Do not exceed 100 ft vertical separation if outdoor unit is above indoor unit.
3. **3/4" suction line should only be used for 1.5 ton systems if outdoor unit is below or at same level as indoor to assure proper oil return.
4. Always use the smallest liquid line allowable to minimize refrigerant charge.
5. Applications shaded in light gray indicate capacity multipliers between 0.90 and 0.96 which are not recommended, but are allowed.
6. Applications shaded in dark gray are not recommended due to excessive liquid or suction pressure drop.

NOTE: Values based on 105°F liquid temperature and 45°F evaporator temperature in cooling mode depending on size

Refrigerant Line Size Information (con't.)

13 - 16 SEER Single-Stage Air-Conditioners																
Unit Size	Allowable Liquid Line Size mm [in.]	Allowable Suction Line Size mm [in.]	Apply Long Line Guidelines if Linear Line Length Exceeds Those Shown Below (Feet)				Equivalent Length (Meters)									
							< 8	8-15	16-23	24-30	31-38	39-46	47-53	54-61	62-69	70-76
			(-)A13	(-)A14 A/B	(-)A14 W	(-)A16	Maximum Vertical Rise (Outdoor Unit Below Indoor Unit) * / Capacity Multiplier									
5.3 KW [1.5 Ton] **SEE NOTE 3	6.35 [1/4]	15.88 [5/8]	N/R	N/R	N/R	N/R	8 / 1.00	15 / 0.99	19 / 0.98	13 / 0.98	7 / 0.97	2 / 0.97	N/R	N/R	N/R	N/R
	7.94 [5/16]	15.88 [5/8]	N/R	68	60	57	8 / 1.00	15 / 0.99	23 / 0.98	30 / 0.98	28 / 0.97	27 / 0.97	25 / 0.96	24 / 0.96	22 / 0.95	21 / 0.94
	9.53 [3/8]	15.88 [5/8]	54	45	40	38	8 / 1.00	15 / 0.99	23 / 0.98	30 / 0.98	30 / 0.97	30 / 0.97	30 / 0.96	30 / 0.96	30 / 0.95	30 / 0.94
	6.35 [1/4]	19.05 [3/4]**	N/R	N/R	N/R	N/R	8 / 1.00	15 / 1.00	19 / 0.99	13 / 0.99	7 / 0.99	2 / 0.99	N/R	N/R	N/R	N/R
	7.94 [5/16]	19.05 [3/4]**	N/R	68	60	57	8 / 1.00	15 / 1.00	23 / 0.99	30 / 0.99	28 / 0.99	27 / 0.99	25 / 0.99	24 / 0.98	22 / 0.98	21 / 0.98
	9.53 [3/8]	19.05 [3/4]**	54	45	40	38	8 / 1.00	15 / 1.00	23 / 0.99	30 / 0.99	30 / 0.99	30 / 0.99	30 / 0.99	30 / 0.98	30 / 0.98	30 / 0.98
7.0 KW [2 Ton]	6.35 [1/4]	15.88 [5/8]	N/R	N/R	N/R	N/R	8 / 0.99	15 / 0.98	6 / 0.97	N/R	N/R	N/R	N/R	N/R	N/R	N/R
	7.94 [5/16]	15.88 [5/8]	74	59	53	53	8 / 0.99	15 / 0.98	23 / 0.97	27 / 0.96	23 / 0.95	21 / 0.94	19 / 0.93	16 / 0.92	14 / 0.91	11 / 0.90
	9.53 [3/8]	15.88 [5/8]	49	39	36	36	8 / 0.99	15 / 0.98	23 / 0.97	30 / 0.96	30 / 0.95	30 / 0.94	30 / 0.93	29 / 0.92	28 / 0.91	27 / 0.90
	6.35 [1/4]	19.05 [3/4]	N/R	N/R	N/R	N/R	8 / 1.00	15 / 1.00	6 / 0.99	N/R	N/R	N/R	N/R	N/R	N/R	N/R
	7.94 [5/16]	19.05 [3/4]	74	59	53	53	8 / 1.00	15 / 1.00	23 / 0.99	27 / 0.99	23 / 0.98	21 / 0.98	19 / 0.98	16 / 0.97	14 / 0.97	11 / 0.96
	9.53 [3/8]	19.05 [3/4]	49	39	36	36	8 / 1.00	15 / 1.00	23 / 0.99	30 / 0.99	30 / 0.98	30 / 0.98	30 / 0.98	29 / 0.97	28 / 0.97	27 / 0.96
8.8 KW [2.5 Ton]	7.94 [5/16]	15.88 [5/8]	N/R	N/R	34	34	8 / 0.99	15 / 0.98	23 / 0.96	21 / 0.94	18 / 0.93	15 / 0.91	11 / 0.90	N/R	N/R	N/R
	9.53 [3/8]	15.88 [5/8]	43	36	22	22	8 / 0.99	15 / 0.98	23 / 0.96	30 / 0.94	30 / 0.93	29 / 0.91	27 / 0.90	N/R	N/R	N/R
	7.94 [5/16]	19.05 [3/4]	65	53	34	34	8 / 1.00	15 / 0.99	23 / 0.99	21 / 0.98	18 / 0.98	15 / 0.97	11 / 0.96	8 / 0.96	4 / 0.95	N/R
	9.53 [3/8]	19.05 [3/4]	43	36	22	22	8 / 1.00	15 / 0.99	23 / 0.99	30 / 0.98	30 / 0.98	29 / 0.97	27 / 0.96	26 / 0.96	25 / 0.95	24 / 0.95
10.6 KW [3 Ton]	7.94 [5/16]	15.88 [5/8]	N/R	N/R	N/R	N/R	8 / 0.99	15 / 0.97	20 / 0.94	15 / 0.92	10 / 0.90	N/R	N/R	N/R	N/R	N/R
	9.53 [3/8]	15.88 [5/8]	33	26	27	25	8 / 0.99	15 / 0.97	23 / 0.94	29 / 0.92	27 / 0.90	N/R	N/R	N/R	N/R	N/R
	7.94 [5/16]	19.05 [3/4]	N/R	39	41	37	8 / 1.00	15 / 0.99	20 / 0.98	15 / 0.98	10 / 0.97	5 / 0.96	N/R	N/R	N/R	N/R
	9.53 [3/8]	19.05 [3/4]	33	26	27	25	8 / 1.00	15 / 0.99	23 / 0.98	29 / 0.98	27 / 0.97	26 / 0.96	24 / 0.95	22 / 0.94	20 / 0.93	19 / 0.93
	12.70 [1/2]	19.05 [3/4]	17	13	14	12	8 / 1.00	15 / 0.99	23 / 0.98	30 / 0.98	30 / 0.97	30 / 0.96	30 / 0.95	30 / 0.94	30 / 0.93	30 / 0.93
	7.94 [5/16]	22.23 [7/8]	N/R	39	41	37	8 / 1.00	15 / 1.00	20 / 1.00	15 / 0.99	10 / 0.99	5 / 0.99	N/R	N/R	N/R	N/R
	9.53 [3/8]	22.23 [7/8]	33	26	27	25	8 / 1.00	15 / 1.00	23 / 1.00	29 / 0.99	27 / 0.99	26 / 0.99	24 / 0.98	22 / 0.98	20 / 0.98	19 / 0.97
	12.70 [1/2]	22.23 [7/8]	17	13	14	12	8 / 1.00	15 / 1.00	23 / 1.00	30 / 0.99	30 / 0.99	30 / 0.99	30 / 0.98	30 / 0.98	30 / 0.98	30 / 0.97
12.3 KW [3.5 Ton]	9.53 [3/8]	19.05 [3/4]	46	31	23	23	8 / 0.99	15 / 0.98	23 / 0.97	27 / 0.96	24 / 0.95	22 / 0.94	20 / 0.92	17 / 0.91	15 / 0.90	N/R
	12.70 [1/2]	19.05 [3/4]	23	15	11	11	8 / 0.99	15 / 0.98	23 / 0.97	30 / 0.96	30 / 0.95	30 / 0.94	30 / 0.92	30 / 0.91	30 / 0.90	N/R
	9.53 [3/8]	22.23 [7/8]	46	31	23	23	8 / 1.00	15 / 1.00	23 / 0.99	27 / 0.99	24 / 0.99	22 / 0.98	20 / 0.97	17 / 0.97	15 / 0.96	13 / 0.96
	12.70 [1/2]	22.23 [7/8]	23	15	11	11	8 / 1.00	15 / 1.00	23 / 0.99	30 / 0.99	30 / 0.99	30 / 0.98	30 / 0.97	30 / 0.97	30 / 0.96	30 / 0.96

NOTES:
1. Do not exceed 61 meters linear line length.
2. *Do not exceed 30 meters vertical separation if outdoor unit is above indoor unit.
3. **19.05 mm [3/4 in.] suction line should only be used for 1.5 ton systems if outdoor unit is below or at same level as indoor to assure proper oil return.
4. Always use the smallest liquid line allowable to minimize refrigerant charge.
5. Applications shaded in light gray indicate capacity multipliers between 0.90 and 0.96 which are not recommended, but are allowed.
6. Applications shaded in dark gray are not recommended due to excessive liquid or suction pressure drop.

[ ] Designates Metric Conversions

Refrigerant Line Size Information (con't.)

13 - 16 SEER Single-Stage Air-Conditioners																
Unit Size	Allowable Liquid Line Size	Allowable Suction Line Size	Apply Long Line Guidelines if Linear Line Length Exceeds Those Shown Below (Feet)				Equivalent Length (Meters)									
							< 8	8-15	16-23	24-30	31-38	39-46	47-53	54-61	62-69	70-76
			(-)A13	(-)A14 A/B	(-)A14 W	(-)A16	Maximum Vertical Rise (Outdoor Unit Below Indoor Unit) * / Capacity Multiplier									
14.1 KW [4 Ton]	9.53 [3/8]	19.05 [3/4]	45	34	N/R	11	8 / 0.99	15 / 0.98	23 / 0.96	24 / 0.95	20 / 0.93	17 / 0.92	14 / 0.91	NR	NR	NR
	12.7 [1/2]	19.05 [3/4]	23	17	N/R	5	8 / 0.99	15 / 0.98	23 / 0.96	30 / 0.95	30 / 0.93	30 / 0.92	30 / 0.91	NR	NR	NR
	9.53 [3/8]	22.23 [7/8]	45	34	N/R	11	8 / 1.00	15 / 0.99	23 / 0.99	24 / 0.98	20 / 0.97	17 / 0.97	14 / 0.96	11 / 0.96	8 / 0.95	5 / 0.95
	12.7 [1/2]	22.23 [7/8]	23	17	N/R	5	8 / 1.00	15 / 0.99	23 / 0.99	30 / 0.98	30 / 0.97	30 / 0.97	30 / 0.96	30 / 0.96	30 / 0.95	30 / 0.95
17.6 KW [5 Ton]	9.53 [3/8]	19.05 [3/4]	24	17	N/R	0	8 / 0.99	15 / 0.97	23 / 0.94	19 / 0.92	14 / 0.90	NR	NR	NR	NR	NR
	12.7 [1/2]	19.05 [3/4]	12	8	N/R	0	8 / 0.99	15 / 0.97	23 / 0.94	30 / 0.92	30 / 0.90	NR	NR	NR	NR	NR
	9.53 [3/8]	22.23 [7/8]	24	17	N/R	0	8 / 1.00	15 / 0.99	23 / 0.98	19 / 0.97	14 / 0.96	10 / 0.95	5 / 0.94	NR	NR	NR
	12.7 [1/2]	22.23 [7/8]	12	8	N/R	0	8 / 1.00	15 / 0.99	23 / 0.98	30 / 0.97	30 /0.96	30 / 0.95	30 / 0.94	29 / 0.94	28 / 0.93	27 / 0.92
	9.53 [3/8]	28.58 [1-1/8]	24	17	N/R	0	8 / 1.01	15 / 1.01	23 / 1.00	19 / 1.00	14 / 0.99	10 / 0.99	5 / 0.99	NR	NR	NR
	12.7 [1/2]	28.58 [1-1/8]	12	8	N/R	0	8 / 1.01	15 / 1.01	23 / 1.00	30 / 1.00	30 / 0.99	30 / 0.99	30 / 0.99	29 / 0.99	28 / 0.99	27 / 0.98

NOTES:

1. Do not exceed 61 meters linear line length.
2. *Do not exceed 30 meters vertical separation if outdoor unit is above indoor unit.
3. **19.05 mm [3/4 in.] suction line should only be used for 1.5 ton systems if outdoor unit is below or at same level as indoor to assure proper oil return.
4. Always use the smallest liquid line allowable to minimize refrigerant charge.
5. Applications shaded in light gray indicate capacity multipliers between 0.90 and 0.96 which are not recommended, but are allowed.
6. Applications shaded in dark gray are not recommended due to excessive liquid or suction pressure drop.

[ ] Designates Metric Conversions

Performance Data @ AHRI Standard Conditions – Cooling

Tested Combination							
Outdoor Unit	**Indoor Coil**	**Total Capacity BTU/H [kW]**	**Net Sensible BTU/H [kW]**	**Net Latent BTU/H [kW]**	**SEER**	**EER**	**Indoor CFM [L/s]**
RA1418AJ1	RCF2417STA+RXMD-C04	17800 [5.2]	12100 [3.5]	5700 [1.7]	14.00	11.50	600 [283.2]
RA1424BJ1	RCF2417STA+RXMD-C04	23200 [6.8]	17500 [5.2]	5700 [1.7]	14.00	11.50	800 [376.0]
RA1430AJ1	RCF3617STA+RXMD-C04	28800 [8.4]	19500 [5.7]	9300 [2.7]	14.00	11.50	1000 [471.9]
RA1436AJ1	RCF3617STA+RXMD-C04	34200 [10.0]	23200 [6.8]	11000 [3.2]	14.00	11.50	1050 [495.5]
RA1436AC1	RCF3617STA+RXMD-C04	34200 [10.0]	23200 [6.8]	11000 [3.2]	14.00	11.50	1050 [495.5]
RA1436AD1	RCF3617STA+RXMD-C04	34200 [10.0]	23200 [6.8]	11000 [3.2]	14.00	11.50	1050 [495.5]
RA1442CJ1	RCF4821STA+RXMD-C04	39500 [11.6]	28900 [8.5]	10600 [3.1]	14.00	11.50	1350 [634.5]
RA1442CC1	RCF4821STA+RXMD-C04	39500 [11.6]	28900 [8.5]	10600 [3.1]	14.00	11.50	1350 [634.5]
RA1448AJ1	RCF4821STA+RXMD-C04	46000 [13.5]	31200 [9.1]	14800 [4.3]	14.00	11.70	1450 [684.3]
RA1448AC1	RCF4821STA+RXMD-C04	46000 [13.5]	31200 [9.1]	14800 [4.3]	14.00	11.70	1450 [684.3]
RA1448AD1	RCF4821STA+RXMD-C04	46000 [13.5]	31200 [9.1]	14800 [4.3]	14.00	11.70	1450 [684.3]
RA1460BJ1	RCF6024STA+RXMD-C04	55500 [16.3]	38100 [11.2]	17400 [5.1]	14.00	11.70	1525 [716.8]
RA1460AD1	RCF6024STA+RXMD-C04	55500 [16.3]	38100 [11.2]	17400 [5.1]	14.00	11.70	1525 [716.8]
RA1460BC1	RCF6024STA+RXMD-C04	55500 [16.3]	38100 [11.2]	17400 [5.1]	14.00	11.70	1525 [716.8]

Note: Additional ratings and system match ups can be accessed on MyRheem.com at: https://my.rheem.com/static/private/ahriresidential.html
Additional ratings and system match ups and downloadable ratings certificates can be accessed from the AHRI website: www.ahridirectory.org

[ ] Designates Metric Conversions

GUIDE SPECIFICATIONS

General

System Description

Outdoor-mounted, air-cooled, split-system air conditioner composite base pan unit suitable for ground or rooftop installation. Unit consists of a hermetic compressor, an air-cooled coil, propeller-type condenser fan, suction and legend line service valve, and a control box. Unit will discharge supply air upward as shown on contract drawings. Unit will be used in a refrigeration circuit to match up to a coil unit.

Quality Assurance

- — Unit will be rated in accordance with the latest edition of AHRI Standard 210.
- — Unit will be certified for capacity and efficiency, and listed in the latest AHRI directory.
- — Unit construction will comply with latest edition of ANSI/ASHRAE and with NEC.
- — Unit will be constructed in accordance with UL standards and will carry the UL label of approval. Unit will have c-UL-us approval.
- — Unit cabinet will be capable of withstanding ASTM B117 1000-hr salt spray test.
- — Air-cooled condenser coils will be leak tested at 150 psig and pressure tested at 550 psig.
- — Unit constructed in ISO9001 approved facility.

Delivery, Storage, and Handling

- — Unit will be shipped as single package only and is stored and handled per unit manufacturer's recommendations.

Warranty (for inclusion by specifying engineer) — U.S. and Canada only.

Products

Equipment

Factory assembled, single piece, air-cooled air conditioner unit. Contained within the unit enclosure is all factory wiring, piping, controls, compressor, refrigerant charge R-410A, and special features required prior to field start-up.

Unit Cabinet

- — Unit cabinet will be constructed of galvanized steel, bonderized, and coated with a powder coat paint.
- — All units constructed with louver coil protection and corner post. Louver can be removed by removing one fastener per louver panel.

AIR-COOLED, SPLIT-SYSTEM AIR CONDITIONER
RA14
1-1/2 TO 5 NOMINAL TONS

Fans

- — Condenser fan will be direct-drive propeller type, discharging air upward.
- — Condenser fan motors will be totally enclosed, 1-phase type with class B insulation and permanently lubricated bearings. Shafts will be corrosion resistant.
- — Fan blades will be statically and dynamically balanced.
- — Condenser fan openings will be equipped with coated steel wire safety guards.

Compressor

- — Compressor will be hermetically sealed.
- — Compressor will be mounted on rubber vibration isolators.

Condenser Coil

- — Condenser coil will be air cooled.
- — Coil will be constructed of aluminum fins mechanically bonded to copper tubes.

Refrigeration Components

- — Refrigeration circuit components will include liquid-line shutoff valve with sweat connections, vapor-line shutoff valve with sweat connections, system charge of R-410A refrigerant, and compressor oil.
- — Unit will be equipped with filter drier for R-410A refrigerant for field installation.

Operating Characteristics

- — The capacity of the unit will meet or exceed _____ Btuh at a suction temperature of _____ °F/°C. The power consumption at full load will not exceed _____ kW.
- — Combination of the unit and the evaporator or fan coil unit will have a total net cooling capacity of _____ Btuh or greater at conditions of _____ CFM entering air temperature at the evaporator at _____ °F/°C wet bulb and _____ °F/°C dry bulb, and air entering the unit at _____ °F/°C.
- — The system will have a SEER of _____ Btuh/watt or greater at DOE conditions.

Electrical Requirements

- — Nominal unit electrical characteristics will be _____ v, single phase, 60 hz. The unit will be capable of satisfactory operation within voltage limits of _____ v to _____ v.
- — Nominal unit electrical characteristics will be _____ v, three phase, 60 hz. The unit will be capable of satisfactory operation within voltage limits of _____ v to _____ v.
- — Unit electrical power will be single point connection.
- — Control circuit will be 24v.

Special Features

- — Refer to section of this literature identifying accessories and descriptions for specific features and available enhancements.

GENERAL TERMS OF LIMITED WARRANTY*

Rheem will furnish a replacement for any part of this product which fails in normal use and service within the applicable period stated, in accordance with the terms of the limited warranty.

***For complete details of the Limited and Conditional Warranties, including applicable terms and conditions, contact your local contractor or the Manufacturer for a copy of the product warranty certificate.**

Conditional Parts
(Registration Required) .....Ten (10) Years

The new degree of comfort.™

In keeping with its policy of continuous progress and product improvement, Rheem reserves the right to make changes without notice.

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INTEGRATED HOME COMFORT

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