Appendix G:
Noise Impact Analysis

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Noise Impact Analysis Report
Ashley Way Logistics Center Project
City of Colton, San Bernardino County, California

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Date: March 4, 2019

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ACRONYMS AND ABBREVIATIONS

ADA	Americans with Disabilities Act
ADT	average daily traffic
ANSI	American National Standards Institute
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dB	decibel
dBA	A-weighted decibel
FCS	FirstCarbon Solutions
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GPA	General Plan Amendment
Hz	hertz
L_{dn}	Day-Night Average Sound Level
L_{eq}	Equivalent Sound Level
OSHA	Occupational Safety and Health Administration
PPV	peak particle velocity
rms	root mean square
SEL	Single Event Level
VdB	Vibration in decibels

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SECTION 1: INTRODUCTION

1.1 - Purpose of Analysis and Study Objectives

This Noise Impact Analysis has been prepared by FirstCarbon Solutions (FCS) to determine the off-site and on-site noise impacts associated with the proposed Ashley Way Logistics Center project. The following is provided in this report:

- A description of the study area, project site, and proposed project
- Information regarding the fundamentals of noise and vibration
- A description of the local noise guidelines and standards
- A description of the existing noise environment
- An analysis of the potential short-term, construction-related noise and vibration impacts from the proposed project
- An analysis of long-term, operations-related noise and vibration impacts from the proposed project

1.2 - Project Summary

1.2.1 - Site Location

The proposed project is located in the City of Colton, San Bernardino County, California (Exhibit 1). The 11.19-acre site is located on a corner lot south of Ashley Way and adjacent to Interstate 215 (I-215). The project area is relatively flat, sloping gently to the northwest; it is located within a highly urbanized and industrial area of the City of Colton. Surrounding the project site are single-family residential homes to the east, multi-family residential homes to the south, and commercial and warehouse land uses to the north and west. Regional access to the site is provided via I-215 through the East Washington Street and South Mount Vernon Avenue interchange, located to the southwest of the site. Local access to the site is provided via East Cooley Drive and Ashley Way (Exhibit 2).

1.2.2 - Project Description

The Applicant is seeking a General Plan Amendment (GPA) and zone change from Commercial to Industrial to allow the construction of a logistical center/warehouse distribution facility and associated infrastructure in the existing C-2 (General Commercial) zone.

The Applicant proposes to construct a 220,185-square-foot logistical center (also known as a distribution warehouse facility) on an 11.19-acre site that would consist of a 10,000-square-foot office, two warehouse structures (one is 10,000 square feet maximum and the other is 10,000 plus square feet), 156 parking stalls (including an employee lot with 6 Americans with Disabilities Act (ADA)-accessible spaces and a truck yard lot), and associated landscaping totaling 93,585 square feet

(Exhibit 3). The logistical center/warehouse distribution facility includes features to accommodate 28 semi-trucks to dock at high door positions, 33 trailer parking positions, and a mezzanine. The main front entrance faces north toward Ashley Way and all truck docking activity would occur on the south side of the building.

Although the building is intended for use as a logistical center/warehouse distribution facility, the end user has not been identified at this time; therefore, specific details about the future operation of the warehouse facility are not currently available. Additionally, because the end user is not known at this time, the Applicant has requested approval for future tenants to operate 24 hours per day/7 days per week depending on business/operational needs, and accordingly, the environmental evaluation will assume this level of activity is part of the proposed project.

Source: Census 2000 Data, The CaSIL

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Exhibit 1
Regional Location Map

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CITY OF COLTON
ASHLEY WAY LOGISTICS CENTER PROJECT
NOISE IMPACT ANALYSIS

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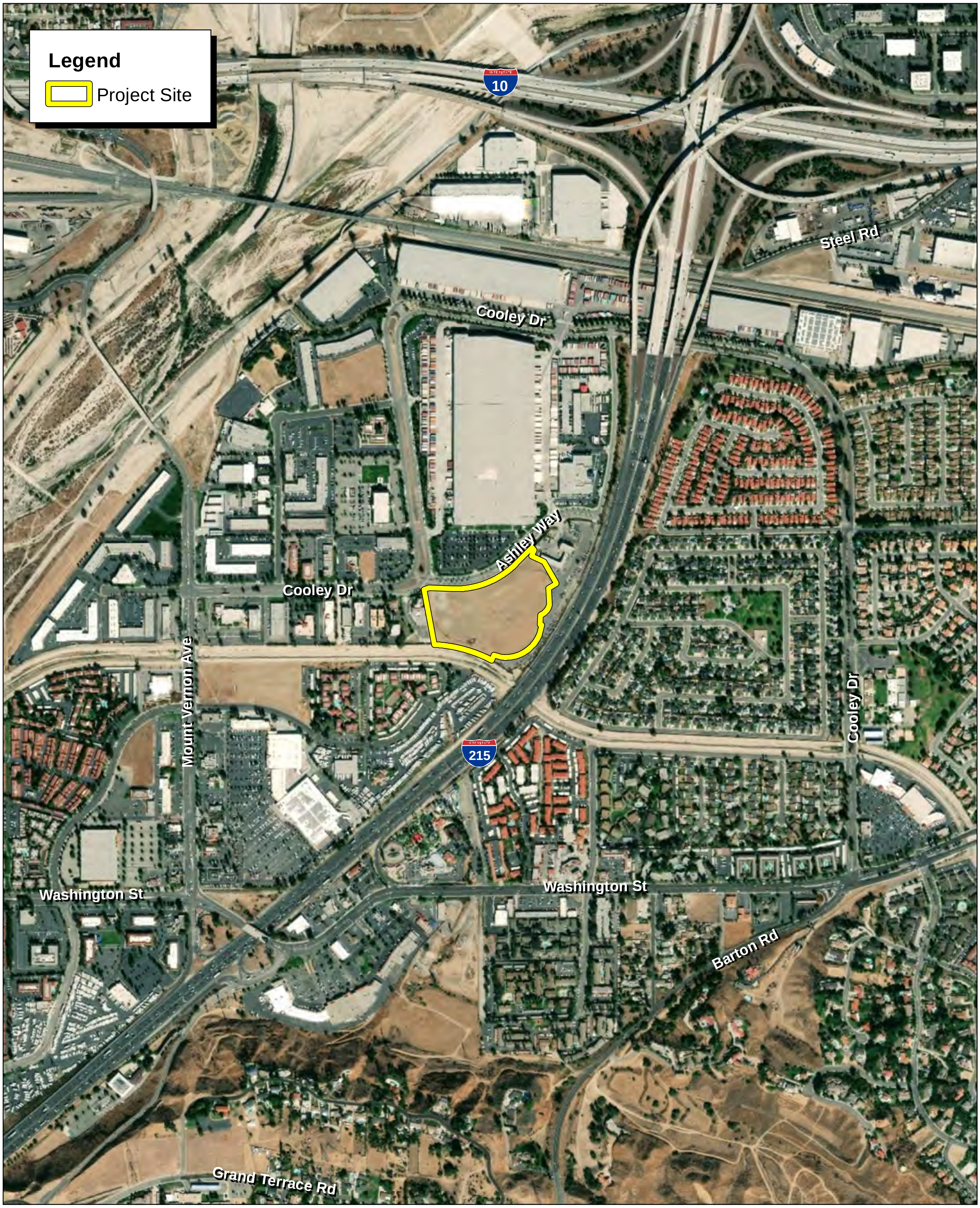

Source: ESRI Aerial Imagery.

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Feet

Exhibit 2
Local Vicinity Map
Aerial Base

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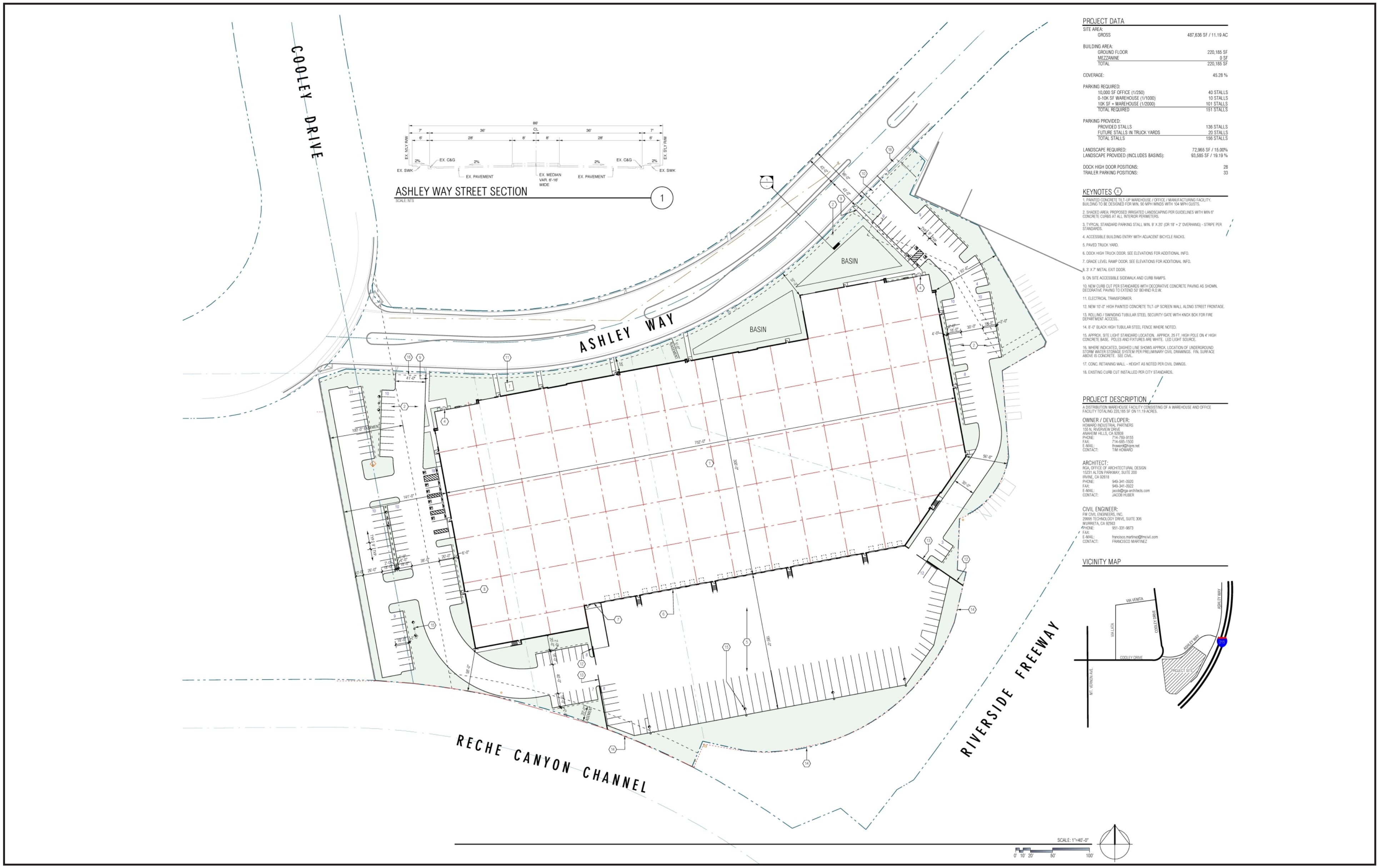

Source: RGA, August 2018.

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Exhibit 3
Site Plan

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CITY OF COLTON
ASHLEY WAY LOGISTICS CENTER PROJECT
NOISE IMPACT ANALYSIS

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SECTION 2: NOISE AND VIBRATION FUNDAMENTALS

2.1 - Characteristics of Noise

Noise is generally defined as unwanted or objectionable sound. Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm, or when it has adverse effects on health. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and in the extreme, hearing impairment. Noise effects can be caused by pitch or loudness. *Pitch* is the number of complete vibrations or cycles per second of a wave that result in the range of tone from high to low; higher-pitched sounds are louder to humans than lower-pitched sounds. *Loudness* is the intensity or amplitude of sound.

Sound is produced by the vibration of sound pressure waves in the air. Sound pressure levels are used to measure the intensity of sound and are described in terms of decibels. The decibel (dB) is a logarithmic unit, which expresses the ratio of the sound pressure level being measured to a standard reference level. The 0 point on the dB scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Changes of 3 dB or less are only perceptible in laboratory environments. Audible increases in noise levels generally refer to a change of 3 dB or more, as this level has been found to be barely perceptible to the human ear in outdoor environments. Only audible changes in existing ambient or background noise levels are considered potentially significant.

The human ear is not equally sensitive to all frequencies within the audible sound spectrum, so sound pressure level measurements can be weighted to better represent frequency-based sensitivity of average healthy human hearing. One such specific "filtering" of sound is called "A-weighting." A-weighted decibels (dBA) approximate the subjective response of the human ear to a broad frequency noise source by discriminating against very low and very high frequencies of the audible spectrum. They are adjusted to reflect only those frequencies that are audible to the human ear. Because decibels are logarithmic units, they cannot be added or subtracted by ordinary arithmetic means. For example, if one noise source produces a noise level of 70 dB, the addition of another noise source with the same noise level would not produce 140 dB; rather, they would combine to produce a noise level of 73 dB.

As noise spreads from a source, it loses energy so that the farther away the noise receiver is from the noise source, the lower the perceived noise level. Noise levels diminish or attenuate as distance from the source increases based on an inverse square rule, depending on how the noise source is physically configured. Noise levels from a single-point source, such as a single piece of construction equipment at ground level, attenuate at a rate of 6 dB for each doubling of distance (between the single-point source of noise and the noise-sensitive receptor of concern). Heavily traveled roads with few gaps in traffic behave as continuous line sources and attenuate roughly at a rate of 3 dB per doubling of distance.

2.1.1 - Noise Descriptors

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. Equivalent continuous sound level (L_{eq}) is the total sound energy of time-varying noise over a sample period. However, the predominant rating scales for human communities in the State of California are the L_{eq} and community noise equivalent level (CNEL) or the day-night average 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 the evening hours. CNEL and L_{dn} are within 1 dBA of each other and are normally exchangeable. 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 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 maximum levels denoted by L_{max} for short-term noise impacts. L_{max} reflects peak operating conditions and addresses the annoying aspects of intermittent noise.

2.1.2 - Noise Propagation

From the noise source to the receiver, noise changes both in level and frequency spectrum. The most obvious is the decrease in noise as the distance from the source increases. The manner in which noise reduces with distance depends on whether the source is a point or line source, as well as ground absorption, atmospheric conditions (wind, temperature gradients, and humidity) and refraction, and shielding by natural and manmade features. Sound from point sources, such as an air conditioning condenser, a piece of construction equipment, or an idling truck, radiates uniformly outward as it travels away from the source in a spherical pattern.

The attenuation or sound drop-off rate is dependent on the conditions of the land between the noise source and receiver. To account for this ground-effect attenuation (absorption), two types of site conditions are commonly used in noise models: soft-site and hard-site conditions. Soft-site conditions account for the sound propagation loss over natural surfaces such as normal earth and ground vegetation. For point sources, a drop-off rate of 7.5 dBA per each doubling of the distance (dBA/DD) is typically observed over soft ground with landscaping, as compared with a 6 dBA/DD drop-off rate over hard ground such as asphalt, concrete, stone and very hard packed earth. For line sources, such as traffic noise on a roadway, a 4.5 dBA/DD is typically observed for soft-site conditions compared to the 3 dBA/DD drop-off rate for hard-site conditions. Table 1 briefly defines these measurement descriptors and other sound terminology used in this section.

Table 1: Sound Terminology

Term	Definition
Sound	A vibratory disturbance created by a vibrating object which, when transmitted by pressure waves through a medium such as air, can be detected by a receiving mechanism such as the human ear or a microphone.
Noise	Sound that is loud, unpleasant, unexpected, or otherwise undesirable.
Ambient Noise	The composite of noise from all sources near and far in a given environment.
Decibel (dB)	A unitless measure of sound on a logarithmic scale, which represents the squared ratio of sound-pressure amplitude to a reference sound pressure. The reference pressure is 20 micropascals, representing the threshold of human hearing (0 dB).
A-Weighted Decibel (dBA)	An overall frequency-weighted sound level that approximates the frequency response of the human ear.
Equivalent Noise Level (L_{eq})	The average sound energy occurring over a specified time period. In effect, L_{eq} is the steady-state sound level that in a stated period would contain the same acoustical energy as the time-varying sound that actually occurs during the same period.
Maximum and Minimum Noise Levels (L_{max} and L_{min})	The maximum or minimum instantaneous sound level measured during a measurement period.
Day-Night Level (DNL or L_{dn})	The energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels occurring between 10:00 p.m. and 7:00 a.m. (nighttime).
Community Noise Equivalent Level (CNEL)	The energy average of the A-weighted sound levels occurring during a 24-hour period, with 5 dB added to the A-weighted sound levels occurring between 7:00 p.m. and 10:00 p.m. and 10 dB added to the A-weighted sound levels occurring between 10:00 p.m. and 7:00 a.m.
Source: Data compiled by FCS 2018	

2.1.3 - Traffic Noise

The level of traffic noise depends on the three primary factors: (1) the volume of the traffic, (2) the speed of the traffic, and (3) the number of trucks in the flow of traffic. Generally, the loudness of traffic noise is increased by heavier traffic volumes, higher speeds, and greater number of trucks. Vehicle noise is a combination of the noise produced by the engine, exhaust, and tires. Because of the logarithmic nature of noise levels, a doubling of the traffic volume (assuming that the speed and truck mix do not change) results in a noise level increase of 3 dBA. Based on the Federal Highway Administration (FHWA) community noise assessment criteria, this change is "barely perceptible." For reference, a doubling of perceived noise levels would require an increase of approximately 10 dBA. The truck mix on a given roadway also has an effect on community noise levels. As the number of heavy trucks increases and becomes a larger percentage of the vehicle mix, adjacent noise levels increase.

2.1.4 - Stationary Noise

A stationary noise producer is any entity in a fixed location that emits noise. Examples of stationary noise sources include machinery, engines, energy production, and other mechanical or powered equipment and activities such as loading and unloading or public assembly that may occur at commercial, industrial, manufacturing, or institutional facilities. Furthermore, while noise generated by the use of motor vehicles over public roads is preempted from local regulation, although the use of these vehicles is considered a stationary noise source when operated on private property such as at a construction site, a truck terminal, or warehousing facility. The emitted noise from the producer can be mitigated to acceptable levels either at the source or on the adjacent property through the use of proper planning, setbacks, block walls, acoustic-rated windows, dense landscaping, or by changing the location of the noise producer.

The effects of stationary noise depend on factors such as characteristics of the equipment and operations, distance and pathway between the generator and receptor, and weather. Stationary noise sources may be regulated at the point of manufacture (e.g., equipment or engines), with limitations on the hours of operation, or with provision of intervening structures, barriers or topography.

Construction activities are a common source of stationary noise. Construction-period noise levels are higher than background ambient noise levels but eventually cease once construction is complete. Construction is performed in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. These various sequential phases would change the character of the noise generated on each construction site and, therefore, would change the noise levels 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 2 shows typical noise levels of construction equipment as measured at a distance of 50 feet from the operating equipment.

Table 2: Typical Construction Equipment Maximum Noise Levels, L_{max}

Type of Equipment	Impact Device? (Yes/No)	Specification Maximum Sound Levels for Analysis (dBA at 50 feet)
Impact Pile Driver	Yes	95
Auger Drill Rig	No	85
Vibratory Pile Driver	No	95
Jackhammers	Yes	85
Pneumatic Tools	No	85
Pumps	No	77

Table 2 (cont.): Typical Construction Equipment Maximum Noise Levels, L_{max}

Type of Equipment	Impact Device? (Yes/No)	Specification Maximum Sound Levels for Analysis (dBA at 50 feet)
Scrapers	No	85
Cranes	No	85
Portable Generators	No	82
Rollers	No	85
Dozers	No	85
Tractors	No	84
Front-End Loaders	No	80
Backhoe	No	80
Excavators	No	85
Graders	No	85
Air Compressors	No	80
Dump Truck	No	84
Concrete Mixer Truck	No	85
Pickup Truck	No	55
Source: FHWA 2006. Highway Construction Noise Handbook, August.		

2.1.5 - Noise from Multiple Sources

Because sound pressure levels in decibels are based on a logarithmic scale, they cannot be added or subtracted in the usual arithmetical way. Therefore, sound pressure levels in decibels are logarithmically added on an energy summation basis. In other words, adding a new noise source to an existing noise source, both producing noise at the same level, will not double the noise level. Instead, if the difference between two noise sources is 10 dBA or more, the louder noise source will dominate and the resultant noise level will be equal to the noise level of the louder source. In general, if the difference between two noise sources is 0–1 dBA, the resultant noise level will be 3 dBA higher than the louder noise source, or both sources if they are equal. If the difference between two noise sources is 2–3 dBA, the resultant noise level will be 2 dBA above the louder noise source. If the difference between two noise sources is 4–10 dBA, the resultant noise level will be 1 dBA higher than the louder noise source.

2.2 - Characteristics of Groundborne Vibration and Noise

Groundborne vibration consists of rapidly fluctuating motion through a solid medium, specifically the ground, that has an average motion of zero and in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. The effects of groundborne vibration typically only causes a nuisance to people, but in extreme cases, excessive groundborne vibration has the potential to cause structural damage to buildings. Although groundborne vibration can be felt outdoors, it is typically only an annoyance to people indoors where the associated effects of the shaking of a building can be notable. Groundborne noise is an effect of groundborne vibration and only exists indoors, since it is produced from noise radiated from the motion of the walls and floors of a room, and may also consist of the rattling of windows or dishes on shelves.

Several different methods are used to quantify vibration amplitude such as the maximum instantaneous peak in the vibrations velocity, which is known as the peak particle velocity (PPV) or the root mean square (RMS) amplitude of the vibration velocity. Because of the typically small amplitudes of vibrations, vibration velocity is often expressed in decibels—denoted as LV—and is based on the reference quantity of 1 micro inch per second. To distinguish these vibration levels referenced in decibels from noise levels referenced in decibels, the unit is written as "VdB."

Although groundborne vibration can be felt outdoors, it is typically only an annoyance to people indoors where the associated effects of the shaking of a building can be notable. When assessing annoyance from groundborne vibration, vibration is typically expressed as root mean square (rms) velocity in units of decibels of 1 micro-inch per second, with the unit written in VdB. Typically, developed areas are continuously affected by vibration velocities of 50 VdB or lower. Human perception to vibration starts at levels as low as 67 VdB. Annoyance due to vibration in residential settings starts at approximately 70 VdB.

Off-site sources that may produce perceptible vibrations are usually caused by construction equipment, steel-wheeled trains, and traffic on rough roads, while smooth roads rarely produce perceptible groundborne noise or vibration. Construction activities, such as blasting, pile driving and operating heavy earthmoving equipment, are common sources of groundborne vibration. Construction vibration impacts on building structures are generally assessed in terms of PPV. Typical vibration source levels from construction equipment are shown in Table 3.

Table 3: Vibration Levels of Construction Equipment

Construction Equipment	PPV at 25 Feet (inches/second)	RMS Velocity in Decibels (VdB) at 25 Feet
Water Trucks	0.001	57
Scraper	0.002	58
Bulldozer—small	0.003	58
Jackhammer	0.035	79
Concrete Mixer	0.046	81
Concrete Pump	0.046	81
Paver	0.046	81
Pickup Truck	0.046	81
Auger Drill Rig	0.051	82

Table 3 (cont.): Vibration Levels of Construction Equipment

Construction Equipment	PPV at 25 Feet (inches/second)	RMS Velocity in Decibels (VdB) at 25 Feet
Backhoe	0.051	82
Crane (Mobile)	0.051	82
Excavator	0.051	82
Grader	0.051	82
Loader	0.051	82
Loaded Trucks	0.076	86
Bulldozer—Large	0.089	87
Caisson drilling	0.089	87
Vibratory Roller (small)	0.101	88
Compactor	0.138	90
Clam shovel drop	0.202	94
Vibratory Roller (large)	0.210	94
Pile Driver (impact-typical)	0.644	104
Pile Driver (impact-upper range)	1.518	112
Source: Compilation of scientific and academic literature, generated by the Federal Transit Administration (FTA) and FHWA.		

The propagation of groundborne vibration is not as simple to model as airborne noise. This is because noise in the air travels through a relatively uniform medium, while groundborne vibrations travel through the earth, which may contain significant geological differences. Factors that influence groundborne vibration include:

- **Vibration source:** Type of activity or equipment, such as impact or mobile, and depth of vibration source;
- **Vibration path:** Soil type, rock layers, soil layering, depth to water table, and frost depth; and
- **Vibration receiver:** Foundation type, building construction, and acoustical absorption.

Among these factors that influence groundborne vibration, there are significant differences in the vibration characteristics when the source is underground compared to at the ground surface. In addition, soil conditions are known to have a strong influence on the levels of groundborne vibration. Among the most important factors are the stiffness and internal damping of the soil and the depth to bedrock. Vibration propagation is more efficient in stiff clay soils than in loose sandy soils, and shallow rock seems to concentrate the vibration energy close to the surface, and can result in groundborne vibration problems at large distance from the source. Factors such as layering of the soil and depth to the water table can have significant effects on the propagation of groundborne vibration. Soft, loose, sandy soils tend to attenuate more vibration energy than hard, rocky materials. Vibration propagation through groundwater is more efficient than through sandy soils. There are three main types of vibration propagation: surface, compression, and shear waves. Surface waves, or Rayleigh waves, travel along the ground's surface. These waves carry most of their energy along an expanding circular wave front, similar to ripples produced by throwing a rock into a pool of water. P-waves, or compression waves, are body waves that carry their energy along an expanding spherical wave front. The particle motion in these waves is longitudinal (i.e., in a "push-pull" fashion). P-waves are analogous to airborne sound waves. S-waves, or shear waves, are also body waves that carry energy along an expanding spherical wave front. However, unlike P-waves, the particle motion is transverse, or side-to-side and perpendicular to the direction of propagation.

As vibration waves propagate from a source, the vibration energy decreases in a logarithmic nature and the vibration levels typically decrease by 6 VdB per doubling of the distance from the vibration source. As stated above, this drop-off rate can vary greatly depending on the soil type, but it has been shown to be effective enough for screening purposes, in order to identify potential vibration impacts that may need to be studied through actual field tests. The vibration level (calculated below as "PPV") at a distance from a point source can generally be calculated using the vibration reference equation:

$$PPV = PPV_{ref} * (25/D)^n \text{ (in/sec)}$$

Where:

PPV_{ref} = reference measurement at 25 feet from vibration source
D = distance from equipment to property line
n = vibration attenuation rate through ground

According to Section 7 of the FTA Transit Noise and Vibration Impact Assessment Manual (2018), an "n" value of 1.5 is recommended to calculate vibration propagation through typical soil conditions.

SECTION 3: REGULATORY SETTING

3.1 - Federal Regulations

3.1.1 - United States Environmental Protection Agency

In 1972, Congress enacted the Noise Control Act. This act authorized the United States Environmental Protection Agency (EPA) to publish descriptive data on the effects of noise and establish levels of sound "requisite to protect the public welfare with an adequate margin of safety." These levels are separated into health (hearing loss levels) and welfare (annoyance levels) categories, as shown in Table 4. The EPA cautions that these identified levels are not standards because they do not take into account the cost or feasibility of the levels.

For protection against hearing loss, 96 percent of the population would be protected if sound levels are less than or equal to an $L_{eq(24)}$ of 70 dBA. The EPA activity and interference guidelines are designed to ensure reliable speech communication at about 5 feet in the outdoor environment. For outdoor and indoor environments, interference with activity and annoyance should not occur if levels are below 55 dBA and 45 dBA, respectively.

Table 4: Summary of EPA Recommended Noise Levels to Protect Public Welfare

Effect	Level	Area
Hearing loss	$L_{eq}(24) \leq 70$ dB	All areas
Outdoor activity interference and annoyance	$L_{dn} \leq 55$ dB	Outdoors in residential areas, farms, and other outdoor areas where people spend widely varying amounts of time and other places in which quiet is a basis for use.
	$L_{eq}(24) \leq 55$ dB	Outdoor areas where people spend limited amounts of time, such as school yards, playgrounds, etc.
Indoor activity interference and annoyance	$L_{eq} \leq 45$ dB	Indoor residential areas.
	$L_{eq}(24) \leq 45$ dB	Other indoor areas with human activities such as schools, etc.
Note: (24) signifies an L_{eq} duration of 24 hours. Source: EPA 1974.		

3.1.2 - Federal Transit Administration

The FTA has established industry accepted standards for vibration impact criteria and impact assessment. These guidelines are published in its Transit Noise and Vibration Impact Assessment Manual (FTA 2018). The FTA guidelines include thresholds for construction vibration impacts for various structural categories as shown in Table 5.

Table 5: Federal Transit Administration Construction Vibration Impact Criteria

Building Category	PPV (in/sec)	Approximate VdB
I. Reinforced—Concrete, Steel or Timber (no plaster)	0.5	102
II. Engineered Concrete and Masonry (no plaster)	0.3	98
III. Non Engineer Timber and Masonry Buildings	0.2	94
IV. Buildings Extremely Susceptible to Vibration Damage	0.12	90

Note:
VdB = vibration measured as rms velocity in decibels of 1 micro-inch per second
Source: FTA 2018.

3.2 - State Regulations

The State of California has established regulations that help prevent adverse impacts to occupants of buildings located near noise sources. Referred to as the "State Noise Insulation Standard," it requires buildings to meet performance standards through design and/or building materials that would offset any noise source in the vicinity of the receptor. State regulations include requirements for the construction of new hotels, motels, apartment houses, and dwellings other than detached single-family dwellings that are intended to limit the extent of noise transmitted into habitable spaces. These requirements are found in the California Code of Regulations, Title 24 (known as the Building Standards Administrative Code), Part 2 (known as the California Building Code), Appendix Chapters 12 and 12A. For limiting noise transmitted between adjacent dwelling units, the noise insulation standards specify the extent to which walls, doors, and floor-ceiling assemblies must block or absorb sound. For limiting noise from exterior noise sources, the noise insulation standards set an interior standard of 45 dBA CNEL in any habitable room with all doors and windows closed. In addition, the standards require preparation of an acoustical analysis demonstrating the manner in which dwelling units have been designed to meet this interior standard, where such units are proposed in an area with exterior noise levels greater than 60 dBA CNEL.

The proposed project does not include any type of residential development. Therefore, these standards are not applicable to the proposed project. However, the State has established land use compatibility guidelines for determining acceptable noise levels for specified land uses, including industrial type land uses such as the proposed project, which the City of Colton has adopted as described below.

3.3 - Local Regulations

The project site is located within the City of Colton, in the County of San Bernardino. The City of Colton addresses noise in the Noise Element of its General Plan (City of Colton 1987) and in its Code of Ordinances (City of Colton 2018).

City of Colton General Plan

The City of Colton establishes land use compatibility standards in the Noise Element of the City of Colton General Plan. The General Plan Land Use Compatibility Standards for Community Noise Environments are shown in Table 6. The land use category listed in the General Plan Land Use Compatibility Standards that most closely applies to the proposed project is industrial, manufacturing, utilities, and agriculture. Under this designation, 75 dBA CNEL is considered to be the “normally acceptable” noise level for this type of new land use development.

Table 6: Land Use Compatibility Standards for Community Noise Environments

Land Use Category	Community Noise Exposure in Decibels (CNEL) Day/Night Average Noise Level in Decibels (L_{dn})							
		55	60	65	70	75	80	
Residential—Low Density Single-Family, Duplex, Mobile Homes								
Residential—Multi-Family								
Transient Lodging—Motels, Hotels								
Schools, Libraries, Churches, Hospitals, Nursing Homes								
Sports Arena, Outdoor Spectator Sports								
Playgrounds, Neighborhood Parks								
Golf Courses, Riding Stables, Water Recreation, Cemeteries								

Table 6 (cont.): Land Use Compatibility Standards for Community Noise Environments

Land Use Category	Community Noise Exposure in Decibels (CNEL) Day/Night Average Noise Level in Decibels (L_{dn})						
	55	60	65	70	75	80	
Office Buildings	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable			
				Conditionally Acceptable (from mid-cell)	Conditionally Acceptable	Conditionally Acceptable (to mid-cell)	
						Normally Unacceptable	
							Clearly Unacceptable
Industrial, Manufacturing, Utilities, Agriculture	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable	Normally Acceptable		
					Conditionally Acceptable	Conditionally Acceptable	
						Normally Unacceptable	Normally Unacceptable
						Clearly Unacceptable	Clearly Unacceptable

NORMALLY ACCEPTABLE	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
NORMALLY UNACCEPTABLE	New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
CONDITIONALLY ACCEPTABLE	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design.
CLEARLY UNACCEPTABLE	New construction or development clearly should not be undertaken.

Source: City of Colton General Plan 1987.

City of Colton Code of Ordinances

The City of Colton establishes its noise performance standards in its Code of Ordinances. The noise ordinance (§ 18.42.040) establishes a threshold of 65 dBA as the maximum operational sound level permitted to be generated, when measured at the boundary line of the property on which the sound is generated. While the City does not indicate the noise metric for this performance threshold, for purposes of this analysis it is assumed the applicable noise metric is an hourly average noise exposure level (65 dBA $L_{eq(h)}$).

The City addresses vibration impacts by restricting a project's operations so as not to generate ground vibration by equipment (other than motor vehicles, trains or by temporary construction or demolition) which is perceptible without instruments by the average person at or beyond any lot line of the lot containing the activities.

SECTION 4: EXISTING NOISE CONDITIONS

The following section describes the existing ambient noise environment of the project vicinity.

4.1 - Existing Ambient Noise Levels

The proposed project site is located within the City of Colton, in the County of San Bernardino, California. Surrounding the project site are single-family residential homes to the south and east, and commercial and warehouse land uses to the north and northwest. I-215 is located directly to the east of the project site.

The existing noise levels on the project site were documented through a noise monitoring effort performed at the project site. The existing noise measurement locations were taken in compliance with the methodology and site selection acoustical equivalence guidance of the Caltrans Technical Noise Supplement. A total of four short-term noise measurements (15 minutes each) were taken on Friday, December 7, 2018, starting at 11:53 a.m. and ending at 1:31 p.m., during the afternoon peak noise hour. The noise measurement data are summarized in Table 7.

Table 7: Short-term Noise Monitoring Summary

Site Location	Description	L_{eq}	L_{max}	L_{min}
ST-1	At the eastern boundary of the project site, approximately 250 feet southeast of Ashley Way and 250 feet northwest of I-215.	61.4	69.6	56.0
ST-2	At the south boundary of the project site, approximately 175 feet northeast of the Reche Canyon Channel and 130 feet northwest of I-215.	64.0	74.9	60.8
ST-3	At the southwest corner of the project site, just north of the Reche Canyon Channel.	57.8	65.3	55.7
ST-4	At the northern boundary of the project site, approximately 400 feet east of East Cooley Drive.	62.6	75.3	57.5
Source: FCS 2018.				

The ambient noise measurement locations are shown in Exhibit 4. The noise monitoring survey data sheets are provided in Appendix A.

4.2 - Existing Traffic Noise Levels

Existing traffic noise levels along selected roadway segments in the project vicinity were modeled using the FHWA Traffic Noise Prediction Model (FHWA-RD-77-108). Site-specific information is entered, such as roadway traffic volumes, roadway active width, source-to-receiver distances, travel speed, noise source and receiver heights, and the percentages of automobiles, medium trucks, and heavy trucks that the traffic is made up of throughout the day, amongst other variables. The daily traffic volumes were obtained from the traffic analysis prepared for the project by Linscott Law & Greenspan Engineers (LLG 2019). The traffic volumes described here correspond to the existing without project conditions traffic scenario as described in the transportation analysis. The model inputs and outputs—including the 60 dBA, 65 dBA, and 70 dBA CNEL noise contour distances—are provided in the Appendix of this document. A summary of the modeling results is shown in Table 8.

Table 8: Existing Traffic Noise Levels

Roadway Segment	Approximate ADT	Centerline to 70 CNEL (feet)	Centerline to 65 CNEL (feet)	Centerline to 60 CNEL (feet)	CNEL (dBA) 50 feet from Centerline of Outermost Lane
Ashley Way—Cooley Drive to Project Driveway 1	1,500	< 50	< 50	< 50	55.4
Ashley Way—Project Driveway 1 to Project Driveway 2	1,500	< 50	< 50	< 50	55.4
Ashley Way—Project Driveway 2 to Cooley Drive	770	< 50	< 50	< 50	53.1
I-215—south of I-10	170,000	427	915	1,968	80.4

Notes:
[1] Modeling results do not take into account mitigating features such as topography, vegetative screening, fencing, building design, or structure screening. Rather it assumes a worst case of having a direct line of site on flat terrain.
Source: FCS 2019.

4.3 - Existing Stationary Source Noise Levels

Some of the surrounding land uses generate noise associated with mechanical ventilation systems and parking lot activities. Noise levels from typical rooftop mechanical ventilation equipment are anticipated to range up to approximately 60 dBA L_{eq} at a distance of 25 feet. Typical parking lot activities, such as people conversing or closing doors, generate approximately 60 dBA to 70 dBA L_{max} at 50 feet. These activities are potential point sources of noise that contribute to the existing ambient noise environment in the project vicinity.

Source: ESRI Aerial Imagery.

FIRSTCARBON SOLUTIONS™

500 250 0 500 Feet

Exhibit 4
Noise Monitoring Locations

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CITY OF COLTON
ASHLEY WAY LOGISTICS CENTER PROJECT
NOISE IMPACT ANALYSIS

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SECTION 5: THRESHOLDS OF SIGNIFICANCE AND IMPACT ANALYSIS

5.1 - Thresholds of Significance

According to California Environmental Quality Act (CEQA) Guidelines updated Appendix G, to determine whether impacts related to noise and vibration are significant environmental effects, the following questions are analyzed and evaluated.

It should be noted that the significance criteria question (a), below, is from the Land Use and Planning section of the CEQA Guidelines Appendix G checklist questions. However, this question addresses impacts related to conflicts with land use plans, which would include project-related conflicts to the noise land use compatibility standards of the Noise Element of the City of Colton General Plan. Therefore, these impacts are addressed here.

Would the proposed plan:

a) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

b) Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

c) Generate excessive groundborne vibration or groundborne noise levels?

d) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

5.2 - Noise levels that would conflict with any land use plan, policy, or regulation

A significant impact would occur if the project would result in a conflict with the City's adopted land use compatibility standards. The City of Colton General Plan indicates that for industrial, manufacturing, utilities, and agricultural land use developments, environments with ambient noise levels ranging up to 75 dBA CNEL are considered "normally acceptable." Additionally, the City of Colton General Plan establishes an exterior noise threshold of 65 dBA $L_{eq(h)}$ during the day, or 55 dBA $L_{eq(h)}$ at night, for commercial land uses.

The ambient noise environment of the project site has been documented through the ambient noise monitoring effort, as well as through traffic noise modeling.

As shown in Table 7, in Section 4 above, measured daytime average noise levels on the project site range from approximately 58 dBA to 64 dBA L_{eq}. These noise levels are within the City's "Normally

Acceptable" threshold of 75 dBA CNEL for industrial, manufacturing, utilities, and agriculture land use developments.

The FHWA highway traffic noise prediction model (FHWA RD-77-108) was used to evaluate existing and future traffic noise conditions in the vicinity of the project site. The projected future traffic noise levels adjacent to the project site were analyzed to determine compliance with the City's noise and land use compatibility standards. The daily traffic volumes were obtained from the traffic analysis prepared for the project by LLG (2018). The resultant noise levels were weighed and summed over a 24-hour period in order to determine the CNEL values. The traffic noise modeling input and output files are included in Appendix A of this document. Table 9 shows a summary of the traffic noise levels for existing, existing plus project, year 2021 without project, year 2021 with project, year 2040 without project, and year 2040 with project conditions as measured at 50 feet from the centerline of the outermost travel lane.

Table 9: Traffic Noise Model Results Summary

Roadway Segment	Existing (dBA) CNEL	Existing with Project (dBA) CNEL	Year 2021 without Project (dBA) CNEL	Year 2021 with Project (dBA) CNEL	Year 2040 without Project (dBA) CNEL	Year 2040 with Project (dBA) CNEL
Ashley Way—Cooley Drive to Project Driveway 1	55.4	56.6	55.7	56.8	55.7	56.8
Ashley Way—Project Driveway 1 to Project Driveway 2	55.4	56.8	55.7	57.0	55.7	57.0
Ashley Way—Project Driveway 2 to Cooley Drive	53.1	53.3	53.2	53.4	56.0	56.0
Interstate 215—south of Interstate 10	80.4	80.5	80.6	80.6	81.4	81.4

Note:
Noise levels as measured at 50 feet from the centerline of the outermost travel lane. Traffic volumes for I-215 are taken from Caltrans Traffic Census Program (Caltrans 2018) with a 1 percent average annual increase applied for future years.
Source: FCS 2018.

As shown in Table 9, projected traffic noise levels along I-215 adjacent to the project site would range up to 81.4 dBA CNEL as measured at 50 feet from the centerline of the outermost travel lane under year 2040 with project conditions.

The nearest façade of the proposed building to the I-215 roadway segment would be located approximately 300 feet from the centerline of I-215. At this distance, traffic noise levels from I-215 would range up to approximately 66 dBA CNEL at this building's nearest façade. These noise levels are within the City's "Normally Acceptable" threshold of 75 dBA CNEL for industrial, manufacturing, utilities, and agriculture land use developments. Therefore, the proposed project would not result in a conflict with the City's land use compatibility standards, which would represent a less than significant impact.

5.3 - Substantial Noise Increase in Excess of Standards

5.3.1 - Construction Noise Impacts

For purposes of this analysis, a significant impact would occur if construction activities would result in a substantial temporary increase in ambient noise levels outside of the City's permissible hours for construction (7:00 a.m. to 7:00 p.m.) that would result in annoyance or sleep disturbance of nearby sensitive receptors.

Construction-related Traffic Noise

Noise impacts from construction activities associated with the project would be a function of the noise generated by construction equipment, equipment location, sensitivity of nearby land uses, and the timing and duration of the construction activities. One type of short-term noise impacts that could occur during project construction would result from the increase in traffic flow on local streets, associated with the transport of workers, equipment, and materials to and from the project site. The transport of workers and construction equipment and materials to the project site would incrementally increase noise levels on access roads leading to the site. Because workers and construction equipment would use existing routes, noise from passing trucks would be similar to existing vehicle-generated noise on these local roadways. Typically, a doubling of the average daily trip (ADT) hourly volumes on a roadway segment is required in order to result in an increase of 3 dBA in traffic noise levels; which, as discussed in the characteristics of nose discussion above, is the lowest change that can be perceptible to the human ear in outdoor environments. Project-related construction trips would not be expected to double the hourly traffic volumes along any roadway segment in the project vicinity. For this reason, short-term intermittent noise from construction trips would be minor when averaged over a longer time-period and would not be expected to result in a perceptible increase in hourly- or daily-average traffic noise levels in the project vicinity. Therefore, short-term construction-related noise impacts associated with the transportation of workers and equipment to the project site would be less than significant.

Construction Equipment Operational Noise

The second type of short-term noise impact is related to noise generated during construction on the project site. Construction is completed in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. These various sequential phases would change the character of the noise generated on the site and, therefore, the noise levels surrounding the site as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction related noise ranges to be categorized by work phase. Table 1 lists typical construction equipment noise levels, based on a distance of 50 feet between the equipment and a noise receptor. Typical operating cycles for these types of construction equipment may involve 1 or 2 minutes of full-power operation followed by 3 or 4 minutes at lower power settings. Impact equipment such as pile drivers are not expected to be used during construction of this project.

The site preparation phase, which includes excavation and grading of the site, tends to generate the highest noise levels because the noisiest construction equipment is earthmoving equipment.

Earthmoving equipment includes excavating machinery and compacting equipment, such as bulldozers, draglines, backhoes, front loaders, roller compactors, scrapers, and graders. Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three or four minutes at lower power settings.

Construction of the project is expected to require the use of scrapers, bulldozers, water trucks, haul trucks, and pickup trucks. Based on the information provided in Table 2, the maximum noise level generated by each scraper is assumed to be 85 dBA L_{max} at 50 feet from this equipment. Each bulldozer would also generate 85 dBA L_{max} at 50 feet. The maximum noise level generated by graders is approximately 85 dBA L_{max} at 50 feet. A characteristic of sound is that each doubling of sound sources with equal strength increases a sound level by 3 dBA. Assuming that each piece of construction equipment operates at some distance from the other equipment, a reasonable worst-case combined noise level during this phase of construction would be 90 dBA L_{max} at a distance of 50 feet from the acoustic center of a construction area. This would result in a reasonable worst-case hourly average of 86 dBA L_{eq}.

The closest noise-sensitive receptors to the project site are the multi-family residential homes located southwest of the project site. The façade of the closest home would be located approximately 280 feet from the acoustic center of construction activity where multiple pieces of heavy construction equipment would operate simultaneously during construction of the proposed warehouse and parking areas. At this distance, construction noise levels could range up to approximately 75 dBA L_{max}, with a relative worst-case hourly average of 71 dBA L_{eq} at this receptor.

Although there could be a relatively high single event noise exposure potential causing an intermittent noise nuisance, the effect of construction activities on longer-term (hourly or daily) ambient noise levels would be small but could result in a temporary increase in ambient noise levels in the project vicinity that could result in annoyance or sleep disturbance of nearby sensitive receptors. Therefore, restricting the permissible hours of construction to daytime hours would reduce the effects of construction activities on longer-term (hourly or daily) ambient noise levels, and it would reduce potential impacts that could result in annoyance or sleep disturbances at nearby sensitive receptors. Therefore, noise producing construction activities shall be restricted to the daytime hours of 7:00 a.m. to 7:00 p.m. Restricting construction activities to these stated time-periods, as well as implementing the best management noise reduction techniques and practices outlined in Mitigation Measure (MM) NOI-1, would ensure that construction noise would not result in a substantial temporary increase in ambient noise levels that would result in annoyance or sleep disturbance of nearby sensitive receptors. Therefore, with implementation of MM NOI-1, temporary construction noise impacts would be reduced to less than significant.

5.3.2 - Mobile Source Operational Noise Impacts

A significant impact would occur if project-generated traffic would result in a substantial increase in ambient noise levels compared with those that would exist without the project. The City does not define “substantial increase,” therefore for purpose of this analysis, a substantial increase is based on the following criteria. A characteristic of noise is that audible increases in noise levels generally refer to a change of 3 dBA or more, as this level has been found to be barely perceptible to the human ear in outdoor environments. A change of 5 dBA is considered the minimum readily perceptible change to the human ear in outdoor environments. Therefore, for purposes of this analysis, a significant impact would occur if the project would cause the CNEL to increase by any of the following:

- 5 dBA or more even if the CNEL would remain below normally acceptable levels for a receiving land use.
- 3 dBA or more, thereby causing the CNEL in the project vicinity to exceed normally acceptable levels and result in noise levels that would be considered conditionally acceptable for a receiving land use.
- 1.5 dBA or more where the CNEL currently exceeds conditionally acceptable levels.

Table 10 shows a summary of the traffic noise levels for existing, existing plus project, year 2021 without project, year 2021 with project, year 2040 without project, and year 2040 with project conditions as measured at 50 feet from the centerline of the outermost travel lane.

Table 10: Traffic Noise Increase Summary

Roadway Segment	Existing (dBA) CNEL	Existing with Project (dBA) CNEL	Increase over Existing (dBA)	Year 2021 without Project (dBA) CNEL	Year 2021 with Project (dBA) CNEL	Increase over Year 2021 without Project (dBA)	Year 2040 without Project (dBA) CNEL	Year 2040 with Project (dBA) CNEL	Increase over Year 2040 without Project (dBA)
Ashley Way—Cooley Drive to Project Driveway 1	55.4	56.6	1.2	55.7	56.8	1.1	55.7	56.8	1.1
Ashley Way—Project Driveway 1 to Project Driveway 2	55.4	56.8	1.4	55.7	57.0	1.3	55.7	57.0	1.3
Ashley Way—Project Driveway 2 to Cooley Drive	53.1	53.3	0.2	53.2	53.4	0.2	56.0	56.0	0.0
Interstate 215—south of Interstate 10	80.4	80.5	0.1	80.6	80.6	0.0	81.4	81.4	0.0
Source: FCS 2018.									

As shown in Table 10, the highest traffic noise level increase with implementation of the project would occur along Ashley Way between Project Driveway 1 and Project Driveway 2, under existing with project conditions. Along this roadway segment, the project would result in traffic noise levels ranging up to 56.8 dBA CNEL as measured at 50 feet from the centerline of the nearest travel lane, representing an increase of 1.4 dBA over existing conditions for this roadway segment. The resulting noise levels are below the normally acceptable threshold for receiving land uses adjacent to this roadway segment. This increase is well below the 5 dBA increase that would be considered a substantial permanent increase in noise levels compared with noise levels that would exist without the project. Therefore, project-related traffic noise levels would not result in a substantial permanent increase in traffic noise levels in excess of applicable standards, and would represent a less than significant impact.

5.3.3 - Stationary Source Operational Noise Impacts

A significant impact would occur if operational noise levels generated by stationary noise sources at the proposed project site would result in a substantial permanent increase in ambient noise levels in excess of any of the noise performance thresholds established in the City's Municipal Code. The City's noise ordinance establishes a noise performance standard threshold of 65 dBA L_{eq} for the maximum sound level radiated by any use of facility when measured at the boundary line of the property on which the sound is generated.

As noted in the characteristics of noise discussion, audible increases in noise levels generally refer to a change of 3 dBA or more, as this level has been found to be barely perceptible to the human ear in outdoor environments. A change of 5 dBA is considered the minimum readily perceptible change to the human ear in outdoor environments. Therefore, for purposes of this analysis, an increase of more than 3 dBA above the applicable noise performance thresholds would be considered a substantial permanent increase in ambient noise levels.

The proposed project would include new stationary noise sources, including new mechanical ventilation equipment, parking lot activities, and truck loading and unloading activities.

Mechanical Equipment Operations

Implementation of the project would include operation of a new mechanical equipment, which would be a new stationary noise source in the project vicinity. At the time of preparation of this analysis, specific details of mechanical ventilation systems were not available; therefore, a reference noise level for typical rooftop mechanical ventilation systems was used. Noise levels from typical commercial-grade mechanical ventilation equipment systems range up to approximately 60 dBA L_{eq} at a distance of 25 feet. The rooftop mechanical ventilation systems could be located as close as 110 feet from the closest project boundary adjoining another land use. At this distance, and assuming a minimum noise reduction of 6 dBA for shielding provided by the rooftop parapet, these mechanical ventilation system operational noise levels would attenuate to below 41 dBA L_{eq}, as measured at the nearest property line. These noise levels would not exceed the City's noise performance threshold of 65 dBA L_{eq}.

Therefore, operational noise levels generated by the proposed mechanical ventilation equipment would not result in a substantial permanent increase in ambient noise levels in excess of any of the noise performance thresholds, and would represent a less than significant impact.

Parking Lot Activities

Typical parking lot activities include people conversing, doors shutting, and vehicles idling which generate noise levels ranging from approximately 60 dBA to 70 dBA L_{max} at 50 feet. These activities are expected to occur sporadically throughout the day, as visitors and staff arrive and leave parking lot areas at the project site.

The nearest noise-sensitive receptor to the parking areas of the proposed project are the multi-family residential land uses located south of the southwestern corner of the project site, across the Reche Canyon Channel. These residences would be located approximately 280 feet from the acoustic center of parking lot activities at the project site. At this distance, noise levels associated with daily parking lot activities would range up to approximately 55 dBA L_{max} at the nearest residential property line. When averaged over an hour, hourly average noise levels from these parking lot activity would range up to 42 dBA L_{eq}. These noise levels would not exceed the City's noise performance threshold of 65 dBA L_{eq}. Therefore, operational parking lot activity noise levels would not result in a substantial permanent increase in ambient noise levels in excess of any of the noise performance thresholds, and would represent a less than significant impact.

Truck Loading Activities

Noise would also be generated by truck delivery, loading and unloading activities at the loading dock areas of the proposed project site. Typical noise levels from this type of loading and unloading activity can range from 70 dBA to 80 dBA L_{max} as measured at 50 feet. Commercial loading and unloading activities at the proposed project site could be located approximately 500 feet from the nearest off-site residential receptor, which is the multi-family residential land use located south of the southwestern corner of the project site, across the Reche Canyon Channel. At this distance, activities at loading and unloading areas could result in intermittent noise levels ranging up to approximately 60 dBA L_{max}. These activities are expected to occur at most a couple of times throughout a typical day as deliveries are made at the proposed facility with maximum noise levels generated for a cumulative minute within any hour. As a result, noise from these activities, when averaged over minutes or hours, would not exceed the background ambient noise level of 58 dBA L_{eq} (as measured at ST-3, the noise monitoring location nearest to this off-site residential receptor). These noise levels would not exceed the City's noise performance threshold of 65 dBA L_{eq}. Therefore, operational truck loading activity noise levels would not result in a substantial permanent increase in ambient noise levels in excess of any of the noise performance thresholds, and would represent a less than significant impact.

Mitigation Measures

Project construction activity noise impacts, which could result in a temporary increase in ambient noise levels in the project vicinity that could result in annoyance or sleep disturbance of nearby sensitive receptors, would be reduced to less than significant with implementation of the following multi-part mitigation measure.

MM NOI-1 Implementation of the following multi-part mitigation measure is required to reduce potential construction period noise impacts:

- The construction contractor shall ensure that all equipment driven by internal combustion engines shall be equipped with mufflers, which are in good condition and appropriate for the equipment.
- The construction contractor shall ensure that unnecessary idling of internal combustion engines (i.e., idling in excess of 5 minutes) is prohibited.

- The construction contractor shall utilize "quiet" models of air compressors and other stationary noise sources where technology exists.
- At all times during project grading and construction, the construction contractor shall ensure that stationary noise-generating equipment shall be located as far as practicable from sensitive receptors and placed so that emitted noise is directed away from adjacent residences.
- The construction contractor shall ensure that the construction staging areas shall be located to create the greatest feasible distance between the staging area and noise-sensitive receptors nearest the project site.
- The construction contractor shall ensure that all on-site construction activities, including the operation of any tools or equipment used in construction, drilling, repair, alteration, grading or demolition work, are limited to between the hours of 7:00 a.m. and 7:00 p.m. daily.

5.4 - Groundborne Vibration/Noise Levels

This section analyzes both construction and operational groundborne vibration impacts. Groundborne vibrations consist of rapidly fluctuating motions within the ground that have an average motion of zero. Vibrating objects in contact with the ground radiate vibration waves through various soil and rock strata to the foundations of nearby buildings.

In extreme cases, excessive groundborne vibration has the potential to cause structural damage to buildings. Common sources of groundborne vibration include construction activities such as blasting, pile driving, and operating heavy earthmoving equipment.

For determining construction-related vibration impacts, the FTA construction vibration impact criteria are utilized. The FTA has established industry accepted standards for vibration impact assessment in its Transit Noise and Vibration Impact Assessment Manual (FTA 2018). These guidelines are summarized in Table 5.

For determining operational vibration impacts, the City's vibration performance criteria are utilized. The City addresses vibration impacts by restricting a project's operations so as not to generate ground vibration by equipment (other than motor vehicles, trains or by temporary construction or demolition) which is perceptible without instruments by the average person at or beyond any lot line of the lot containing the activities.

5.4.1 - Short-term Construction Vibration Impacts

A significant impact would occur if existing structures at the project site or in the project vicinity would be exposed to groundborne vibration levels in excess of levels established by the FTA's Construction Vibration Impact Criteria for the listed type of structure, as shown in Table 5.

Of the variety of equipment used during construction, the small vibratory rollers that are anticipated to be used in the site preparation phase of construction would produce the greatest groundborne vibration levels. Small vibratory rollers produce groundborne vibration levels ranging up to 0.101 inch per second (in/sec) PPV at 25 feet from the operating equipment.

The nearest off-site receptor to the project site is the equipment rental building located northeast of the project site. The façade of this building would be located approximately 90 feet from the nearest construction footprint where the heaviest construction equipment would potentially operate. At this distance, groundborne vibration levels would range up to 0.015 PPV from operation of the types of equipment that would produce the highest vibration levels. This is below the FTA's Construction Vibration Impact Criteria of 0.3 PPV for buildings of engineered concrete and masonry. Therefore, the impact of short-term groundborne vibration associated with construction to off-site receptors would be less than significant.

5.4.2 - Operational Vibration Impacts

A significant impact would occur if existing structures at the project site or in the project vicinity would be exposed to groundborne vibrations from equipment (other than motor vehicles, trains or by temporary construction or demolition) which is perceptible without instruments by the average person at or beyond any lot line of the lot containing the activities.

Implementation of the project would not include any permanent sources that would expose persons in the project vicinity to groundborne vibration levels that could be perceptible without instruments at any existing sensitive land use in the project vicinity. In addition, there are no existing significant permanent sources of groundborne vibration in the project vicinity to which the proposed project would be exposed. Therefore, there would be no impact related to operational groundborne vibration.

5.5 - Excessive Noise Levels from Airport Activity

A significant impact would occur if the project would expose people residing or working in the project area to excessive noise levels for a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport.

The project site is not located within the vicinity of a private airstrip. The nearest public airport to the project site is the San Bernardino International Airport, located approximately 3.5 miles northeast of the project site. Because of the distance of the project site from the airport runways, the project site is located outside of the 65 dBA CNEL airport noise contours. While aircraft noise is occasionally audible on the project site from aircraft flyovers, aircraft noise associated with nearby airport activity would not expose people residing or working near the project site to excessive noise levels. Therefore, implementation of the project would not expose persons residing or working in the project vicinity to noise levels from airport activity that would be in excess of normally acceptable standards for the proposed land use development, and no impact would occur.

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SECTION 6: REFERENCES

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Federal Highway Administration (FHWA). 2006. Highway Construction Noise Handbook. August.

Federal Transit Administration (FTA). 2018. Transit Noise and Vibration Impact Assessment Manual. September.

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Appendix A: Noise Monitoring and Traffic Modeling Data

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Project Number: 0237.0026
Project Name: Ashley Way (Colton)
Test Personnel: Victoria Chung

Sheet 1 of 2

Noise Measurement Survey

Site Number: ST-1 Date: 12/7/18 Time: From 1:16pm To 1:31pm

Site Location:
15 ft from NE white wall, 15 ft from South fence, 15 ft from SE pole

Primary Noise Sources: Workers on forklift, talking & hauling equipment, I-5 freeway traffic (cars)

Measurement Results

	dBA
Leq	61.4
Lmax	69.6
Lmin	56
L5	
L10	
L50	
L90	
Ldn	
CNEL	

Observed Noise Sources/Events

Time	Noise Source/Event	dBA
1:23	train horn	
1:26	high pressure washer	
1:24	loud exhaust motorcycle	
1:30	Vehicle backing up sound	
1:31	high pressure wash	

Comments: Occasional train and airplane activity in the distance.

Equipment: Larson Davis LxT2 Measured Difference: 0.46 dBA
Settings: A-Weighted☒ Other☐ Slow☒ Fast☐ Windscreen☒

Atmospheric Conditions:

Maximum Wind Velocity (mph)	Average Wind Velocity (mph)	Temperature (F)	Relative Humidity (%)	
9.2	0.8	69.3		
Comments:	slightly windy conditions 1-6 mph			

Photos Taken:

Photo Number	Location/Description
ST-1 N	NE of project site; facing N toward Ashley Way
ST-1 S	" " facing S toward River
ST-1 E	" " facing E toward King Equip.
ST-1 W	" " facing W toward CASE Engineering

Traffic Description:

Roadway	# Lanes	Posted Speed	Average Speed	NB/EB Counts	SB/WB Counts

Diagram/Further Comments:

Project Number: 0237.0026
Project Name: Ashley Way (Cotton)
Test Personnel: Victoria Chung

Sheet 1 of 2

Noise Measurement Survey

Site Number: ST-2 Date: 12/7/18 Time: From 12:48 pm To 1:03 pm

Site Location:
10 ft from light pole on construction Rental equip. property (south) & 85 ft from west end of fence.

Primary Noise Sources: Generators used to power industrial lights, beeping from vehicles backing up, I-5 freeway traffic.

Measurement Results

	dBA
Leq	64
Lmax	74.9
Lmin	60.8
L5	
L10	
L50	
L90	
Ldn	
CNEL	

Observed Noise Sources/Events

Time	Noise Source/Event	dBA
12:55	train horn (distant)	
12:58	Construction Equipment parking	

Comments: frequent Activity of workers going back & forth to this area, driving various crane/construction equipment

Equipment: Larson Davis LxT2 Measured Difference: 0.35 dBA
Settings: A-Weighted☒ Other☐ Slow☒ Fast☐ Windscreen☒

Atmospheric Conditions:

Maximum Wind Velocity (mph)	Average Wind Velocity (mph)	Temperature (F)	Relative Humidity (%)	
9.2	0.8	66°		
Comments:	Slightly windy around 4-6 mph			

Photos Taken:

Photo Number	Location/Description
ST-2 N	South of the project site, facing N toward Ashley Way
ST-2 S	" " facing S toward River
ST-2 E	" " facing E toward King equip.
ST-2 W	" " facing W toward Case Engineering

Traffic Description:

Roadway	# Lanes	Posted Speed	Average Speed	NB/EB Counts	SB/WB Counts

Diagram/Further Comments:

Project Number: 0237.0026
Project Name: Ashley Way (Cotton)
Test Personnel: Victoria Chung

Sheet 1 of 2

Noise Measurement Survey

Site Number: ST-3 Date: 12/7/18 Time: From 12:19pm To 12:35pm

Site Location:
20 ft from western property line/fence, 3 ft from South property line (River fence), 3 ft ~~from~~ N of trespassing sign.

Primary Noise Sources: Vehicular traffic of I-5 freeway, occassional person walking along River path., vehicular traffic along Ashley Way

Measurement Results

	dBA
Leq	57.8
Lmax	65.3
Lmin	55.7
L5	
L10	
L50	
L90	
Ldn	
CNEL	

Observed Noise Sources/Events

Time	Noise Source/Event	dBA
12:24	car w/ loud exhaust	
12:27	honking of horns (Beeping)	
12:34	people walking on riverpath.	
12:35	talking people.	

Comments:

Equipment: Larson Davis LXT2 Measured Difference: -0.03 dBA
Settings: A-Weighted ☑ Other ☐ Slow ☑ Fast ☐ Windscreen ☑

Atmospheric Conditions:

Maximum Wind Velocity (mph)	Average Wind Velocity (mph)	Temperature (F)	Relative Humidity (%)	
9.2	1	65°		
Comments:				

Photos Taken:

Photo Number	Location/Description
ST-3 N	~~East~~ West of project site, facing N toward Ashley Way
ST-3 S	" West " facing S toward River
ST-3 E	" " facing E toward King equipment
ST-3 W	" " facing W toward CASC Engineering

Traffic Description:

Roadway	# Lanes	Posted Speed	Average Speed	NB/EB Counts	SB/WB Counts

Diagram/Further Comments:

Project Number: 0237.0026
Project Name: Ashley Way (Colton)
Test Personnel: Victoria Chung

Noise Measurement Survey

Site Number: ST-4 Date: 12/7/18 Time: From 11:53 am To 12:08 pm

Site Location: Sidewalk on Ashley way near fire hydrant, 50ft from western side light pole, and 100 ft from eastern light pole

Primary Noise Sources: Vehicular traffic off Ashley Way, I-5 freeway traffic

Measurement Results

	dBA
Leq	62.6
Lmax	75.3
Lmin	57.5
L5	
L10	
L50	
L90	
Ldn	
CNEL	

Observed Noise Sources/Events

Time	Noise Source/Event	dBA
12pm	train horn	
12:03	vehicle backing up (Beeping)	

Comments: Can occassionally hear distant plane & trains.

Equipment: Larson Davis LXT2 Measured Difference: 0.15 dBA
Settings: A-Weighted ☑ Other ☐ Slow ☒ Fast ☐ Windscreen ☒

Atmospheric Conditions:

Maximum Wind Velocity (mph)	Average Wind Velocity (mph)	Temperature (F)	Relative Humidity (%)	
4.7	2.5	64.5		
Comments:	Wind speed varies between 4.5mph - 9mph.			

Photos Taken:

Photo Number	Location/Description
ST-4 N	North of project site, facing N toward Ashley Way
ST-4 S	" " , facing S toward River
ST-4 E	" " ; facing E toward King Equipment
ST-4 W	" " facing W toward Carc engineering
	" "

Traffic Description:

Roadway	# Lanes	Posted Speed	Average Speed	NB/EB Counts	SB/WB Counts

Diagram/Further Comments:

TABLE Existing-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/15/2019
ROADWAY SEGMENT: Ashley Way - Cooley Drive to Project Driveway 1
NOTES: Ashley Way Logistics Center Project - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1500   SPEED (MPH): 35   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

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

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 55.37

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	65.5

TABLE Existing-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/15/2019
ROADWAY SEGMENT: Ashley Way - Project Driveway 1 to Project Driveway 2
NOTES: Ashley Way Logistics Center Project - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1500   SPEED (MPH): 35   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

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

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 55.37

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	65.5

TABLE Existing-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/15/2019
ROADWAY SEGMENT: Ashley Way - Project Driveway 2 to Cooley Drive
NOTES: Ashley Way Logistics Center Project - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 770   SPEED (MPH): 35   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

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

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 53.06

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-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/15/2019
ROADWAY SEGMENT: Interstate 215 - south of Interstate 10
NOTES: Ashley Way Logistics Center Project - Existing

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 170000   SPEED (MPH): 65   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

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

ACTIVE HALF-WIDTH (FT): 48   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 80.44

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
426.7	914.6	1967.8	4237.7

TABLE Existing with Project-01

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/15/2019
ROADWAY SEGMENT: Ashley Way - Cooley Drive to Project Driveway 1
NOTES: Ashley Way Logistics Center Project - Existing with Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2000   SPEED (MPH): 35   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

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

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 56.62

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	78.9

TABLE Existing with Project-02

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/15/2019
ROADWAY SEGMENT: Ashley Way - Project Driveway 1 to Project Driveway 2
NOTES: Ashley Way Logistics Center Project - Existing with Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2100   SPEED (MPH): 35   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

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

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 56.83

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	81.5

TABLE Existing with Project-03

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/15/2019
ROADWAY SEGMENT: Ashley Way - Project Driveway 2 to Cooley Drive
NOTES: Ashley Way Logistics Center Project - Existing with Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 810   SPEED (MPH): 35   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

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

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 53.28

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 with Project-04

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/15/2019
ROADWAY SEGMENT: Interstate 215 - south of Interstate 10
NOTES: Ashley Way Logistics Center Project - Existing with Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 170500   SPEED (MPH): 65   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

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

ACTIVE HALF-WIDTH (FT): 48   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 80.45

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
427.5	916.4	1971.7	4246.0

TABLE Year 2021 without Project-01

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/15/2019
ROADWAY SEGMENT: Ashley Way - Cooley Drive to Project Driveway 1
NOTES: Ashley Way Logistics Center Project - Year 2021 without Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1600   SPEED (MPH): 35   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

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

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 55.65

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	68.3

TABLE Year 2021 without Project-02

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/15/2019

ROADWAY SEGMENT: Ashley Way - Project Driveway 1 to Project Driveway 2

NOTES: Ashley Way Logistics Center Project - Year 2021 without Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1600   SPEED (MPH): 35   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

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

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 55.65

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	68.3

TABLE Year 2021 without Project-03

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/15/2019
ROADWAY SEGMENT: Ashley Way - Project Driveway 2 to Cooley Drive
NOTES: Ashley Way Logistics Center Project - Year 2021 without Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 790   SPEED (MPH): 35   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

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

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 53.17

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

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

TABLE Year 2021 without Project-04

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/15/2019
ROADWAY SEGMENT: Interstate 215 - south of Interstate 10
NOTES: Ashley Way Logistics Center Project - Year 2021 without Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 175200 SPEED (MPH): 65 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

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

ACTIVE HALF-WIDTH (FT): 48 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 80.57

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
435.3	933.1	2007.7	4323.7

TABLE Year 2021 with Project-01

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/15/2019
ROADWAY SEGMENT: Ashley Way - Cooley Drive to Project Driveway 1
NOTES: Ashley Way Logistics Center Project - Year 2021 with Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2100   SPEED (MPH): 35   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

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

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 56.83

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	81.5

TABLE Year 2021 with Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/15/2019
ROADWAY SEGMENT: Ashley Way - Project Driveway 1 to Project Driveway 2
NOTES: Ashley Way Logistics Center Project - Year 2021 with Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2200 SPEED (MPH): 35 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

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

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 57.04

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	84.0

TABLE Year 2021 with Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/15/2019
ROADWAY SEGMENT: Ashley Way - Project Driveway 2 to Cooley Drive
NOTES: Ashley Way Logistics Center Project - Year 2021 with Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 830   SPEED (MPH): 35   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

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

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 53.38

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

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

TABLE Year 2021 with Project-04

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/15/2019
ROADWAY SEGMENT: Interstate 215 - south of Interstate 10
NOTES: Ashley Way Logistics Center Project - Year 2021 with Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 175700   SPEED (MPH): 65   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

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

ACTIVE HALF-WIDTH (FT): 48   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 80.58

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
436.1	934.8	2011.6	4331.9

TABLE Year 2040 without Project-01

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/15/2019
ROADWAY SEGMENT: Ashley Way - Cooley Drive to Project Driveway 1
NOTES: Ashley Way Logistics Center Project - Year 2040 without Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1600   SPEED (MPH): 35   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

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

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 55.65

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	68.3

TABLE Year 2040 without Project-02

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/15/2019
ROADWAY SEGMENT: Ashley Way - Project Driveway 1 to Project Driveway 2
NOTES: Ashley Way Logistics Center Project - Year 2040 without Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1600   SPEED (MPH): 35   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

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

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 55.65

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	68.3

TABLE Year 2040 without Project-03

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/15/2019
ROADWAY SEGMENT: Ashley Way - Project Driveway 2 to Cooley Drive
NOTES: Ashley Way Logistics Center Project - Year 2040 without Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1500   SPEED (MPH): 35   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

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

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 55.95

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	64.7

TABLE Year 2040 without Project-04

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/15/2019
ROADWAY SEGMENT: Interstate 215 - south of Interstate 10
NOTES: Ashley Way Logistics Center Project - Year 2040 without Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 211600   SPEED (MPH): 65   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

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

ACTIVE HALF-WIDTH (FT): 48   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 81.39

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
493.0	1057.9	2276.8	4903.5

TABLE Year 2040 with Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/15/2019
ROADWAY SEGMENT: Ashley Way - Cooley Drive to Project Driveway 1
NOTES: Ashley Way Logistics Center Project - Year 2040 with Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2100   SPEED (MPH): 35   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

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

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 56.83

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	81.5

TABLE Year 2040 with Project-02

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/15/2019
ROADWAY SEGMENT: Ashley Way - Project Driveway 1 to Project Driveway 2
NOTES: Ashley Way Logistics Center Project - Year 2040 with Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2200   SPEED (MPH): 35   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

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

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 57.04

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	84.0

TABLE Year 2040 with Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/15/2019
ROADWAY SEGMENT: Ashley Way - Project Driveway 2 to Cooley Drive
NOTES: Ashley Way Logistics Center Project - Year 2040 with Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1500   SPEED (MPH): 35   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

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

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 55.95

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	64.7

TABLE Year 2040 with Project-04

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 02/15/2019
ROADWAY SEGMENT: Interstate 215 - south of Interstate 10
NOTES: Ashley Way Logistics Center Project - Year 2040 with Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 212100   SPEED (MPH): 65   GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

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

ACTIVE HALF-WIDTH (FT): 48   SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 81.40

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
493.7	1059.5	2280.4	4911.2
