SECTION 5.6
NOISE

5.6 NOISE

This section focuses on the potential noise and vibration impacts of the proposed project. Potential noise and vibration impacts considered in this analysis include effects that would be generated by the proposed project on nearby sensitive land uses, as well as the existing noise from adjacent uses and highways that could impact proposed land uses in the Project Area.

5.6.1 REGULATORY SETTING

It is difficult to specify noise levels that are generally acceptable to everyone; what is annoying to one person may be unnoticed by another. Standards may be based on documented complaints in response to documented noise levels, or based on studies of the ability of people to sleep, talk, or work under various noise conditions.

This section summarizes the laws, ordinance, regulations, and standards that are applicable to the project. Regulatory requirements related to environmental noise are typically promulgated at the local level. However, Federal and State agencies provide standards and guidelines to the local jurisdictions.

STATE OF CALIFORNIA GUIDELINES

The State of California Office of Planning and Research (OPR) *Noise Element Guidelines* include recommended interior and exterior level standards for local jurisdictions to identify and prevent the creation of incompatible land uses due to noise. The *OPR Guidelines* describe the compatibility of various land uses with a range of environmental noise levels in terms of dBA CNEL.

A noise environment of 50 dBA CNEL to 60 dBA CNEL is considered to be "normally acceptable" for residential uses. The State indicates that locating residential units, parks, and institutions (i.e., churches, schools, libraries, and hospitals) in areas where exterior ambient noise levels exceed 65 dBA CNEL is undesirable. The OPR recommendations also note that, under certain conditions, more restrictive standards than the maximum levels cited may be appropriate. As an example, the standards for quiet suburban and rural communities may be reduced by 5 to 10 dB to reflect their lower existing outdoor noise levels in comparison with urban environments.

In addition, *Title 25, Section 1092* of the *California Code of Regulations*, sets forth requirements for the insulation of multiple-family residential dwelling units from excessive and potentially harmful noise. Whenever multiple-family residential dwelling units are proposed in areas with excessive noise exposure, the developer must incorporate features into the building's design that reduce interior noise levels to 45 dBA CNEL.

Table 5.6-1, *Noise and Land Use Compatibility Matrix*, illustrates the State guidelines established by the State Department of Health Services for acceptable noise levels for each county and city. These standards and criteria are incorporated into the land use planning process to reduce future noise and land use incompatibilities. This table is the primary tool that allows the City to ensure integrated planning for compatibility between land uses and outdoor noise.

Table 5.6-1
Noise and Land Use Compatibility Matrix

Land Use Category	Community Noise Exposure (L_{dn} or CNEL, dBA)			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential - Low Density, Single-Family, Duplex, Mobile Homes	50 - 60	55 - 70	70-75	75-85
Residential - Multiple Family	50 - 65	60 - 70	70 - 75	70 – 85
Transient Lodging - Motel, Hotels	50 - 65	60 - 70	70 - 80	80 – 85
Schools, Libraries, Churches, Hospitals, Nursing Homes	50 - 70	60 - 70	70 - 80	80 – 85
Auditoriums, Concert Halls, Amphitheaters	NA	50 - 70	NA	65 – 85
Sports Arenas, Outdoor Spectator Sports	NA	50 - 75	NA	70 – 85
Playgrounds, Neighborhood Parks	50 - 70	NA	67.5 - 75	72.5 – 85
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50 - 70	NA	70 - 80	80 – 85
Office Buildings, Business Commercial and Professional	50 - 70	67.5 - 77.5	75 - 85	NA
Industrial, Manufacturing, Utilities, Agriculture	50 - 75	70 - 80	75 - 85	NA

NA: Not Applicable

Source: Office of Planning and Research, California, *General Plan Guidelines*, October 2003.

Normally Acceptable – Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
Conditionally Acceptable – New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.
Normally Unacceptable – New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
Clearly Unacceptable – New construction or development should generally not be undertaken.

CITY OF SAN BERNARDINO NOISE STANDARDS

The City of San Bernardino maintains a comprehensive Noise Ordinance (Section 19.20.030.15) within its *Development Code* which specifies the maximum acceptable levels of noise for residential uses in the City. According to the Noise Ordinance, in residential areas, no exterior noise level shall exceed 65 dBA and no interior noise level shall exceed 45 dBA.

The City's *Municipal Code* also contains City noise level regulations. The City has adopted a number of policies that are directed at controlling or mitigating environmental noise effects. The City's Noise Ordinance (*Municipal Code* Chapter 8.54, *Noise Control*) controlled hours of operation for multiple sources of excessive noise. Excessive noise is not permitted between the hours of 8:00 PM and 8:00 AM in residential zones, and between 8:00 PM and 7:00 AM in all other zones. Unreasonably loud noise is determined by multiple factors including, but not limited to: level of noise; level of background noise; proximity to sensitive receptors; zoning of the noise source area; density of inhabitation of the noise source area; time of day or night the noise occurs; duration; whether the noise is recurrent, intermittent, or constant; and whether the noise is produced by a commercial or noncommercial activity.

The City of San Bernardino prohibits construction activities between the hours of 8:00 PM and 7:00 AM. Construction activities necessary for the immediate preservation of life or property, related to facilities of park and recreation departments, public work projects, or essential public services and facilities are exempt from the provisions of the Noise Ordinance. Also, construction performed pursuant to a valid written agreement with the City, which provides for noise mitigation measures, are also exempt from the Noise Ordinance. However, the City does not have a significance threshold to assess noise impacts during construction for CEQA determinations of noise impacts. Construction noise is a short-term temporary event, occurs mostly during daytime hours (such as 6:00 AM to 3:00 PM), and is considered a common necessity for new development.

5.6.2 ENVIRONMENTAL SETTING

STANDARD UNIT OF MEASUREMENT

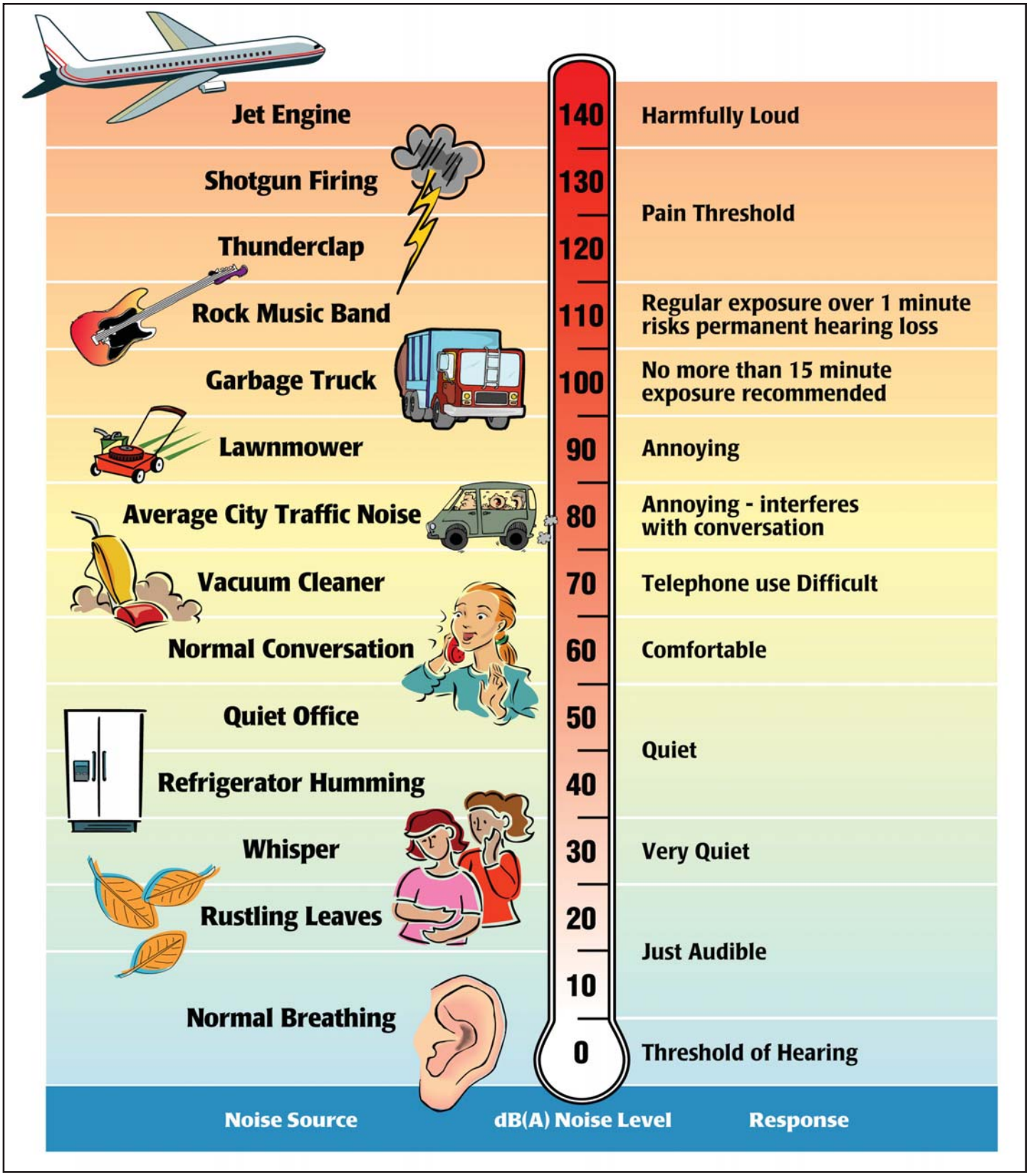
Sound is described in terms of the loudness (amplitude) of the sound and frequency (pitch) of the sound. The standard unit of measurement of the loudness of sound is the decibel (dB). Since the human ear is not equally sensitive to sound at all frequencies, a special frequency-dependent rating scale has been devised to relate noise to human sensitivity. The A-weighted decibel scale (dBA) performs this compensation by differentiating among frequencies in a manner approximating the sensitivity of the human ear.

The perceived loudness of sound is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and should be approximated by the A-waited sound levels (expressed as dBA) and the way the human ear perceives noise. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment.

Community noise is commonly described in terms of the “ambient” nose level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (Leq), which corresponds to a steady-state A-weighted sound level containing the same total energy as a time-varying signal over a given time period (usually one hour). The Leq is the foundation of the composite noise descriptor, Ldn, and shows very good correlation with community response to noise.

Decibels are based on the logarithmic scale. The logarithmic scale compresses the wide range in sound pressure levels to a more usable range of numbers in a manner similar to the Richter scale used to measure earthquakes. In terms of human response to noise, a sound ten dBA higher than another is perceived to be twice as loud and 20 dBA higher is perceived to be four times as loud, and so forth. Everyday sounds normally range from 30 dBA (very quiet) to 100 dBA (very loud).

Examples of various sound levels in different environments are illustrated on *Exhibit 5.6-1*, *Sound Levels and Human Response*.



Source: Melville C. Branch and R. Dale Beland, *Outdoor Noise in the Metropolitan Environment*, 1970.
Environmental Protection Agency, *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* (EPA/ONAC 550/9-74-004), March 1974.

ENVIRONMENTAL IMPACT REPORT
SAN BERNARDINO MERGED AREA A – MERGER AND AMENDMENTS

Sound Levels and Human Response

RBF CONSULTING

12/10 • JN 65-100614

Exhibit 5.6-1

Various methods have been developed for evaluating community noise to account for, among other things:

- The variation of noise levels over time;
- The influence of periodic individual loud events; and
- The community response to changes in the community noise environment.

Table 5.6-2, *Noise Descriptors*, lists various methods to measure sound over a period of time.

Table 5.6-2
Noise Descriptors

Term	Definition
Decibel (dB)	The unit for measuring the volume of sound equal to 10 times the logarithm (base 10) of the ratio of the pressure of a measured sound to a reference pressure (20 micropascals).
A-Weighted Decibel (dBA)	A sound measurement scale that adjusts the pressure of individual frequencies according to human sensitivities. The scale accounts for the fact that the region of highest sensitivity for the human ear is between 2,000 and 4,000 cycles per second (hertz).
Equivalent Sound Level (L_{eq})	The sound level containing the same total energy as a time varying signal over a given time period. The L_{eq} is the value that expresses the time averaged total energy of a fluctuating sound level.
Maximum Sound Level (L_{max})	The highest individual sound level (dBA) occurring over a given time period.
Minimum Sound Level (L_{min})	The lowest individual sound level (dBA) occurring over a given time period.
Community Noise Equivalent Level (CNEL)	A rating of community noise exposure to all sources of sound that differentiates between daytime, evening, and nighttime noise exposure. These adjustments are +5 dBA for the evening, 7:00 PM to 10:00 PM, and +10 dBA for the night, 10:00 PM to 7:00 AM
Day/Night Average (L_{dn})	The L_{dn} is a measure of the 24-hour average noise level at a given location. It was adopted by the U.S. Environmental Protection Agency (EPA) for developing criteria for the evaluation of community noise exposure. It is based on a measure of the average noise level over a given time period called the L_{eq}. The L_{dn} is calculated by averaging the L_{eq}'s for each hour of the day at a given location after penalizing the "sleeping hours" (defined as 10:00 PM to 7:00 AM), by 10 dBA to account for the increased sensitivity of people to noises that occur at night.
L_{01}, L_{10}, L_{50}, L_{90}	The fast A-weighted noise levels equaled or exceeded by a fluctuating sound level for 1 percent, 10 percent, 50 percent, and 90 percent of a stated time period.
Source: Cyril M. Harris, *Handbook of Noise Control*, 1979.	

HEALTH EFFECTS OF NOISE

Human response to sound is highly individualized. Annoyance is the most common issue regarding community noise. The percentage of people claiming to be annoyed by noise generally increases with the environmental sound level. However, many factors also influence people's response to noise. The factors can include the noise character, variability of the sound level, presence of tones or impulses, and time of day of the occurrence. Additionally, non-acoustical factors, such as a person's opinion of the noise source, ability to adapt to the noise, attitude towards the source and those associated with it, and predictability of the noise, all influence a person's response. As such, response to noise varies widely from one person to another and with any particular noise, individual responses range from "not annoyed" to "highly annoyed."

The effects of noise are often only transitory, but adverse effects can be cumulative with prolonged or repeated exposure. The effects of noise on the community can be organized into six broad categories:

- Noise-induced hearing loss;
- Interference with communication;
- Effects of noise on sleep;
- Effects on performance and behavior;
- Extra-auditory health effects; and
- Annoyance.

Although it often causes discomfort and sometimes pain, noise-induced hearing loss usually takes years to develop. Noise-induced hearing loss can impair the quality of life through a reduction in the ability to hear important sounds and to communicate with family and friends. Hearing loss is one of the most obvious and easily quantified effects of excessive exposure to noise. While the loss may be temporary at first, it could become permanent after continued exposure. When combined with hearing loss associated with aging, the amount of hearing loss directly caused by the environment is difficult to quantify. Although the major cause of noise-induced hearing loss is occupational, substantial damage can be caused by non-occupational sources.

According to the United States Public Health Service, nearly ten million of the estimated 21 million Americans with hearing impairments owe their losses to noise exposure. Noise can mask important sounds and disrupt communication between individuals in a variety of settings. This process can cause anything from a slight irritation to a serious safety hazard, depending on the circumstance. Noise can disrupt face-to-face communication and telephone communication, and the enjoyment of music and television in the home. It can also disrupt effective communication between teachers and pupils in schools, and can cause fatigue and vocal strain in those who need to communicate in spite of the noise.

Interference with communication has proved to be one of the most important components of noise-related annoyance. Noise-induced sleep interference is one of the critical components of community annoyance. Sound level, frequency distribution, duration, repetition, and variability can make it difficult to fall asleep and may cause momentary shifts in the natural sleep pattern, or level of sleep. It can produce short-term adverse effects on mood changes and job performance, with the possibility of more serious effects on health if it continues over long periods. Noise can cause adverse effects on task performance and behavior at work, and non-occupational and social settings. These effects are the subject of some controversy, since the presence and degree of effects depends on a variety of intervening variables. Most research in this area has focused mainly on occupational settings, where noise levels must be sufficiently high, and the task sufficiently complex for effects on performance to occur.

Recent research indicates that more moderate noise levels can produce disruptive after-effects, commonly manifested as a reduced tolerance for frustration, increased anxiety, and decreased incidence of "helping" behavior and increased incidence of "hostile" behavior. Noise has been implicated in the development or exacerbation of a variety of health problems, ranging from hypertension to psychosis. As with other categories, quantifying these effects is difficult due to the amount of variables that need to be considered in each situation. As a biological stressor, noise can influence the entire physiological system. Most effects seem to be transitory, but with continued exposure some effects have been shown to be chronic in laboratory animals.

Annoyance can be viewed as the expression of negative feelings resulting from interference with activities, as well as the disruption of one's peace of mind and the enjoyment of one's environment. Field evaluations of community annoyance are useful for predicting the consequences of planned actions involving highways, airports, road traffic, railroads, or other noise sources. The consequences of noise-induced annoyance are privately held dissatisfaction, publicly expressed complaints to authorities, and potential adverse health effects, as discussed above. In a study conducted by the United States Department of Transportation, the effects of annoyance to the community were quantified. In areas where noise levels were consistently above 60 dBA CNEL, approximately nine percent of the community was highly annoyed. When levels exceeded 65 dBA CNEL, the percentage rose to 15 percent. Although evidence for the various effects of noise has differing levels of certainty, it is evident that noise can affect human health. Most of the effects are, to a varying degree, stress related.

GROUND-BORNE VIBRATION

Vibration is an oscillatory motion throughout a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. The peak particle velocity (PPV) or the root mean square (RMS) velocity is usually used to describe vibration amplitudes. PPV is defined as the maximum instantaneous peak or vibration signal, while RMS is defined as the square root of the average of the squared amplitude of the signal. PPV is typically used for evaluating potential building damage, whereas RMS is typically more suitable for evaluating human response. Typically, ground-borne vibration, generated by manmade activities, attenuates rapidly with distance from the source of vibration. Man-made vibration issues are therefore usually confined to short distances (i.e., 500 feet or less) from the source.

Both construction and operation of development projects can generate ground-borne vibration. In general, demolition of structures preceding construction generates the highest vibrations. Construction equipment such as vibratory compactors or rollers, pile drivers, and pavement breakers can generate perceptible vibration during construction activities. Heavy trucks can also generate ground-borne vibrations that vary depending on vehicle type, weight, and pavement conditions.

NOISE SENSITIVE RECEPTORS

Human response to noise varies widely depending on the type of noise, time of day, and sensitivity of the receptor. The effects of noise on humans can range from temporary or permanent hearing loss to mild stress and annoyance due to such things as speech interference and sleep deprivation. Prolonged stress, regardless of the cause, is known to contribute to a variety of health disorders. Noise, or the lack of it, is a factor in the aesthetic perception of some settings, particularly those with religious or cultural significance. Certain land uses are particularly sensitive to noise, including schools, hospitals, rest homes, long-term medical and mental care facilities, and parks and recreation areas. Residential areas are also considered noise sensitive, especially during the nighttime hours. *Table 5.6-3*, *Sensitive Receptors*, indicates some of the sensitive receptors that are located within the City that can be affected by excess noise levels.

Table 5.6-3
Sensitive Receptors

Type	Name	Street
Place of Worship	Templo Baptista	North H Street
	Downtown Apostolic Church	760 West 6th Street
	St Bernardine's Church	531 North F Street
	Anointed Remnant Ministries	570 West 4th Street
	First Church of Christ	736 North E Street
	Ministerio Biblico Verbo Dvn	555 North E Street
	Way World Outreach Ministry	310 West 4th Street
	St John Primitive	323 West 7th Street
	Antioch Christian Center	590 North Sierra Way
	New Miracle Christian Center	157 North E Street
	Igelisa Caminando Con Dios	191 South E Street
	Greater Faith Community Church	West Rialto Avenue
	Calvary Chapel Antorcha	761 West 2nd Street
	Catholic War Veterans	298 South D Street
	Hallelujah Temple	395 South G Street
	New Beginnings Christian Center	455 South G Street
	Victory Outreach	441 South E Street
	Door Christian Fellowship Church	West Cluster Street
	Iglesia Rios Be Agua Viva	1375 South E Street
	Community of Christ	1894 Commercenter West
	The Rock Church and World Outreach Center	2345 South Waterman Avenue

Table 5.6-3 (continued)
Sensitive Receptors

Type	Name	Street
Schools	Juanita B Jones Elementary	700 North F Street
	Genesis 8 Learning Center	661 North Arrowhead Avenue
	Head Start: H Street	342 North H Street
	American Heritage University of Southern California	255 North D Street
	Civic Circle Preschool	265 North D Street
	Rhema College	118 South Arrowhead Avenue
	John Muir Charter School	1824 Commercenter Circle
	Concorde Career College	201 East Airport Drive
	California Baptist College	225 West Hospitality Lane
	University of Phoenix - San Bernardino Learning Center	301 East Vanderbilt Lane
	Azusa Pacific University	685 Carnegie Drive
	Argosy University Inland Empire	636 East Brier Drive
	ITT Technical Institute	670 Carnegie Drive
	La Petite Academy	855 East Hospitality Lane
	Miles of Smiles Education Center	855 East Hospitality Lane
	National University San Bernardino Academic Center	804 East Brier Drive
Hospitals	Kaiser Permanente Med Care	325 West Hospitality Lane
Libraries	San Bernardino Public Library	555 West 6th Street
Parks	Pioneer Park	West 6th Street
	Secombe Lake State Recreation Area	North Sierra Way
	Meadowbrook Park	East 3rd Street
	Municipal Baseball Park	South E Street
Senior Center	San Bernardino Senior Center	600 West 5th Street

Source: Google Earth Maps accessed March 2010.

MOBILE NOISE SOURCES

San Bernardino's noise environment is dominated by vehicular traffic, including vehicular generated noise along Interstate 215 (I-215) and Interstate 10 (I-10) which adjoin the Project Area, as well as major and primary arterials. Primary arterials that serve the Project Area are State Route 66 (SR-66) (5th Street), 2nd Street, Rialto Avenue, Mill Street, G Street, E Street, Arrowhead Avenue, Waterman Avenue, and Tippecanoe Avenue. During peak travel hours, heavy traffic on these roadways cause higher noise levels compared to noise levels during non-peak hours. These roadways have been designed to specifically carry large volumes, although long-established land use patterns have placed residential uses along some portions of these roadways.

Railroad Noise

The Burlington Northern Santa Fe Railroad (BNSF), Union Pacific Railroad (UP), and Metrolink railroads traverse the City, which create additional mobile source noises in the area. The UP line is located along I-10 from Los Angeles to Colton, where it splits into the westward Palmdale line and the Yuma eastward line. The UP line is utilized by both commuter and freight trains.

The BNSF trends east and southward from the City of Los Angeles and traverses the City of San Bernardino (Cajon Line). The San Bernardino Metrolink Line extends from the City of San Bernardino to Los Angeles Union Station. The Inland Empire Orange County Metrolink Line extends from the City of San Bernardino to the City of San Juan Capistrano. Freight and commuter rail traffic passing through the City and can generate substantial noise impacts (i.e., from whistles and horns) to residents located along these railroad corridors.

Aircraft Noise

The San Bernardino International Airport (SBIA) is located in the southeastern portion of the City and is approximately 0.5 miles north of the nearest portion of the Project Area. Aircraft takeoff, flyovers/over flights, and approach/landings contribute to the City's noise environment. Sensitive uses in proximity to the SBIA may experience increased noise exposure from SBIA operations. According to the San Bernardino County Land Use Plan Hazard Overlay map, the Project Area is located outside of the SBIA noise contours.

STATIONARY NOISE SOURCES

Commercial and industrial land uses located near residential areas currently generate occasional noise impacts. The primary noise sources associated with these facilities are caused by delivery trucks, heavy machinery, air compressors, generators, outdoor loudspeakers, and gas venting. Also, fire and police department operations, park facilities, school sites, and residential uses can also contribute to the ambient noise environment. Other significant stationary noise sources in the project area include noise from construction activities, street sweepers, and gas-powered leaf blowers. Ongoing noise from construction activities throughout the City also adds to the City's ambient noise environment. These types of stationary noise sources have the potential to affect noise-sensitive receptors such as residences, schools, and hospitals.

5.6.3 SIGNIFICANCE THRESHOLD CRITERIA

The environmental analysis in this section is patterned after the Initial Study Checklist recommended by the *CEQA Guidelines*, as amended, and used by the City of San Bernardino in its environmental review process, and is contained in Appendix A of this EIR. The Initial Study Checklist includes questions relating to noise. The issues presented in the Initial Study Checklist have been utilized as thresholds of significance in this section. Accordingly, a project may create a significant environmental impact if it causes one or more of the following to occur:

- Exposure of persons to or generation of noise levels in excess of standards established in the City's General Plan or Development Code, or applicable standards of other agencies.
- Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project (refer to Section 8.0, Effects Found Not To Be Significant).

- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project (refer to Section 8.0, Effects Found Not To Be Significant).

- For a project located within an airport land use plan or Airport Influence Area, would the project expose people residing or working in the project area to excessive noise levels.

Based on these standards, the effects of the proposed project have been categorized as either a "less than significant impact" or a "potentially significant impact." Mitigation measures are recommended for potentially significant impacts. If a potentially significant impact cannot be reduced to a less than significant level through the application of mitigation, it is categorized as a significant unavoidable impact.

5.6.4 PROJECT IMPACTS AND MITIGATION MEASURES

SHORT-TERM CONSTRUCTION NOISE

◆ **FUTURE DEVELOPMENT AND IMPROVEMENTS ASSOCIATED WITH IMPLEMENTATION OF THE PROPOSED PROJECT COULD CAUSE TEMPORARY CONSTRUCTION RELATED NOISE LEVELS IN EXCESS OF ESTABLISHED STANDARDS.**

Level of Significance Before Mitigation: Potentially Significant Impact.

Impact Analysis: Construction activities have a short and temporary duration, lasting from a few days to a period of several months. Groundborne noise and other types of construction-related noise impacts would typically occur during the initial site preparation, which can create the highest levels of noise. Generally, site preparation has the shortest duration of all construction phases. Activities that occur during this phase include earthmoving and soils compaction. High groundborne noise levels and other miscellaneous noise levels can occur during this phase by the operation of heavy-duty trucks, backhoes, and other heavy-duty construction equipment.

Noise from construction activities is generated by two primary sources: (1) the transport of workers and equipment to construction sites, and (2) the noise related to active construction equipment. These noise sources can be a nuisance to local residents and businesses or unbearable to sensitive receptors (i.e., residences, hospitals, senior centers, schools, day care facilities, etc.). The Federal Transit Administration (FTA) has compiled data regarding noise generating characteristics of specific types of construction equipment and typical construction activities. These noise levels would decrease rapidly with distance from the construction site at a rate of approximately 6 dBA per doubling of distance.

Future development could generate significant amounts of noise during grading and construction operations. During construction, adjacent sensitive receptors would be exposed to sporadic high noise levels associated with construction activities as a result of power tools, jack-hammers, truck noise, etc. It is anticipated that construction traffic would access the potential construction sites from several major roadways, including SR-66 (5th Street), 2nd Street, Rialto Avenue, Mill Street, G Street, E Street, Arrowhead Avenue, Waterman Avenue, and Tippecanoe Avenue. As stated above, various sensitive receptors exist in these areas.

The development anticipated within the proposed project is consistent with the *General Plan* land use designations. The *General Plan EIR* concluded the following regarding construction noise impacts:

> *Impacts are considered less than significant at the project level through the enforcement of the San Bernardino Municipal Code and in a broader sense through the policies of the General Plan Noise Ordinance.*

As a result, the proposed project was considered in the *General Plan EIR* analysis. Therefore, project implementation would be consistent with the analysis presented in the *General Plan EIR*, and would result in no greater construction noise impacts within the Project Area than previously identified.

Future development within the Project Area would be subject to compliance with *Municipal Code* Section 8.54.020, which prohibits construction activities between the hours of 8:00 PM and 7:00 AM. Construction noise impacts would also be limited by Policy 14.3.1 of the *General Plan*, which limits construction activities adjacent to residential uses. Additionally, implementation of *General Plan* Policy 14.3.2 would require that future construction activities would employ feasible and practical noise-minimizing techniques (e.g., ensuring equipment is properly muffled and in good working condition, shut off equipment when not in use, implement necessary temporary noise attenuation measures, scheduling high noise-producing activities during daytime hours, routing heavily loaded trucks away from sensitive uses, etc.) that would reduce construction noise impacts to adjacent uses.

Implementation of Mitigation Measure NOI-1 would further reduce construction noise associated with future development within the Project Area to less than significant levels. Notwithstanding, due to the conceptual nature of the future development within the Project Area, future proposals could require individual assessments of potential construction-related noise impacts. If necessary, additional mitigation would be recommended on a project-by-project basis to further minimize potential construction noise impacts. With implementation of Mitigation Measure NOI-1 and compliance with the City's Noise Ordinance and *General Plan* Policies, short-term construction noise impacts would be reduced to less than significant levels.

General Plan Goals and Policies:

NOISE ELEMENT

Goal 14.3 **Protect residents from the negative effects of "spill over" or nuisance noise.**

Policy 14.3.1 Require that construction activities adjacent to residential units be limited as necessary to prevent adverse noise impacts.

Policy 14.3.2 Require that construction activities employ feasible and practical techniques that minimize the noise impacts on adjacent uses.

Mitigation Measures:

NOI-1 The following measures shall be implemented when construction is to be conducted within 500 feet of any residential structures or has the potential to disrupt classroom activities or religious functions.

- All construction equipment shall be equipped with mufflers and sound control devices (e.g., intake silencers and noise shrouds) no less effective than those provided on the original equipment and no equipment shall have an unmuffled exhaust.
- The City shall require that the contractor maintain and tune-up all construction equipment to minimize noise emissions.
- Stationary equipment shall be placed so as to maintain the greatest possible distance to the sensitive use structures.
- All equipment servicing shall be performed so as to maintain the greatest possible distance to the sensitive use structures.
- The construction contractor shall provide an on-site name and telephone number of a contact person. In the event that construction noise is intrusive to an educational process, the construction liaison will revise the construction schedule to preserve the learning environment.
- Trucks shall utilize a route that is least disruptive to sensitive receptors, preferably major roadways, during any necessary off-site import/export of fill material during construction.

Level of Significance After Mitigation: Less Than Significant Impact.

GROUNDBOURNE VIBRATION

◆ **CONSTRUCTION-RELATED ACTIVITIES RESULTING FROM IMPLEMENTATION OF THE PROPOSED PROJECT COULD GENERATE OR EXPOSE PERSONS OR STRUCTURES TO EXCESSIVE GROUNDBORNE VIBRATION.**

Level of Significance Before Mitigation: Potentially Significant Impact.

Impact Analysis: Project construction can generate varying degrees of groundborne vibration, depending on the construction procedure and the construction equipment used. Operation of construction equipment generates vibrations that spread through the ground and diminish in amplitude with distance from the source. The effect on buildings located in the vicinity of a construction site often varies depending on soil type, ground strata, and construction characteristics of the receiver building(s). The results from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibration at moderate levels, to slight damage at the highest levels. Groundborne vibrations from construction activities rarely reach levels that damage structures.

The types of construction vibration impacts include human annoyance and building damage. Human annoyance occurs when construction vibration rises significantly above the threshold of human perception for extended periods of time. Building damage can be cosmetic or structural. Ordinary buildings that are not particularly fragile would not experience any cosmetic damage (e.g., plaster cracks) at distances beyond 25 feet. This distance can vary substantially depending on the soil composition and underground geological layer between vibration source and receiver. In addition, not all buildings respond similarly to vibration generated by construction equipment. Construction activities that result under the proposed project may have the potential to generate low levels of groundborne vibration. *Table 5.6-4*, *Typical Vibration Levels For Construction Equipment*, identifies various vibration velocity levels for types of construction equipment that would operate within the City during construction.

Table 5.6-4
Typical Vibration Levels For Construction Equipment

Equipment	Approximate ground velocity in decibels at 25 feet (inches/second)	Approximate ground velocity in decibels at 50 feet (inches/second)
Pile Driver (impact)	104	98
Large Bulldozer	87	81
Loaded Trucks	86	80
Jackhammer	79	73
Small Bulldozer	58	52
Notes: Root mean square amplitude ground velocity in decibels (VdB) referenced to 1 micro-inch/second.		
Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Guidelines*, May 2006.		

Similar to noise, groundborne vibration would attenuate at a rate of approximately 6 VdB per doubling of distance. The groundborne vibration generated during construction activities would primarily impact existing sensitive uses that are located adjacent to or within the vicinity of specific projects. Based upon the information provided in *Table 5.6-4*, vibration levels could reach up to 87 VdB for typical construction activities (and up to 104 VdB if pile driving activities were to occur) at sensitive uses located within 25 feet of construction. For sensitive uses that are located at or within 25 feet of potential project construction sites, sensitive receptors at these locations may experience vibration levels during construction activities that exceed the FTA's vibration impact threshold of 85 VdB for human annoyance. However, pursuant to Mitigation Measure NOI-2, should future construction activities take place within 25 feet of an occupied structure, a project-specific vibration impact analysis shall be conducted, resulting in a less than significant impact. Also, the project would be required to comply with *Municipal Code* Section 15.68.20, which regulates vibration generated by machinery.

Compliance and/or adherence to the City's *Municipal Code* and *General Plan* Goals and Policies, and Mitigation Measure NOI-2 would reduce the generation and/or exposure of persons or structures to excessive groundborne vibration to less than significant levels.

General Plan Goals and Policies: Refer to the goals and policies identified above.

Mitigation Measures:

NOI-2 Project applicants shall require by contract specifications that construction staging areas along with the operation of earthmoving equipment within the City would be located as far away from vibration and noise sensitive sites as possible. Should construction activities take place within 25 feet of an occupied structure, a project specific vibration impact analysis shall be conducted. Contract specifications shall be included in the proposed project construction documents, which shall be reviewed by the City prior to issuance of a grading permit.

Level of Significance After Mitigation: Less Than Significant Impact.

LONG-TERM OPERATIONAL IMPACTS

- **FUTURE DEVELOPMENT ASSOCIATED WITH IMPLEMENTATION OF THE PROPOSED PROJECT COULD INCREASE AMBIENT NOISE LEVELS FROM MOBILE AND STATIONARY SOURCES IN EXCESS OF THE ESTABLISHED STANDARDS.**

Level of Significance Before Mitigation: Less Than Significant Impact.

Impact Analysis:

MOBILE SOURCES

Traffic Noise

The *General Plan EIR* states that the major source of noise in the City is from mobile sources. Traffic noise modeling for the *General Plan EIR* indicated that the greatest traffic noise level increases would occur in areas subject to increased land use intensity or increased connectivity. The *General Plan EIR* determined that the increase in traffic noise under General Plan buildout as compared to existing conditions would be significant. The *General Plan EIR* stated that there are areas of the City where noise levels would exceed the 63 and 65 dBA thresholds for playground/park and residential areas (as defined in the City's Community Noise and Land Use Compatibility matrix). Also, other sensitive land uses (i.e., institutional and recreational uses) could be exposed to traffic noise levels exceeding established thresholds. Therefore, according to the *General Plan EIR*, any siting of sensitive land uses within these contours then represents a potentially significant impact and would require a separate noise study through the development review process to determine the level of required mitigation.

The land uses proposed within the Project Area are consistent with the *General Plan* land use designations. Therefore, the proposed project and anticipated future development were considered in the *General Plan EIR* analysis. For this reason, project implementation would be consistent with the analysis presented in the *General Plan EIR*, and would result in no greater noise impacts from mobile sources in the Project Area than previously identified. The *General Plan EIR* concluded that without mitigation, "Project implementation would result in long-term operational-related noise that would exceed local standards that may have significant noise impacts related to noise sources which include stationary, roadway, railroad, and aircraft." Compliance with Mitigation Measure NOI-3 (*General Plan EIR* Mitigation Measure GP 5.10-1),

along with *General Plan* Policies 2.9.4, 6.4.1, 6.4.8, and 6.5.1 would reduce traffic noise impacts to a less than significant level.

Railroad Noise

The *General Plan EIR* states that train activity is predicted to increase due to the larger volume of freight arriving at southern California seaports and the projected increase in commuter train travel. Increases in railroad operations would further expose noise sensitive uses to excessive noise and vibration. Implementation of *General Plan* Policies 6.7.3 and 14.2.6 would reduce railroad noise impacts by encouraging buffers between residential uses and railway facilities. Also, implementation of Mitigation Measure NOI-3 would require an approved noise analysis for any project that involves a noise sensitive use within the 65 dBA CNEL contour along railroads. Compliance with the City's *General Plan* Policies and implementation of Mitigation Measure NOI-2 would reduce potential railroad noise and vibration impacts to less than significant levels.

STATIONARY SOURCES

Land uses within the Project Area include commercial, industrial, and multi-family residential. Primary noise sources associated with these facilities are due to customer trips, delivery trucks, heavy machinery, air compressors, generators, outdoor loudspeakers, and gas vents.

Residential Uses

Noise that is typical of residential areas includes children playing, pets, amplified music, mechanical equipment, car repair, and home repair. Noise from residential stationary sources would primarily occur during the "daytime" activity hours. Noise impacts to surrounding uses associated with implementation of the proposed project are anticipated to be less than significant.

Industrial/Commercial Uses

The areas of redevelopment potential include approximately 518,916 square feet of industrial uses and 5,681,674 square feet of commercial uses. New industrial uses could increase noise levels in their proximity due to continual presence of heavy trucks, equipment utilized in the manufacturing or machining process, and other on-site vehicle-related noise. Noise generally produced in commercial areas includes slow moving truck deliveries, parking areas, landscape maintenance, etc. These proposed industrial and commercial uses were analyzed under the *General Plan EIR*. Although these industrial land uses may be located adjacent to residential and other noise sensitive uses, *Municipal Code* Section 8.54.030 provides an exemption to the noise regulations for noise generated in commercial or industrial zones. Nonetheless, significant noise impacts could result if these uses emit excessive noise in the vicinity of sensitive receptors. However, noise strategies and actions require the reduction of noise transmission between commercial and residential uses. Implementation of Policies 14.1.4, 14.2.3, and 14.2.19 would prohibit the development of industrial and commercial uses that would expose sensitive receptors to noise levels above 65 dBA, require acoustical analyses when necessary, and require the provision of appropriate mitigation measures. Implementation of *General Plan* Policies would ensure reduction of noise transmission between industrial/commercial uses and sensitive receptors to less than significant levels.

General Plan Goals and Policies:

LAND USE ELEMENT

Goal 2.9 **Protect the airspace of the San Bernardino International Airport and minimize related noise and safety impacts on our citizens and businesses.**

Policy 2.9.4 Limit the development of sensitive land uses (e.g. residential, hospitals, schools) within the 65 decibel (dB) Community Noise Equivalent Level (CNEL) contour, as shown on Figure LU-4.

CIRCULATION ELEMENT

Goal 6.4 **Minimize the impact of roadways on adjacent land uses and ensure compatibility between land uses and highway facilities to the extent possible.**

Policy 6.4.1 Work with Caltrans to ensure that construction of new facilities includes appropriate sound walls or other mitigating noise barriers to reduce noise impacts on adjacent land uses.

Policy 6.4.8 Develop appropriate protection measures along routes frequently used by trucks to minimize noise impacts to sensitive land uses including but not limited to residences, hospitals, schools, parks, daycare facilities, libraries, and similar uses.

Policy 6.5.1 Provide designated truck routes for use by commercial/industrial trucking that minimize impacts on local traffic and neighborhoods.

Policy 6.7.3 Encourage the provision of a buffer between residential land uses and railway facilities and encourage the construction of sound walls or other mitigating noise barriers between railway facilities and adjacent land uses.

NOISE ELEMENT

Goal 14.3 **Protect residents from the negative effects of "spill over" or nuisance noise.**

Policy 14.1.1 Minimize, reduce, or prohibit, as may be required, the new development of housing, health care facilities, schools, libraries, religious facilities, and other noise sensitive uses in areas where existing or future noise levels exceed an Ldn of 65 dB(A) exterior and an Ldn of 45 dB(A) interior if the noise cannot be reduced to these levels.

Policy 14.1.2 Require that automobile and truck access to commercial properties abutting residential parcels be located at the maximum practical distance from the residential parcel.

Policy 14.1.3 Require that all parking for commercial uses abutting residential areas be enclosed within a structure, buffered by walls, and/or limited hours of operation.

Policy 14.1.4 Prohibit the development of new or expansion of existing industrial, commercial, or other uses that generate noise impacts on housing, schools, health care facilities or other sensitive uses above a Ldn of 65 dB(A).

Policy 14.2.3 Require that development that increases the ambient noise level adjacent to noise-sensitive land uses provide appropriate mitigation measures.

Policy 14.2.6 Buffer residential neighborhoods from noise caused by train operations and increasing high traffic volumes along major arterials and freeways.

Policy 14.2.19 As may be necessary, require acoustical analysis and ensure the provision of effective noise mitigation measures for sensitive land uses, especially residential uses, in areas significantly impacted by noise.

Policy 14.3.5 Require that the hours of truck deliveries to commercial properties abutting residential uses be limited unless there is no feasible alternative or there are overriding transportation benefits by scheduling deliveries at another hour.

Policy 14.3.6 Ensure that buildings are constructed soundly to prevent adverse noise transmission between differing uses located in the same structure and individual residences in multifamily buildings.

Mitigation Measures:

NOI-3 Prior to the issuance of building permits for any project that involves a noise sensitive use within the 65 dBA CNEL contour along major roadways or freeway, railroads, or the San Bernardino International Airport, the project property owner/developers shall submit a final acoustical report prepared to the satisfaction of the Planning Director. The report shall show that the development will be sound-attenuated against present and projected noise levels, including roadway, aircraft, helicopter and railroad, to meet City interior and exterior noise standards.

(Source: General Plan EIR Mitigation Measure GP 5.10-1)

Level of Significance After Mitigation: Less Than Significant Impact.

AIRPORT NOISE IMPACTS

- **AS THE SAN BERNARDINO INTERNATIONAL AIRPORT IS LOCATED WITHIN THE PROJECT VICINITY, FUTURE DEVELOPMENT ASSOCIATED WITH IMPLEMENTATION OF THE PROPOSED PROJECT COULD EXPOSE PEOPLE RESIDING OR WORKING IN THE PROJECT AREA TO EXCESSIVE NOISE LEVELS.**

Level of Significance Before Mitigation: Potentially Significant Impact.

Impact Analysis: The existing land uses in the vicinity of the flight path for the SBIA include noise sensitive uses such as parkland and residential uses. However, according to the San Bernardino County Land Use Plan Hazard Overlay map, the Project Area is located outside of the SBIA noise contours. The SBIA is located approximately 0.5 miles from the nearest redevelopment area of the proposed project (Southeast Industrial Park). The Southeast Industrial Park area is currently occupied by manufacturing- and distribution-related warehouse uses, which are not considered to be noise sensitive uses. Similar uses are proposed in the Southeast Industrial Park area under the proposed project. The nearest residential uses under the proposed project would be located approximately 1.2 miles north of the SBIA. To a lesser degree, the City is also exposed to noise emanating from helicopter operations.

Implementation of *General Plan* Policies 2.9.1, 2.9.2, 14.2.17, and 14.2.18 would require all new development to be consistent with the adopted CLUP for the SBIA, limit development of sensitive land uses within the 65 dBA contour, and ensure that new development is compatible with the City's noise compatibility criteria and noise contours. Also, Mitigation Measure 5.6-3 would require an approved noise analysis for any project that involves a noise sensitive use within the 65 dBA CNEL contour of the SBIA, Therefore, with adherence to *General Plan* Policies, implementation of the proposed project would not expose people residing or working in the area to excessive noise levels. Thus, a less than significant impact would occur.

General Plan Goals and Policies:

LAND USE ELEMENT

Goal 2.9 **Protect the airspace of the San Bernardino International Airport and minimize related noise and safety impacts on our citizens and businesses.**

Policy 2.9.1 Require that all new development be consistent with the adopted Comprehensive Land Use Plan for the San Bernardino International Airport and ensure that no structures or activities encroach upon or adversely affect the use of navigable airspace.

Policy 2.9.2 Refer any adoption or amendment of this General Plan, specific plan, zoning ordinance, or building regulation within the planning boundary of the adopted Comprehensive Airport Master Plan for the SBIA to the airport authority as provided by the Airport Land Use Law.

NOISE ELEMENT

Goal 14.2 **Encourage the reduction of noise from transportation-related noise sources such as motor vehicles, aircraft operations, and railroad movements.**

Policy 14.2.17 Ensure that new development is compatible with the noise compatibility criteria and noise contours as defined in the Comprehensive Land Use Plan for the SBIA and depicted in Figure LU-4.

Policy 14.2.18 Limit the development of sensitive land uses located within the 65 decibel (dB) Community Noise Equivalent Level (CNEL) contour, as defined in the Comprehensive Land Use Plan for the SBIA and depicted in Figure LU-4.

Mitigation Measures: Refer to Mitigation Measure NOI-3. No additional mitigation measures are required.

Level of Significance After Mitigation: Less Than Significant Impact.

5.6.5 CUMULATIVE IMPACTS AND MITIGATION MEASURES

CUMULATIVE NOISE IMPACTS

- **CUMULATIVE SHORT-TERM AND OPERATIONAL NOISE AS A RESULT OF IMPLEMENTATION OF THE PROPOSED PROJECT COULD RESULT IN CUMULATIVELY CONSIDERABLE IMPACTS**.

Level of Significance Before Mitigation: Potentially Significant Impact.

Impact Analysis: The *General Plan EIR* utilized the summary projections method for evaluating cumulative impacts, which addresses the cumulative impacts of development within the City and its Sphere of Influence. The proposed project would be consistent with land use designations of the *General Plan*, and would therefore not result in any impacts not considered in the *General Plan EIR*. Noise level increases would primarily be caused by cumulative increases in traffic, including traffic generated by future development in the Project Area. Noise impacts from cumulative traffic volumes from both local growth, as well as vehicles passing through the Project Area were concluded to be less than significant with implementation of *General Plan* Policies and *General Plan EIR* Mitigation Measures (outlined above). Stationary sources associated with future development could also cause local noise level increases. These two activities together would result in higher noise levels than considered separately; however, the expected combined cumulative effect within the Project Area would be reduced by Mitigation Measures NOI-1 through NOI-3, as well as adherence to the *General Plan* Policies. Therefore, cumulative noise impacts from stationary and mobile noise sources would be considered less than significant.

General Plan Goals and Policies: Refer to the goals and policies identified above.

Mitigation Measures: Refer to Mitigation Measures NOI-1 through NOI-3. No additional mitigation measures are required.

Level of Significance After Mitigation: Less Than Significant.

5.6.6 SIGNIFICANT UNAVOIDABLE IMPACTS

Noise impacts would be less than significant with compliance with *General Plan* goals and policies, and recommended mitigation measures. Therefore, no significant unavoidable noise impacts would occur as a result of the proposed project.

5.6.7 SOURCES CITED

City of San Bernardino, *City of San Bernardino General Plan*, 2005.

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