

## **SUMMARY**

*The project site currently experiences relatively high noise levels, due to the nearby traffic on SR-99 and the operation of agricultural machinery. Project construction activities could result in significant impacts to existing, proposed, and potential future residential uses, given the possible proximity of such uses to the noise sources that would occur on-site. Noise from vehicular traffic generated by the project would not result in an exceedance of the City noise criteria, and future projects in the general area would be designed to incorporate anticipated noise levels from cumulative development. However, proposed uses on site could be exposed to high noise levels that would exceed the City criteria. This significant project-specific and cumulative impact would be reduced to a less-than-significant level through acoustical studies and incorporation of noise attenuation features into the project design. Noise from parking lot sweepers and loading docks could also be significant without incorporation of noise attenuation features into the design of nearby uses. The project would contribute to significant cumulative traffic noise related impacts off-site.*

## **INTRODUCTION**

The purpose of this noise analysis is twofold: (1) to evaluate the proposed project in terms of its design to ensure that it is planned appropriately from a noise perspective; and (2) to evaluate the noise impact of the project on the surrounding (off-site) areas. Noise modeling conducted for the project is presented in **Appendix 4.4** of this EIR.

On July 1, 2000, the City of Elk Grove passed a resolution adopting all Sacramento County ordinances in their entirety, as well as adopting all elements of the Sacramento County General Plan. Therefore, the analysis in this section is based on a review of applicable County ordinances and the County General Plan, with the understanding that these regulations and policies are also valid for the City of Elk Grove.

## **ENVIRONMENTAL SETTING**

### **Characteristics of Noise**

Noise is usually defined as unwanted sound. It is an undesirable by-product of society's normal day-to-day activities. Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm, or when it has adverse effects on health. The definition of noise as unwanted sound implies that it has an adverse effect on people and their environment.

Noise is measured on a logarithmic scale of sound pressure level known as a decibel (dB). The human ear does not respond uniformly to sounds at all frequencies, being less sensitive to low and high frequencies than to medium frequencies that correspond with human speech. In response, the A-weighted noise level (or scale) has been developed. It corresponds better with people's subjective judgment of sound levels. This A-weighted sound level is called the "noise level" referenced in units of dB(A). Because noise is measured on a logarithmic scale, a doubling of sound energy results in a three dB(A) increase in noise levels. However, changes in a community noise level of less than three dB(A) are not typically noticed by the human ear.<sup>1</sup> Changes from three to five dB(A) may be noticed by some individuals who are extremely sensitive to changes in noise. A 5.0 dB(A) increase is readily noticeable, and the human ear perceives a 10 dB(A) increase in sound level to be a doubling of sound.

Noise sources are classified in two forms: (1) point sources, such as stationary equipment, or individual motor vehicles; and (2) line sources, such as a roadway with a large number of point sources (motor vehicles). Sound generated by a point source typically diminishes (attenuates) at a rate of 6.0 dB(A) for each doubling of distance from the source to the receptor at acoustically "hard" sites and 7.5 dB(A) at acoustically "soft" sites.<sup>2</sup> For example, a 60 dB(A) noise level measured at 50 feet from a point source at an acoustically hard site would be 54 dB(A) at 100 feet from the source and 48 dB(A) at 200 feet from the source. Sound generated by a line source typically attenuates at a rate of 3.0 dB(A) and 4.5 dB(A) per doubling of distance from the source to the receptor for hard and soft sites, respectively.<sup>3</sup>

Sound levels can also be attenuated by man-made or natural barriers as illustrated in **Figure 4.4-1, Noise Attenuation by Barriers**. Solid walls, berms, or elevation differences typically reduce noise levels by 5.0 to 10.0 dB(A).<sup>4</sup> The noise attenuation provided by typical structures in California is provided in **Table 4.4-1, Outside to Inside Noise Attenuation**.

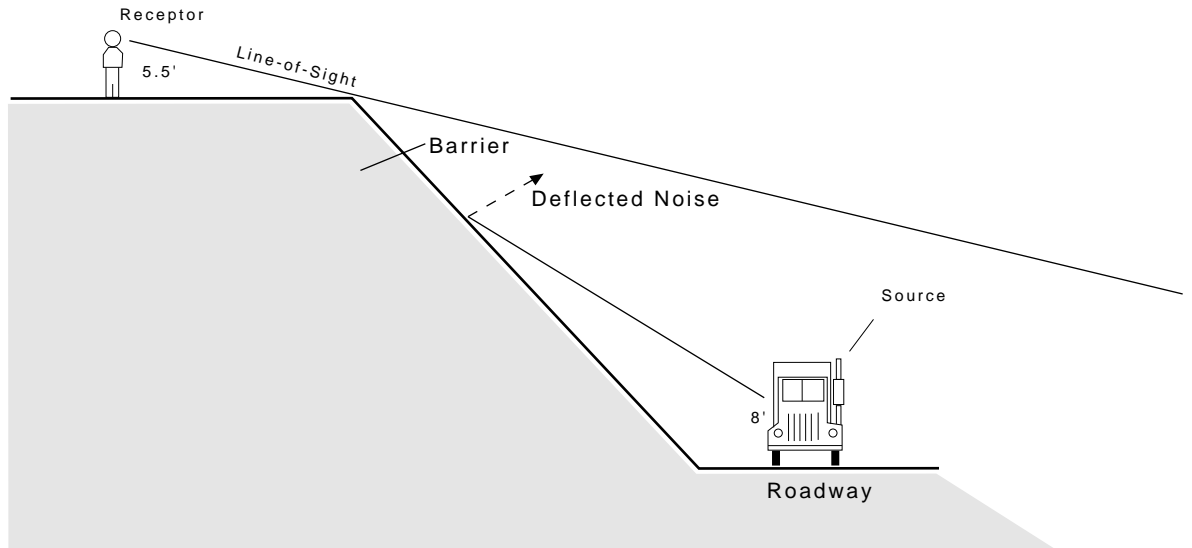
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<sup>1</sup> *Highway Noise Fundamentals*, (Springfield, Virginia: U.S. Department of Transportation, Federal Highway Administration, September 1980), p. 81.

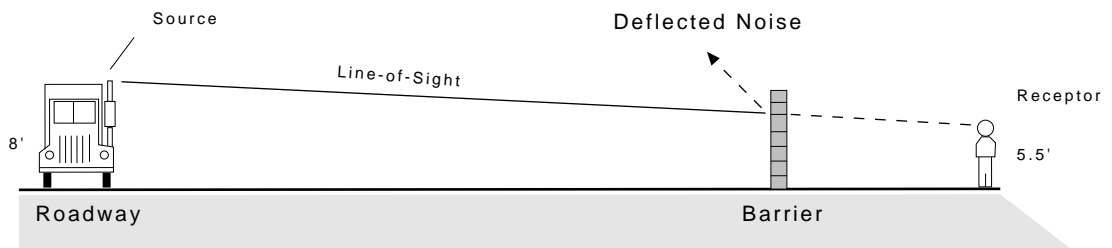
<sup>2</sup> *Ibid.*, p. 97. A "hard" or reflective site does not provide any excess ground-effect attenuation and is characteristic of asphalt, concrete, and very hard packed soils. An acoustically "soft" or absorptive site is characteristic of normal earth and most ground with vegetation.

<sup>3</sup> *Ibid.*, p. 97.

<sup>4</sup> *Highway Noise Mitigation* (Springfield, Virginia: U.S. Department of Transportation, Federal Highway Administration, September 1980), p. 18.



"Barrier Effect" Resulting from Differences in Elevation.



"Barrier Effect" Resulting from Typical Soundwall.

SOURCE: © Impact Sciences, September 1997.

FIGURE 4.4-1

Noise Attenuation by Barriers

**Table 4.4-1**  
**Outside to Inside Noise Attenuation**

<b>Building Type</b>	<b>Noise Reduction - dB(A)</b>	
	<b>Open Windows</b>	<b>Closed Windows</b>
Residences	12	25
Schools	12	25
Churches	20	30
Hospitals/Convalescent	17	25
Homes	17	25
Offices	20	30
Theaters	17	25
Hotels/Motels	17	25

*Source: Highway Noise Fundamentals, p. 117.*

When assessing community reaction to noise, there is an obvious need for a scale that averages varying noise exposures over time and quantifies the results in terms of a single number descriptor. Several scales have been developed which address community noise levels. Those that are applicable to this analysis are the Equivalent Noise Level ( $L_{eq}$ ) and the Community Noise Equivalent Level (CNEL).  $L_{eq}$  is the average A-weighted sound level measured over a given time interval.  $L_{eq}$  can be measured over any time period, but is typically measured for 1-minute, 10-minute, 15-minute, 1-hour, or 24-hour periods. CNEL is another average A-weighted sound level measured over a 24-hour time period, and is adjusted to account for some individuals' increased sensitivity to noise levels during the evening and nighttime hours. A CNEL noise measurement is obtained after adding 5.0 decibels to sound levels occurring during the evening from 7:00 P.M. to 10:00 P.M., and 10.0 decibels to sound levels occurring during the nighttime from 10:00 P.M. to 7:00 A.M. The 5.0 and 10.0 decibel "penalties" are applied to account for peoples' increased sensitivity during the evening and nighttime hours. For example, the logarithmic effect of these additions is that a 60.0 dB(A) 24-hour  $L_{eq}$  would result in a measurement of 66.7 dB(A) CNEL.

The Day-Night Average Level ( $L_{dn}$ ) is similar to CNEL in that it is measured over a 24-hour period. However, it is obtained after adding 10 decibels to sound levels occurring during the nighttime from 10:00 P.M. to 7:00 A.M. and no additional decibels to the evening noise levels.  $L_{dn}$  noise levels are typically a fraction of a dB less than CNEL noise levels and, for all practical purposes, CNEL and  $L_{dn}$  are interchangeable.

Other noise descriptors referred to in this section include  $L_{50\%}$ , which is the sound level exceeded 50 percent of the time, and  $L_{max}$ , which is the highest effective sound level measured over a given period of time.

## Characteristics of Vibration

Vibration is a unique form of noise in that its energy is carried through structures and the earth, whereas noise is carried through the air. Thus, vibration is generally felt rather than heard. Some vibration effects can be caused by noise; for example, the rattling of windows from truck pass-bys. This phenomenon is related to the coupling of the acoustic energy at frequencies that are close to the resonant frequency of the material being vibrated. Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration

The peak particle velocity (PPV) or the root mean square (RMS) velocity are usually used to describe vibration amplitudes. PPV is defined as the maximum instantaneous peak of the vibration signal, while RMS is defined as the square root of the average of the squared amplitude of the signal. PPV is more appropriate for evaluating potential building damage, whereas RMS is typically more suitable for evaluating human response.

## Noise Analysis Methodology

The analysis of the existing and future noise environments presented in this EIR section is based on technical reports, noise level monitoring, and noise prediction modeling. Future noise levels for some stationary activities and equipment were estimated based on available technical reports and literature, which are cited in this EIR section.

Noise modeling procedures involved the calculation of existing and future vehicular noise levels along individual roadway segments in the vicinity of the project site. This task was accomplished using the Federal Highway Administration Highway Noise Prediction Model (FHWA-RD-77-108). The model calculates the average noise level at specific locations based on traffic volumes, average speeds, roadway geometry, and site environmental conditions. The average vehicle noise rates (energy rates) utilized in the FHWA Model have been modified to reflect average vehicle noise rates identified for California by Caltrans.<sup>5</sup> The Caltrans data show that California automobile noise is 0.8 to 1.0 dB(A) higher than national levels and that medium and heavy truck noise is 0.3 to 3.0 dB(A) lower than national levels.<sup>6</sup> Traffic volumes utilized as data inputs into the noise prediction model are consistent with the traffic and circulation analysis provided in **Section 4.2, Transportation and Circulation**, of this EIR.

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<sup>5</sup> Rudolf W. Hendriks, *California Vehicle Noise Emission Levels* (Sacramento, California: California Department of Transportation, January 1987), NTIS, FHWA/CA/TL-87/03.

<sup>6</sup> Ibid.

The analysis in this section addresses the existing and future noise environments on and off the Lent Ranch Marketplace project site.

### ***On-Site Methodology***

The primary concern regarding on-site noise is the potential for proposed on-site land uses to be exposed to noise levels that exceed adopted or recommended thresholds (discussed later in this EIR section). In essence, the analysis of on-site noise levels assesses the compatibility of proposed on-site land uses with proposed on-site activities, adjacent off-site land uses and activities, and with roadway traffic noise that would occur proximal to the site.

### ***Off-Site Methodology***

The assessment of off-site noise levels focuses on how on-site activities and increased traffic levels would affect existing land uses adjacent to, or near, the project site. This section specifically focuses on impacts to existing noise-sensitive uses, or those uses that would be most sensitive to an increase in noise levels. These uses are discussed later in this EIR section. Noise levels were modeled with and without project traffic to determine those locations at which the project (via increased traffic) may have an impact on existing noise sensitive uses.

## **Applicable Plans and Policies**

In advance of presenting the existing and future noise levels and the thresholds of significance utilized in this EIR, plans and policies that pertain to noise are discussed below. These plans and policies include: (1) the State of California, Department of Environmental Health, Office of Noise Control guidelines for noise and land use compatibility; and (2) the City of Elk Grove (Sacramento County) *General Plan Noise Element*.

### ***California Department of Environmental Health***

The State of California, Department of Environmental Health, Office of Noise Control, has published recommended guidelines for mobile source noise and land use compatibility. Each jurisdiction is required to consider these guidelines when developing its *General Plan Noise Element* and determining the acceptable noise levels within its community. As discussed below, the *General Plan* defers to these guidelines when assessing a project's noise compatibility with motor vehicle noise sources. These State guidelines are illustrated in **Figure 4.4-2, Land Use Compatibility Guidelines for Noise**.

As shown, 60 dB(A) CNEL is the acceptable exterior noise level for single family, duplex, and mobile homes involving normal, conventional construction, without any special noise insulation requirements (normally acceptable noise levels). Exterior noise levels of up to 65 dB(A) CNEL are typically considered acceptable for multi-family units without any special noise insulation requirements. For noise-sensitive uses such as schools, libraries, churches, hospitals, day care centers, and nursing homes of conventional construction, an exterior noise level of 70 dB(A) CNEL is considered acceptable by the State.

Above the identified thresholds, exterior noise levels are typically considered acceptable only if the buildings are conditioned to include noise insulation features (conditionally acceptable noise levels). Conventional construction of the buildings with the inclusion of fresh air supply systems or air conditioning will normally ensure that interior noise levels are acceptable (reference **Table 4.4-1** for noise reduction provided by conventional construction techniques). However, detailed acoustical analyses must be conducted to identify all needed noise insulation features and confirm their effectiveness.

### *City of Elk Grove General Plan Noise Element*

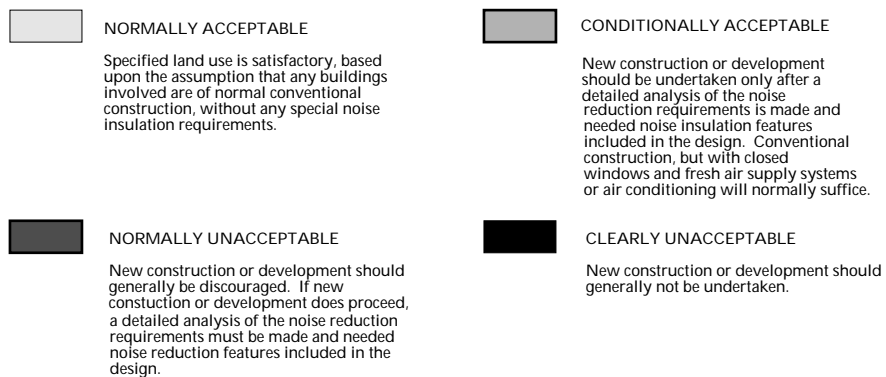
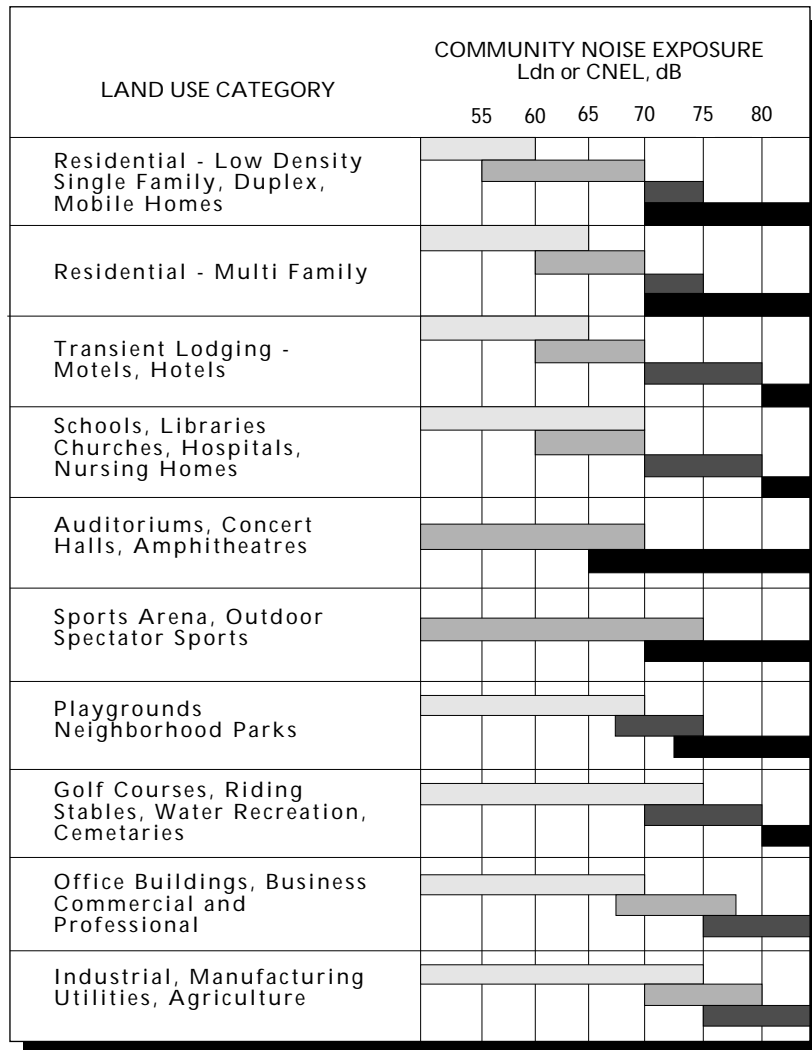
The City's Noise Ordinance and Noise Element of the *General Plan* are the basis for the adoption and enforcement of noise standards. The Noise Element establishes land-use compatibility criteria for both interior and exterior areas of various land uses.

**Table 4.4-2, Noise Level Performance Standards for Residential Areas Affected by Non-Transportation Noise**, applies to new or existing residential areas affected by new or existing non-transportation noise sources. For example, Policy NO-2 from the Noise Element states that new non-transportation noise sources shall be mitigated so as not to exceed any of the noise level standards in **Table 4.4-2**. Policy NO-4 states that where residential land uses are proposed in areas exposed to existing or projected exterior noise levels exceeding either 60 dB(A)  $L_{dn}$ /CNEL or the performance standards of **Table 4.4-2**, an acoustical analysis shall be required as part of the environmental review process so that noise mitigation may be included in the project design.

**Table 4.4-2  
Noise Level Performance Standards for Residential Areas Affected by Non-Transportation Noise**

Statistical Noise Level Descriptor	Exterior Noise Level Standards (dB(A))	
	Daytime (7 A.M. – 10 P.M.)	Nighttime (10 P.M. – 7 A.M.)
$L_{50}$	50	45
$L_{max}$	70	65

*Source: City General Plan, Noise Element.*



SOURCE: California Department of Health, Office of Noise Control, Guidelines for the Preparation and Content of Noise Elements of The General Plan, February 1976.

FIGURE 4.4-2

## Land Use Compatibility Guidelines for Noise

Policy NO-6 from the Noise Element states that the compatibility of proposed non-residential projects with existing and future noise levels due to transportation noise sources shall be evaluated through a comparison to **Table 4.4-3, Noise Element Noise Standards, Exterior Noise Level Standard,  $L_{dn}$ /CNEL**. The table also provides compatibility guidelines for residential uses. As shown in the table, exterior noise levels of up to 60 dB(A),  $L_{dn}$  /CNEL are typically considered acceptable for residential uses (including uses in Zoning Districts AR-1 and AR-2), and noise levels of up to 65 dB(A),  $L_{dn}$  /CNEL are typically considered acceptable for agriculture residential (5- and 10-acre lots) and office/commercial/professional uses. For agricultural uses (such as uses within AG-20 and AG-80 zones), the exterior noise level threshold is 70 dB(A),  $L_{dn}$  /CNEL. Above the identified thresholds, “the use should be permitted only after careful study and inclusion of protective measures as needed for intended use and to satisfy policies of the Noise Element.”

**Table 4.4-3  
Noise Element Noise Standards  
Exterior Noise Level Standard,  $L_{dn}$ /CNEL**

<b>Land Use Category</b>	<b>Acceptable</b>	<b>Conditionally Acceptable</b>
Residential (including AR-1 and AR-2)	60	75
Agriculture/Residential (5 and 10 acres)	65	75
Office/Commercial/Professional	65	75
Industrial/Utilities/Agriculture	70	80

Source: City of Elk Grove General Plan, Noise Element.

The Noise Element includes standards for acceptable noise levels in unoccupied rooms affected by transportation noise, as shown in **Table 4.4-4, Acceptable Noise Levels In Unoccupied Rooms Affected By Transportation Noise**.

**Table 4.4-4  
Acceptable Noise Levels In Unoccupied Rooms Affected By Transportation Noise**

<b>Location</b>	<b>Average Sound Level<sup>1</sup> dB(A)</b>	<b>Location</b>	<b>Average Sound Level<sup>1</sup> dB(A)</b>
Radio studios, recording studios	25-30	Music Rooms	30-35
Concert halls, auditoriums	30-35	Theaters (speech)	30-35
Motion picture theaters	40-45	Churches	35-40
Conference rooms, small offices	40-45	Classrooms	35-45
Public offices, banks, stores	45-50	Hospitals	40-45
Restaurants, cafeterias	45-50	Court rooms	40-45
Libraries	40-45		

<sup>1</sup>  $L_{eq}$  in worst-case hour during periods of use.

Source: City of Elk Grove General Plan, Noise Element.

### *City of Elk Grove Noise Ordinance*

The Noise Ordinance regulates development projects with regard to construction noise. Section 6.68.090 of the Ordinance contains quantitative restrictions on noise levels that effectively limit construction activities to 6:00 A.M. to 8:00 P.M., Monday through Friday, and 7:00 A.M. to 8:00 P.M. on Saturday and Sunday. Section 6.68.070 establishes exterior noise standards for residential properties of 55 dB(A) from 7:00 A.M. to 10:00 P.M., and 50 dB(A) from 10:00 P.M. to 7:00 A.M. Section 6.68.120 restricts the noise levels produced by machinery, equipment, fans and air conditioning, as heard at the property lines of nearby residential uses.

### *City of Elk Grove Zoning Code*

The Zoning Code includes certain performance standards (Title III, Use Regulations and Development Standards) that could have the effect of reducing noise levels. For example, Chapter I, Article 5, Section 301-61 requires that a masonry wall be provided along the exterior property lines for all industrial and commercial projects when located adjacent to residential (and specified other) zones, and that where a sound wall is required, a masonry wall of up to eight feet in height may be provided. Chapter 5, Article 2, Section 305-13.3 requires that a solid wood fence or masonry wall with a minimum height of six feet be built along the exterior property lines of any multi-family residential project. Chapter 15, Article 6, Section 315-43(f) requires that loading docks adjacent to residentially zoned property have a setback of at least 75 feet from that zoning boundary. Section 315-45(b) of the same Article requires that, for commercial development adjacent to residential and other specified zones, a six-foot high perimeter masonry wall be installed along the property lines of those zones.

## **Existing Conditions**

### *On-Site Noise Levels*

The project area is located in a rural environment primarily used for agricultural and associated residential uses. Potential noise receptor areas located within the area of the project site are identified and illustrated on **Figure 4.4-3, Potential Noise Receptor Areas**.

Predominant noise sources include agricultural equipment and machinery operations, irrigation and rural residential activities such as noise from domestic animals and human conversation. In addition, given the project site location near SR-99, vehicle noise plays a major role in ambient noise conditions. Secondary sources of noise in this area include residential noise from the Elk Grove residential area

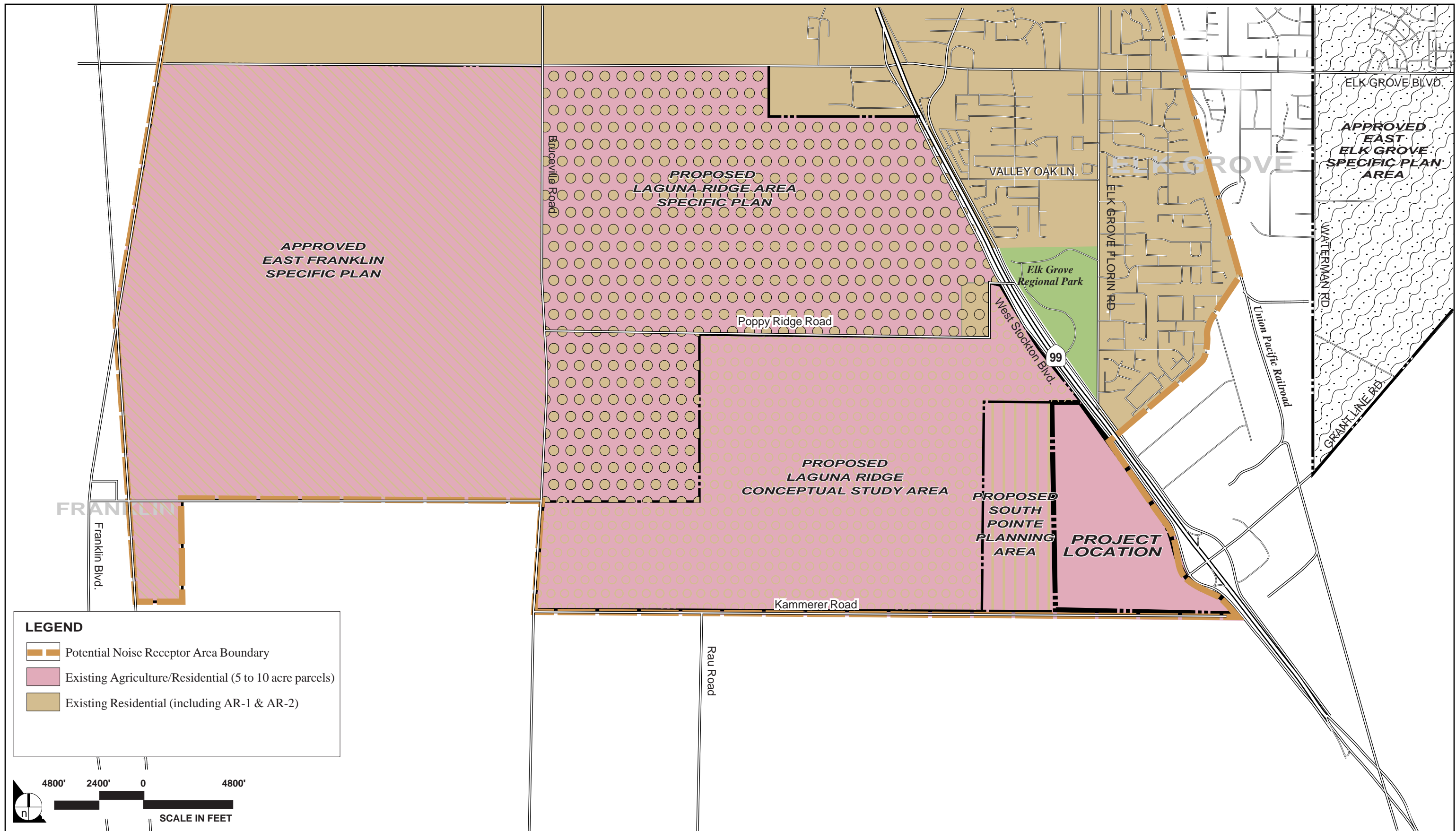


FIGURE 4.4-3

Potential Noise Receptor Areas

located east of SR-99 and consist of human conversation and yelling, doors slamming, lawn care equipment operation, stereos, and domestic animals, and occasional overflight by aircraft.

### *Roadway Noise*

In order to characterize the existing ambient noise environment, noise levels created by vehicular traffic traveling along the roadway segments that would be most affected by the project were calculated. A generalized survey of various land uses located along these roadways was conducted to determine those uses that could be affected by project-generated traffic. The results are presented in **Table 4.4-5, Existing Roadway Noise Levels**. As shown below in **Table 4.4-5**, all of the existing land uses along the studied roadway segments presently experience exterior noise levels that are considered Acceptable or Conditionally Acceptable by the Land Use Compatibility Guidelines. The Conditionally Acceptable areas (the areas with the higher noise levels relative to the standards) are generally along Elk Grove Boulevard and West Stockton Boulevard. It should be noted that the results of ambient noise measurements conducted by Impact Sciences on and around the project site were lower than the modeled results presented in **Table 4.4-5**. As such, the modeled results used within this EIR are representative of a worst-case condition.

**Table 4.4-5  
Existing Roadway Noise Levels**

<b>Roadway</b>	<b>Land Uses along Roadway Segments</b>	<b>dB(A) L<sub>dn</sub></b>	<b>Above Normally Acceptable</b>
<b>State Route 99</b>			
Elk Grove Blvd. to Grant Line	Commercial, Agriculture	74.5	Yes
<b>Elk Grove Blvd.</b>			
I-5 to Franklin Blvd.	Residential, Agriculture	67.3	Yes
Franklin Blvd. to Bruceville Rd.	Residential, Agriculture	68.7	Yes
Bruceville Rd. to W. Stockton Blvd.	Residential, Agriculture, and Commercial	69.9	Yes
E. Stockton Blvd. to Elk Grove-Florin	Residential, Commercial	71.8	Yes
<b>Poppy Ridge Rd.</b>			
Bruceville Rd. to W. Stockton Blvd.	Residential, Agriculture	47.5	No
<b>Hood Franklin Rd.</b>			
I-5 to Franklin Blvd.	Agriculture, Agriculture/Residential	59.3	No
<b>Bilby Rd.</b>			
Franklin Blvd. to Bruceville Rd.	Residential, Agriculture	55.2	No
<b>Kammerer Rd.</b>			
Bruceville Rd. to W. Stockton Blvd.	Agriculture	56.2	No
<b>Grant Line Rd.</b>			
Waterman Rd. to Bradshaw Rd.	Agriculture, Industrial	65.7	Yes
<b>Franklin Blvd.</b>			
Bilby Rd. to Elk Grove Blvd.	Residential, Agriculture	60.6	Yes
<b>Bruceville Rd.</b>			
Kammerer Rd. to Bilby Rd.	Agriculture	58.7	No
Bilby Rd. to Poppy Ridge Rd.	Agriculture	59.3	No
Poppy Ridge Rd. to Elk Grove Blvd.	Agriculture	59.5	No
Elk Grove Blvd. to Laguna Blvd.	Residential, Agriculture/Residential	65.0	Yes
<b>West Stockton Blvd.</b>			
Kammerer Rd. to project Access	Agriculture	73.0 <sup>1</sup>	Yes
project Access to Poppy Ridge Rd.	Agriculture	73.0 <sup>1</sup>	Yes
Poppy Ridge Rd. to Elk Grove Blvd.	Agriculture, Commercial	73.0 <sup>1</sup>	Yes
<b>Elk Grove – Florin Rd.</b>			
E. Stockton Blvd. to Elk Grove Blvd.	Residential, High School, Commercial and Elk Grove Regional Park	63.5	Yes
<b>Waterman Rd.</b>			
Grant Line Rd. to Elk Grove Blvd.	Residential	64.0	Yes

Source: Impact Sciences, Inc. Calculations provided in Appendix 4.4. Noise levels were determined assuming the land use was approximately 50 foot from the roadway centerline except along SR-99 where land uses were assumed to be 100 feet from the centerline. No attenuation due to existing noise walls or other sound reduction techniques was assumed.

<sup>1</sup>Measured Noise levels from Bollard & Brennan, Inc, May 12, 1999: Noise level assumes combined noise from SR-99 and West Stockton Blvd.

## PROJECT IMPACTS

### Thresholds of Significance

#### *Noise*

In order to assist in determining whether a project will have a significant effect on the environment, the CEQA *Guidelines* identify criteria that may be deemed to constitute a substantial or potentially substantial adverse change in physical conditions. Specifically, Appendix G of the *Guidelines* (Environmental Checklist Form) lists the following as criteria for determining that a project may have a significant impact:

- Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, 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; or
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

The CEQA *Guidelines* do not define what a substantial increase in ambient noise is. Furthermore, the CEQA *Guidelines* do not provide an impact threshold for potential noise impacts. As such, the following thresholds of significance were developed for this noise analysis, based on the plans and policies discussed previously in this EIR section. These thresholds apply to both the project and cumulative impacts.

#### **On-Site Thresholds**

According to the City's Noise Element Noise Standards (**Table 4.4-3**), office buildings, business commercial and professional uses are "acceptable" with exterior noise levels of up to 65 dB(A)  $L_{dn}$  /CNEL. Given this, for purposes of this EIR, the project would result in a significant noise impact if on-site exterior locations around the proposed mall, community commercial, neighborhood commercial, or office uses would be exposed to noise levels above 65 dB(A)  $L_{dn}$  /CNEL. For residential uses and hotels, the noise guidelines identify 60 dB(A)  $L_{dn}$  /CNEL as the "acceptable" exterior noise level threshold. Therefore, the project would result in a significant noise impact if a person residing within a usable area (such as a yard or patio) of the proposed multi-family residential uses or potential hotels would be exposed to exterior noise above 60 dB(A)  $L_{dn}$  /CNEL.

### Off-Site Thresholds

Off-site noise thresholds consider the City Noise Compatibility Criteria, community responses to changes in noise levels, and CEQA standards. Changes in a noise level of less than three dB(A) are not typically noticed by the human ear.<sup>7</sup> Some individuals who are extremely sensitive to changes in noise may notice changes from three to five dB(A). Based on this information, the following thresholds have been established for this analysis:

1. An increase of three dB(A) or greater in traffic noise level that occurs from project-related activities would be significant if the resulting noise levels would cause the City's noise compatibility thresholds for "Acceptable" exterior or interior noise levels to be exceeded, or result in a three dB(A) increase in noise to a land use experiencing levels above the City's noise compatibility threshold for "Acceptable." A noise level increases of less than three dB(A) under either of the previously described scenarios is not considered to significant.
2. An increase of five dB(A) or less in traffic noise level that occurs from project-related activities would be considered not significant if the resulting noise levels remain below the "Acceptable" thresholds established by the City. Increases in traffic noise greater than 5 dB(A) would be considered to be significant.
3. Stationary noise sources proposed as part of the project that could result in the exposure of existing or proposed residential or hotel uses to noise levels above the City Performance Standards contained within the General Plan would be considered a significant impact of the project.
4. According to the General Plan Noise Element, the project site is not within the noise boundaries for the nearest airport (Sunset Sky Ranch), nor within the noise boundaries for other airports in the area. Therefore, the thresholds for airport noise were not considered in this analysis.

### Vibration

Neither the City of Elk Grove nor the County of Sacramento have standards or significance threshold for determining vibration impacts. Reaction to vibration will vary from person to person. Peak velocities of 0.01 inches per second RMS are barely noticeable to people, while velocities of 0.1 inches per second RMS are troublesome to some people. Architectural damage to structures can begin occurring when peak velocities reach 0.4 inches per second RMS.<sup>8</sup> The point at which damage to residential, commercial, or industrial structures can occur is utilized as the significance threshold within this EIR.

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<sup>7</sup> Federal Highway Administration, *Highway Noise Fundamentals*, September 1980.

<sup>8</sup> Marshall Long Acoustics, *Weldon Canyon Vibration Study*, undated.

## Analysis

### *Construction Impacts*

#### Noise

##### *On-site Development*

**Impact 4.4-1 Construction equipment noise would affect sensitive receptor locations both and around the project site. This would result in a significant impact.**

Construction noise would occur with the development of the project site, including the removal of a few existing residential and associated structures, the construction of new structures, the installation of needed off-site improvements such as the detention basin, the extension of infrastructure and utilities, and any needed roadway improvements. The noise produced by construction equipment would vary depending on the types of equipment used as well as equipment operation and maintenance. **Figure 4.4-4, Noise Levels of Typical Construction Equipment**, illustrates typical construction equipment noise levels for individual pieces of equipment. Usually, construction noise is of relatively short duration, lasting from a few days to a period of several months.

In general, the first and noisiest stage is site preparation, which usually involves existing structure removal, earth moving, compaction of soils and the removal of excess materials. High noise levels created during this phase will be associated with the operation of heavy-duty trucks, scrapers, graders, backhoes, and front-end loaders. When construction equipment is operating, noise levels can range from 73 to 96 dB(A) at a distance of 50 feet from individual pieces of equipment. During the second stage of construction, foundation forms are constructed and concrete foundations are poured. Primary noise sources include heavy concrete trucks and mixers, cranes, and pneumatic drills. At 50 feet from the source, noise levels in the 70 to 90 dB(A) range are common.

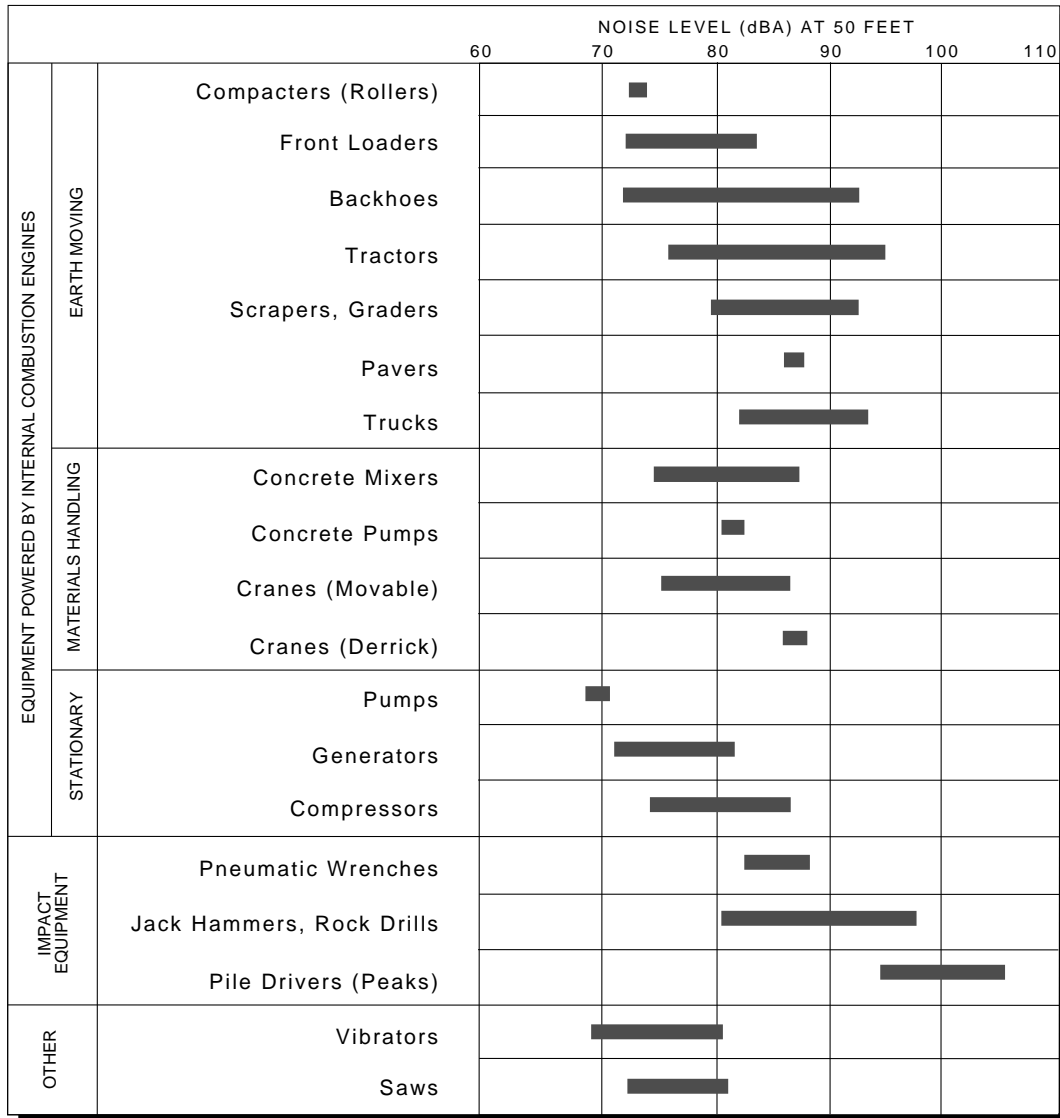
The third and fourth stages consist of interior and facade construction, and site cleanup. Primary noise sources associated with the third phase include hammering, diesel generators, compressors, and light truck traffic. Noise levels are typically in the 60 to 80 dB(A) range at a distance of 50 feet. The final stages typically involves the use of trucks, landscape rollers and compactors, with noise levels in the 65 to 75 dB(A) range.

During construction activities, noise level increases could be noticeable to nearby agricultural residential land uses located to the south, north, and west of the project site. If the South Pointe project west of the project site is approved, the residential uses built in association with that project could also be exposed to construction noise from the Lent Ranch project (depending on the timing of the development of South Pointe and Lent Ranch). These residences could be exposed to periodic noise during demolition and construction activities occurring on and near the project site. Additionally, if the on-site (existing or proposed) residential uses are occupied during construction activities, those uses could also be exposed to construction noise.

The project area is (1) in agricultural production, which requires the use of tractors and other noise generating equipment on a regular basis and (2) near SR-99, which generates high levels of traffic noise. The ambient noise levels at some of the residential uses near the project site are already considered to be high (e.g., above 73.0 dB(A) along West Stockton Boulevard), and the noise levels at other nearby locations are typical of a rural area (e.g., 56.2 dB(A) along Kammerer Road). Construction activities on the project site as a whole could occur on any one part of the site. The Noise Ordinance would restrict proposed construction activities to 6:00 A.M. to 8:00 P.M. during the weekdays, when residents are less likely to be disturbed, but would allow construction activities on the weekends from 7:00 A.M. to 8:00 P.M., when more residents could be disturbed by construction. Given that there is a potential that some existing, proposed, and potential future residential uses (particularly those further from SR-99) would be exposed to project construction noise, this impact (though temporary) is considered to be potentially significant when construction occurs near those sensitive receptors.

A portion of the project site could be operational, such as the onsite residential uses, a portion of the mall, the entire mall, or any combination of onsite land uses, while another portion of the project site is under construction. In addition, proposed land uses located in the South Pointe area and/or Laguna Ridge Conceptual area could also be partially constructed or fully built-out at the time construction on the proposed project site is occurring. Therefore, there is the potential that combined onsite construction and operational noise could affect existing land uses either onsite and/or offsite within the South Pointe and Laguna Ridge Conceptual area. Noise levels would vary depending on the location of construction activities and operational noise sources. Nonetheless, the dominant noise sources that would impact either onsite or offsite land uses would be those associated with the construction activities. This impact (though temporary) is considered to be potentially significant when construction occurs near these existing sensitive receptors.

In addition to equipment noise, the movement of equipment and workers onto the project construction site and infrastructure installation areas would generate traffic noise along access routes to the project



Note: Based on limited available data samples.

SOURCE::United States Environmental Protection Agency, 1971, "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances," NTID 300-1.

FIGURE 4.4-4



## Noise Levels Of Typical Construction Equipment

areas. The major pieces of heavy equipment would be moved into the development areas once for each construction project, and thus would have an insignificant short-term effect on traffic noise levels. Although the daily transportation of construction workers is expected to cause increases in noise levels along project roadways, this traffic would not be a substantial percentage of daily volumes in the area and thus would not increase levels by more than 3 dB(A). Therefore, the potential traffic noise level increases are considered to be less than significant.

### *Offsite Infrastructure*

**Impact 4.4-2 Construction activities needed for the development of offsite infrastructure would result in increases in ambient noise condition along construction routes. This would result in a significant impact.**

Offsite infrastructure improvements, such as the installation of the 24-inch water main from the treatment facility, the wastewater interceptor line, the 8-acre detention basin, roadway improvements, telephone, electrical, and natural gas lines, would be developed along various routes within the City of Elk Grove as described in the project Description. The installation of these facilities would involve trenching and backfilling activities, and would not be in any given location for more than a few days. These construction activities would involve the use of less construction equipment than the development of onsite structures and would last for a much shorter period of time. Nonetheless, construction activities along offsite infrastructure routes would result in significant short-term construction impacts.

### **Vibration**

**Impact 4.4-3 Vibration associated with construction activities due to pile driving could affect nearby sensitive land uses. This would result in significant impact.**

Construction operations can generate varying degrees of ground vibration, depending on the construction procedures and the construction equipment. Operation of construction equipment generates vibrations, which spread through the ground and diminish in amplitude with distance from the source. The effect on buildings located in the vicinity of the construction site often varies; depending on soil type, ground strata, and receptor building construction. The results from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibrations at moderate levels, and slight damage at the highest levels. Ground vibrations from construction activities rarely reach the levels that can damage structures, but can achieve the audible and perceptible ranges in buildings close to the construction site. Typically, the highest vibration levels are generated by blasting

and impact pile driving; blasting will not be employed for this project and pile driving will be very limited. **Table 4.4-6, Vibration Levels for Construction Equipment**, below, lists vibration source levels for construction equipment.

The primary vibration sources associated with the development of the project would include the use of pile drivers during the construction of foundations. Pile drivers create a high intensity, repetitious noise that is disturbing and can result in ground vibrations. The use of any pile drivers would be very limited during the development of on-site structures,

**Table 4.4.-6  
Vibration Levels for Construction Equipment**

<b>Equipment</b>		<b>Approximate Velocity Level at 25 ft, VdB</b>	<b>Approximate RMS<sup>a</sup> Velocity at 25 ft, Inch/second</b>
Pile Driver (impact)	upper range	112	0.37950
	typical	104	0.16100
Pile Driver (sonic)	upper range	105	0.18350
	typical	93	0.04250
Clam shovel drop (slurry wall)		94	0.05050
Hydromill (slurry wall)	in soil	66	0.00200
	in rock	75	0.00430
Large bulldozer		87	0.02225
Caisson drilling		87	0.02225
Loaded trucks		86	0.01900
Jackhammer		79	0.00875
Small bulldozer		58	0.00075

Note:

<sup>a</sup> RMS velocity calculated from vibration level (VdB) using the reference of 1 micro-inch/second.

Source: USDOT Federal Transit Administration, 1995

As indicated in **Table 4.4-6**, impact pile drivers are capable of producing RMS velocity levels at 25 feet in the upper range of 0.37 inches-per second, but typically produce levels of approximately 0.16 inches per second. Sonic pile drivers are capable of producing RMS velocity levels at 25 feet in the upper range of 0.18 inches-per second, but typically produce levels of approximately 0.04 inches per second. These vibration levels demonstrate that it is possible that pile-driving activities could result in vibration above the acceptable threshold of 0.4 inches per second. Given that there is a potential that some existing, proposed, and potential future residential uses (particularly those further from SR-99) would be exposed to project vibration, this impact (though temporary) is considered to be potentially significant when construction occurs near those sensitive receptors.

## *Operational Impacts*

### **Roadway Noise - Buildout of Entire project**

**Impact 4.4-4** Ambient noise conditions due to increased traffic resulting from the implementation of the project would occur along Poppy Ridge Road between Bruceville Road and West Stockton Boulevard, where an increase of 17.3 dB(A) is expected, and along Bilby Road where an increase in noise of approximately 7.4 dB(A) is expected. This would result in a significant impact.

Implementation of the proposed project would introduce additional traffic to areas of Elk Grove and unincorporated areas of Sacramento County. Based on the distribution of traffic volumes, noise modeling was conducted for the segments of roadways analyzed in **Section 4.2, Transportation and Circulation**.

As shown in **Table 4.4-7, Existing + Project Roadway Noise Levels**, increases in noise levels along roadways within the City of Elk Grove under full buildout of the project would be between 0.0 and 17.3 dB(A)  $L_{dn}$ . On 13 of the 20 roadway segments studied, the increase in noise levels from the project would be less than 3.0 dB(A), and thus would not be perceptible to people. On five of the remaining segments, the increase in noise levels would be greater than 3.0 dB(A), but the resulting noise levels would not exceed the threshold for the nearby Agriculture or Agriculture/Residential uses. The greatest change in ambient noise conditions resulting from the implementation of the project would occur along Poppy Ridge Road between Bruceville Road and West Stockton Boulevard, where an increase of 17.3 dB(A) is expected. Existing land uses along this roadway are primarily Agriculture; however, there is an area of Residential (AR-2) uses on Poppy Ridge Road toward West Stockton Boulevard. In addition, residential use along Bilby Road would experience noise level increase of approximately 7.4 dB(A). Noise increases along these roadway segments would be audible (i.e., greater than 3 dB(A)) compared to existing conditions, and would result in an exceedance of the Residential land use compatibility criteria of 60 dB(A)  $L_{dn}$ . Potential impacts to the existing uses are, therefore, considered to be significant.

**Table 4.4-7  
Existing + Project Roadway Noise Levels**

Roadway	Existing Land Use	Existing L <sub>dn</sub>	Existing Plus project L <sub>dn</sub>	Increase in L <sub>dn</sub>	Signifi- cant project Impact
<b>State Route 99</b>					
Elk Grove Blvd. to Grant Line	Commercial, Agriculture	74.5	76.3	+1.8	No
<b>Elk Grove Blvd.</b>					
I-5 to Franklin Blvd.	Residential, Agriculture	67.3	68.6	+1.5	No
Franklin Blvd. to Bruceville Rd.	Residential, Agriculture	68.7	70.1	+1.4	No
Bruceville Rd. to W. Stockton Blvd.	Residential, Agriculture, and Commercial	69.9	70.9	+1.0	No
E. Stockton Blvd. to Elk Grove-Florin	Residential, Commercial	71.8	72.6	+0.8	No
<b>Poppy Ridge Rd.</b>					
Bruceville Rd. to W. Stockton Blvd.	Residential, Agriculture	47.5	64.7	+17.3	Yes
<b>Hood Franklin Blvd.</b>					
I-5 to Franklin Blvd.	Agriculture, Agriculture/Residential	59.3	63.7	+4.4	No
<b>Bilby Rd.</b>					
Franklin Blvd. to Bruceville Rd.	Residential, Agriculture	55.2	62.6	+7.4	Yes
<b>Kammerer Rd.</b>					
Bruceville Rd. to W. Stockton Blvd.	Agriculture	56.2	60.1	+3.9	No
<b>Grant Line Rd.</b>					
Waterman Rd. to Bradshaw Rd.	Agriculture, Industrial	65.7	67.9	+2.2	No
<b>Franklin Blvd.</b>					
Bilby Rd. to Elk Grove Blvd.	Residential, Agriculture	60.6	60.6	+0.0	No
<b>Bruceville Rd.</b>					
Kammerer Rd. to Bilby Rd.	Agriculture	58.7	58.7	+0.0	No
Bilby Rd. to Poppy Ridge Rd.	Agriculture	59.3	63.7	+4.4	No
Poppy Ridge Rd. to Elk Grove Blvd.	Agriculture	59.5	63.8	+4.3	No
Elk Grove Blvd. to Laguna Blvd.	Residential, Agriculture/ Residential	65.0	66.5	+1.5	No
<b>West Stockton Blvd.</b>					
Kammerer Rd. to project Access	Agriculture	73.0 <sup>1</sup>	70.5	-2.5	No
project Access to Poppy Ridge Rd.	Agriculture	73.0 <sup>1</sup>	68.3	-3.7	No
Poppy Ridge Rd. to Elk Grove Blvd.	Agriculture, Commercial	73.0 <sup>1</sup>	67.0	-4.0	No
<b>Elk Grove – Florin Rd.</b>					
E. Stockton Blvd. to Elk Grove Blvd.	Residential, High School, Commercial, and Elk Grove Regional Park	63.5	64.1	+0.6	No
<b>Waterman Rd.</b>					
Grant Line Rd. to Elk Grove Blvd.	Residential	64.0	65.7	+1.7	No

*Source: Impact Sciences, Inc. Calculations provided in Appendix 4.4. Noise levels were determined assuming the land use was approximately 50 feet from the roadway centerline, except along SR-99 where land uses were assumed to be 100 feet from the centerline. No attenuation due to existing noise walls or other sound reduction techniques was assumed.*

<sup>(1)</sup> Measured Noise levels from Bollard & Brennan, Inc, May 12, 1999; Noise level assumes combined noise from SR-99 and West Stockton Blvd.

The recently-approved East Franklin Specific Plan allows the construction of single-family residential uses along Bilby Road and Bruceville Road, where noise levels with the proposed project would be above

the Residential land use compatibility criteria of 60 dB(A)  $L_{dn}$ . However, future cumulative noise levels (including noise from the proposed Lent Ranch Marketplace project) were considered in the EIR for the East Franklin project, and mitigation measures were adopted for the East Franklin Specific Plan to incorporate acoustical considerations into the siting and design of the future residences. It was concluded by Sacramento County that the level of impact significance to onsite residential land use associated with the East Franklin Specific Plan, after mitigation, would be less than significant.<sup>9</sup> Therefore, there would be no project-related impacts to the future residences in the East Franklin Specific Plan area.

Other reasonably foreseeable development includes the Laguna Ridge Specific Plan, which could result in residential development adjacent to Poppy Ridge Road, and the South Pointe project, which could result in residential development adjacent to Kammerer Road. The Lent Ranch Marketplace project would result in noise level increases of more than 3.0 dB(A) along those segments, and the resulting noise levels would be above the Residential land use compatibility criteria of 60 dB(A)  $L_{dn}$ . The environmental review documents for those projects will need to consider future cumulative noise levels (including noise from the proposed Lent Ranch Marketplace project), and future residences within those project sites will be required to incorporate acoustical considerations into their siting and design. Therefore, the project-related impacts to those potential future residences would be less than significant.

**Impact 4.4-5 Exterior noise levels along West Stockton Boulevard within the project site would be approximately 70.5 dB(A), except in and around the multi-family land uses where levels would be approximately 74.1 due to the combined noise levels of SR-99 and West Stockton Boulevard. This level is above the City's Acceptable level and would result in a significant impact.**

As shown in **Table 4.4-7**, future noise levels 50 feet from the centerline of West Stockton Boulevard would range from 67.0 dB (A) to 70.5 dB(A), between Kammerer Road and Poppy Ridge Road. These noise levels would be less than currently exist along West Stockton Boulevard since the roadway would be realigned further from SR-99 than it is now and would be further away from the high noise levels generated by traffic on SR-99. Exterior noise levels along West Stockton Boulevard within the project site would be approximately 70.5 dB(A), except in and around the multi-family land uses where levels would be approximately 74.1 due to the combined noise levels of SR-99 and West Stockton Boulevard. Onsite noise levels would be considered "Conditionally Acceptable" with the implementation of mitigation measures. Depending on the types of uses constructed and distance from the roadway,

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<sup>9</sup> Sacramento County Department of Environmental Review and Assessment, *Final Environmental Impact Report East Franklin Specific Plan and Associated Rezones and Subdivision Maps Known as Jungkeit Dairy, Laguna Creek South, Franklin Meadows, and JAS Development*, February 2000.

proposed uses along West Stockton Boulevard (and uses along SR-99) could be exposed to exterior noise levels that exceed City standards for commercial and multi-family land uses. Typical construction techniques generally achieve an exterior noise level reduction of at least 25 dB(A). As such, on-site uses would be exposed to interior noise levels of 40 to 50 dB(A). Depending on the types of uses constructed and the distance from the roadway, these interior noise levels could exceed City interior thresholds as presented in **Table 4.4-4**. Therefore, potential exposure of on-site uses to high noise levels would be a significant impact of the project.

### **Regional Mall, Commercial, Office and Entertainment Uses**

#### *Parking Lot*

**Impact 4.4-6** During nighttime periods,  $L_{eq}$  parking lot noise levels could exceed the City Noise Level Performance  $L_{max}$  Standard of 65 dB(A). This would result in a significant impact.

Development of the proposed project would introduce a substantial number of parking spaces to the project site. In general, traffic associated with parking lots is not of sufficient volumes to exceed community standards based on the time-weighted  $L_{dn}$  scale. Parking areas can be a source of annoyance problems due to automobile engine start-ups and acceleration, tire squeal noise depending on the parking surface, and the activation of car alarms.

Based on the proposed district organization presented in **Section 3.0, Project Description**, the project could include the development of parking spaces within approximately 150 feet of the residential uses (District F) along West Stockton Boulevard. On-site residential land uses would be the closest sensitive receptors within the project area and would thus represent the worst-case impact associated with parking lot noise from the project. Parking lot areas can generate  $L_{eq}$  noise levels of approximately 55 dB(A), with peak  $L_{eq}$  noise levels of approximately 83 dB(A) at 50 feet.<sup>10</sup> The parking lot peak noise levels are usually associated with car alarms. Parking lot areas within the area of the onsite residential land uses would be located approximately 150 feet from these uses within the area of the office and entertainment district. Noise levels in the area of the residential uses along West Stockton Boulevard from parking lot noise is expected to be approximately 46 dB(A)  $L_{eq}$  with a peak noise level of approximately 74 dB(A)  $L_{eq}$ . This estimate does not take into account that parking areas that are constructed could provide additional

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<sup>10</sup> City of San Buenaventura, *Final Environmental Impact Report for the Buenaventura Mall Renovation/Expansion project*, December 1993.

attenuation if they are lower than the surrounding street grades or shielded by onsite structures. Due to the existing high traffic noise levels along SR-99 and West Stockton Boulevard (i.e., 73.0 dB(A)  $L_{dn}$ ), normal daytime parking lot  $L_{eq}$  noise would not be audible due to the masking of noise by traffic on nearby roadways. During nighttime periods,  $L_{eq}$  noise levels would be more noticeable and could exceed the City Noise Level Performance  $L_{max}$  Standard of 65 dB(A). Therefore, impacts due to parking lot noise during nighttime period are considered to be significant.

**Impact 4.4-7 The maximum sound levels (i.e., peaks) generated by the sweepers in parking lot areas could exceed the City's Noise Level Performance Standards for Residential Areas. This would result in a significant impact.**

Other noise sources that may be associated with the parking lot area include the use of sweepers in the early morning or late evening hours to clean the facilities. Noise levels generated by sweepers are generally higher than parking lot noise associated with automobile activities. Vacuum sweepers can generate noise levels of between 74 to 77 dB(A)  $L_{eq}$  at 50 feet. The noise from sweepers would not cause an increase in long-term average noise of more than 3 dB(A), and would not be significant from that perspective. However, the maximum sound levels (i.e., peaks) generated by the sweepers could exceed the Noise Level Performance Standards for Residential Areas. Depending on the timing of operations, and locations of the parking lots relative to existing or future residences, this noise source could be an annoyance problem during quieter morning and evening periods. Without mitigation, this impact would be significant.

#### *Loading Docks*

**Impact 4.4-8 The maximum sound levels (i.e., peaks) generated by loading and unloading of trucks could exceed the City's Noise Level Performance Standards for Residential Areas**

External truck loading and unloading docks associated with the project are potential stationary noise sources. These sources would primarily be associated with the regional mall and commercial uses. The specific location of the loading docks has not been determined; per the Zoning Code, loading docks would be located at least 75 feet from the boundaries of residential properties. The operations at loading docks typically result in noise levels of 64 to 66 dB(A) at 75 feet. The noise from loading docks would not cause an increase in long-term average noise of more than 3 dB(A), and would not be significant from that perspective. In addition, loading docks that are located away from residential uses would not create significant impacts because no sensitive receptors would be present. Loading docks in areas near residential uses would be shielded from those uses by the masonry walls that are required between

commercial and residential uses. However, the maximum sound levels (i.e., peaks) generated by loading and unloading of trucks could exceed the Noise Level Performance Standards for Residential Areas. Depending on the timing of operations, and locations of loading docks relative to existing or future residences, peak noise levels could generate short-term adverse impacts during the early morning or late night hours. Without mitigation, this impact would be significant if loading docks are near residential uses.

#### *Electrical and Mechanical Equipment*

**Impact 4.4-9** Given the location of onsite structures and proximity to residential use the possibility exists that during nighttime periods electrical and mechanical equipment sources could exceed the City' Noise Level Performance standards. This would result in a significant impact.

New regional mall and commercial uses proposed on the project site could introduce various stationary noise sources, including electrical and mechanical air conditioning, most of which would be located on rooftops. Areas potentially affected by the introduction of such equipment include on-site residential uses on the northern portion of the project site. Typically, equipment noise sources produce noise levels of approximately 56 dB(A) at 50 feet.<sup>11</sup>

Although these noise levels may be annoying within a quiet environment, it is very likely that existing daytime ambient levels within the project and surrounding areas would substantially mask these on-site sources. In addition, the Zoning Code requires (among other restrictions) that such equipment not produce noise levels exceeding 60 dB(A) near the property line of nearby residential uses. Nevertheless, given the location of onsite structures and proximity to residential use the possibility exists that during nighttime periods these sources could exceed the City' Noise Level Performance standards. As such, impacts are considered to be potentially significant.

#### **Multi-Family Residential Uses**

Future residents located to the west of the project site, as well as on site, may experience noise due to an increase in human activity within the area. Potential residential-type noise sources include people talking, doors slamming, lawn care equipment operation, stereos, domestic animals and other noises

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<sup>11</sup> City of Thousand Oaks, *Final EIR for Specific Plan 16 (Amgen Center) and General Plan Amendment C93-23*, January 1994.

associated with human activity. These noise sources are not unique and generally contribute to the ambient noise levels experienced in all residential areas. Noise levels for medium density, quiet suburban residential areas average between 48 to 52 dB(A) CNEL.<sup>12</sup> Overall, the noise generated by the project's residential land uses would not exceed City's compatibility thresholds and is considered to be less than significant.

### **Combined Onsite Noise Levels**

The combination of noise associated with project-related sources, such as vehicular traffic, loading docks, parking areas, mechanical and electrical equipment, and residential-type noise, would increase the ambient noise condition over existing conditions. These noise sources would be distributed at various locations on the site and would interact with each other in any number of various combinations to increase ambient conditions. Some of the onsite noise sources, such as parking lots, loading docks and mechanical equipment, were considered to result in significant noise impacts. Other noise sources and residential type noise sources were considered to result in less than significant impacts. Mitigation measures have been proposed for all onsite noise sources that are considered to result individually in significant impacts. These mitigation measures would reduce potential impacts associated with these noise sources to a less than significant level. As a result, when these noise sources are combined with other noise sources, the resulting noise level would be less than significant.

## **PROJECT MITIGATION MEASURES**

### **Construction Noise Impacts**

The project developer shall implement all of the following measures to reduce potential construction noise impacts.

#### **MM4.4-1(a)**

**MM4.4-2(a)** Site preparation and construction activities shall be limited to between the hours of 6 A.M. to 8 P.M., Monday through Friday, and 7:00 A.M. to 8:00 P.M. on Saturday and Sunday (City of Elk Grove Noise Control Ordinance, Section #6.68.090). Furthermore, construction equipment maintenance shall be limited to the same hours.

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<sup>12</sup> U.S. Environmental Protection Agency, *Information on Levels of Environmental Noise Requisite to protect Public Health and Welfare with an Adequate Margin of Safety*, March 1974.

*Timing/Implementation: During all construction phases of the project.*

*Enforcement/Monitoring: City of Elk Grove Planning Department.*

**MM4.4-1(b)**

**MM4.4-2(b)** All construction equipment shall be equipped with appropriate mufflers in good working condition.

*Timing/Implementation: During all construction phases of the project.*

*Enforcement/Monitoring: City of Elk Grove Planning Department.*

**MM4.4-1(c)**

**MM4.4-2(c)** Construction staging areas shall be located as far from noise-sensitive uses as is feasible.

*Timing/Implementation: During all construction phases of the project.*

*Enforcement/Monitoring: City of Elk Grove Planning Department.*

**MM4.4-1(d)**

**MM4.4-2(d)** Stationary construction equipment shall be located as far from noise sensitive uses as feasible, and temporary or portable acoustic barriers shall be installed around the equipment/work area when within 100 feet or less of residential properties or other sensitive uses.

*Timing/Implementation: During all construction phases of the project.*

*Enforcement/Monitoring: City of Elk Grove Planning Department.*

**MM4.4-1(e)**

**MM4.4-2(e)** Construction hours, allowable workdays, and the phone number of the job superintendent shall be clearly posted on a sign no larger than 4 foot by 8 foot at all construction entrances to allow for surrounding and on-site property owners to contact the job superintendent. If the City or the job superintendent receives a complaint, the superintendent shall investigate, take appropriate corrective action, and report the action taken to the reporting party.

*Timing/Implementation: During all construction phases of the project.*

*Enforcement/Monitoring: City of Elk Grove Planning Department.*

**MM4.4-1(f)**

**MM4.4-2(f)** If construction noise results in noise levels that exceed the 65 dB(A)  $L_{dn}$  /CNEL to onsite or adjacent residential land uses, the project applicant shall relocate the occupants on a temporary basis.

*Timing/Implementation: During all construction phases of the project.*

*Enforcement/Monitoring: City of Elk Grove Planning Department.*

**MM4.4-3(a)**

If construction vibration results in peak ground velocities of more than 0.1 inches/second to onsite or adjacent residential land uses, the project applicant shall relocate the occupants on a temporary basis.

*Timing/Implementation: During all pile driving activities.*

*Enforcement/Monitoring: City of Elk Grove Planning Department.*

**MM4.4-3(b)**

Prior to the commencement of pile driver operation in proximity to residential areas, an assessment of vibrations induced by pile driving at the site shall be evaluated. During indicator pile driving, vibrations should be measured at regular intervals to determine the levels of vibration at various distances from pile driving equipment. The indicator piles shall be driven at location at least 400 feet from any existing residents. After monitoring, methods of reducing the peak ground velocities to less than 0.4 inches/second shall be determined and implemented during production pile driving. Methods to reduce vibrations, if needed, could include cut-off trenches, and the use of smaller hammers. The vibration reduction techniques to be used should be described in a note attached to the construction plans for the project to be reviewed and approved by the appropriate City regulatory agency prior to issuance of building permits.

*Timing/Implementation: Prior to any pile driving activities,*

*Enforcement/Monitoring: City of Elk Grove Planning Department.*

## **Operational Noise Impacts**

### *Offsite Traffic Noise*

The following mitigation measures are proposed to reduce project-specific impacts to residential (zoned AR-1) land uses along Poppy Ridge Road near West Stockton Boulevard, and Bilby Road. However, even

with the implementation of both these mitigation measures, potential noise impacts along these roadways would remain significant.

- MM4.4-4(a)** Where feasible and consistent with City standards, speed limits on Poppy Ridge near West Stockton Boulevard or other arterials experiencing significant noise impacts shall be reduced. Each 5-mile per hour reduction in speed limits will decrease the CNEL level by approximately 1 dB(A).

*Timing/Implementation: Prior to completion of initial development.*

*Enforcement/Monitoring: City of Elk Grove Planning and Transportation Departments.*

- MM4.4-4(b)** Where feasible and consistent with City standards, medium and heavy duty truck traffic on Poppy Ridge near West Stockton Boulevard or other arterials experiencing significant noise impacts shall be restricted. Limiting medium and heavy duty truck traffic will decrease the CNEL level by approximately 3 dB(A).

*Timing/Implementation: Prior to completion of initial development.*

*Enforcement/Monitoring: City of Elk Grove Planning and Transportation Departments.*

### ***Onsite Traffic Noise***

The following measures are identified to reduce future traffic-related noise levels at proposed residential and other sensitive uses near the relocated West Stockton Boulevard.

- MM4.4-5** The project developer shall implement noise attenuation measures, as necessary to reduce exterior and interior noise levels below the thresholds shown in the *General Plan* Noise Element. Based on the Land Use Compatibility Guidelines in the Noise Element (as well as Policy NO-1), the exterior thresholds are 60 dB(A) Ldn/CNEL for residential uses and 65 dB(A) for commercial uses. Based on Policy NO-7, the interior threshold is 45 dB(A) Ldn/CNEL for residential uses. Based on Table II-3 of the Noise Element, the acceptable interior noise levels in conference rooms and small offices are 40 to 45 dB(A), in large offices, banks and stores, 45 to 50 dB(A), and in restaurants, 45 to 55 dB(A). The measures required shall be identified during the planning and design of individual projects within the project site, on the basis of a detailed acoustical analysis. The analysis shall consider traffic generated by the proposed project and anticipated cumulative development, based on the Sacramento County Traffic Model.

*Implementation/Monitoring: Prior to issuance of building permit for each project development component.*

*Enforcement/Monitoring: City of Elk Grove Planning Department to review and approve noise attenuation features, City of Elk Grove Building Official or designee shall spot check to ensure compliance.*

- MM4.4-6** A noise barrier of sufficient size to break the line of sight between exterior usable areas within the multi-family residential uses and traffic noise sources along SR99/West Stockton Boulevard and parking lot noise shall be developed along the District F boundary. The noise wall will designed in accordance design guidelines, as adopted by the City Council.

*Implementation/Monitoring: Prior to occupancy of the District F.*

*Enforcement/Monitoring: City of Elk Grove Planning Department.*

### ***Loading Docks and Sweepers***

- MM4.4-7** Loading docks constructed on the project site shall be designed to have either a depressed (i.e., below grade) loading dock area; an internal bay; or wall to break the line of sight between residential land uses and loading operations. Acoustical analysis shall be performed to demonstrate that the loading docks do not result in noise levels that exceed City standards at nearby residential property lines. These components shall be incorporated into the plans to be submitted by the applicant to the City of Elk Grove for review and approval prior to the issuance of building permits.

*Implementation/Monitoring: Prior to issuance of building permits.*

*Enforcement/Monitoring: City of Elk Grove Planning.*

- MM4.4-8** Where sweepers are operated within 75 feet of residential uses, sweeper operations shall be restricted to the hours of 7:00 A.M. to 10:00 P.M.

*Implementation/Monitoring: Throughout life of project.*

*Enforcement/Monitoring: City of Elk Grove Planning Department.*

### *Electrical and Mechanical Equipment*

**MM4.4-9** The applicant shall minimize noise impacts from electrical and mechanical equipment, such as ventilation and air conditioning units, by locating equipment away from receptor areas, proper selection and sizing of equipment, installation of equipment with proper acoustical shielding and incorporating the use of parapets into building design.

*Implementation/Monitoring: Prior to issuance of building permits.*

*Enforcement/Monitoring: City of Elk Grove Planning.*

### **CONSISTENCY WITH GENERAL PLAN POLICIES**

**Table 4.4-8** identifies the General Plan Noise Element policies that are directly applicable to the proposed project, and presents an evaluation of the consistency of the project with these statements. The final authority for interpretation of these policy statements, and determination of the project's consistency rests with the City Council.

**Table 4.4-8  
General Plan Noise Element Policy Consistency**

General Plan Policies	Consistency with General Plan	Analysis
<p><b>Policy NO-1:</b> Noise created by new transportation noise sources should be mitigated so as not to exceed 60 dB Ldn/CNEL at the outdoor activity areas of any affected residential lands or land use situated in the unincorporated areas. When a practical application of the best available noise-reduction technology cannot achieve the 60dB Ldn CNEL standard, then an exterior noise level of 65dB Ldn CNEL may be allowed in outdoor activity areas.</p>	Yes	<p>Because noise modeling studies indicate that the future multiple-family residential uses might be subject to substantial noise from traffic along West Stockton Boulevard of approximately 70dB Ldn, an acoustical analysis will be performed to determine what precise steps need to be taken to reduce exterior noise levels to the 60 – 65 Ldn/CNEL level. These levels will be achieved through the acoustical analysis required as project mitigation.</p>

General Plan Policies	Consistency with General Plan	Analysis
<p><b>Policy NO-2:</b> Noise created by new non-transportation noise sources shall be mitigated so as not to exceed any of the noise level standards of Table II-1, as measured immediately within the property line of any affected residentially designated lands or residential land use situated in the unincorporated areas.</p>	Yes	Because analysis indicates that sweeper operations, loading docks and electrical and mechanical equipment could exceed the noise level standards of Table II, project mitigation requires that sweeper operations hours be restricted, and that an acoustical analysis be performed to demonstrate that the loading docks do not exceed City noise standards at nearby residential property lines. The impact of mechanical and electrical equipment noise on residential development will be minimized by locating equipment away from receptor areas, proper selection and sizing of equipment and proper acoustical shielding. In addition, the project includes a sound attenuation wall along the boundary of the residential uses that will substantially reduce parking lot noise.
<p><b>Policy NO-3:</b> Where proposed non-transportation noise sources are likely to produce noise levels exceeding the performance standards of Table II-1 at existing or planned residential uses, an acoustical analysis shall be required as part of the environmental review process so that noise mitigation may be included in the project design. (Requirements for the content of an acoustical analysis are given by Table II-2.)</p>	Yes	See analysis of Policy NO-2, above.
<p><b>Policy NO-4:</b> Where residential land uses are proposed in areas exposed to existing or projected exterior noise levels exceeding either 60 dB Ldn/CNEL or the performance standards of Table II-1, an acoustical analysis shall be required as part of the environmental review process so that noise mitigation may be included in the project design.</p>	Yes	In accordance with MM4.4-5, a noise barrier of sufficient size to break the line of sight between exterior usable areas within the multi-family residential uses and traffic noise sources along SR99/West Stockton Boulevard shall be developed along the District F boundary. In addition, the project will include noise attenuation measures, as necessary, to reduce exterior residential noise levels below the performance standards of Table II-1. See analysis of Policies NO-1 and NO-2, above.
<p><b>Policy NO-5:</b> New residential development shall not be allowed where the noise level due to non-transportation noise sources will exceed the noise level standards of Table II-1 (page 6), as measured immediately within the property line of the new development.</p>	Yes	See analysis of Policy NO-2, above.

General Plan Policies	Consistency with General Plan	Analysis
<p><b>Policy NO-6:</b> The compatibility of proposed nonresidential projects with existing and future noise levels due to transportation sources shall be evaluated through a comparison to Figure II-1, "Land Use Compatibility for Community Noise Environments" and Table II-3, "Acceptable Noise Levels in Unoccupied Rooms," and to Figure II-4 for projects affected by aircraft noise.</p>	<p>Yes</p>	<p>Table II-3 indicates that an acceptable noise level from transportation noise for commercial uses is 45-50 dBA. Noise modeling results indicate that development along West Stockton Boulevard and Kammerer Road will be subject to noise levels of up to 70 dB Ldn and development along State Route 99 will be subject to noise levels of up to 75 dB Ldn. However, the majority of commercial uses adjacent to State Route 99 will be contained in an indoor mall so that exposure to exterior noise levels will be minimized. Implementation of MM4.4-5 and standard commercial construction techniques for new concrete buildings provide a noise level reduction of 25 dBA – 30 dBA depending on the amount of glass used. As a result, interior noise levels in the proposed commercial buildings should not exceed 50 dB Leq.</p>
<p><b>Policy NO-7:</b> Proposed development of residential land uses should not be permitted: 1) In areas exposed to existing or projected levels of noise from transportation noise sources which exceed 60dB to 65 dB Ldn/CNEL unless the project design includes effective mitigation measures to reduce noise to 60 dB to 65 dB Ldn/CNEL or less in outdoor activity areas, and 45 dB Ldn/CNEL or less in indoor areas; and 2) For 5 and 10 acre Agricultural-Residential land use the standard for exterior noise is also 60 dB to 65 dB Ldn/CNEL. The standard remains at 45 dB Ldn/CNEL for interior noise levels.</p>	<p>Yes</p>	<p>See analysis of Policies NO-1 and NO-4.</p>

**CUMULATIVE IMPACTS**

**Impact 4.4-10 Development of project in combination with cumulative projects would result in increases in ambient noise conditions due combined construction activities. This would result in a significant cumulative impact.**

Construction activities associated with the Grant Line Road interchange project, the development of the South Pointe project, East Franklin and Laguna Ridge Specific Plans, the Laguna Ridge Conceptual Study, and Lent Ranch project could all or partially occur during the same period. Therefore, these is the potential for combined construction noise or vibration impacts to occur if activities were occurring simultaneous. While all these projects would implement standard construction techniques to reduce noise and would to the extent feasible adhere to City noise ordinance pertaining to the period when

construction activities would occur, the combined noise effect would be cumulatively significant. Vibration impacts, however, with the implementation of mitigation measures may be reduced to a less than significant level.

**Impact 4.4-11 The project's contribution to cumulative ambient noise level increases along Poppy Ridge Road would be approximately 3 dB(A) and along Bilby Road approximately 6.5 dB(A). This would result in a significant cumulative impact.**

Cumulative noise impacts would occur as a result of increased traffic on local streets attributable to the project together with the buildout of other developments in the region. Therefore, the cumulative noise impact analysis is based on a comparison between the existing roadway noise levels identified in **Table 4.4-5** and the future noise levels identified in **Table 4.4-9, Cumulative Roadway Noise Levels**.

Section 15130(a)(4) of the CEQA *Guidelines* states that an EIR may determine that a project's contribution to a significant cumulative impact is de minimus and is thus not significant. A de minimus contribution means that the environmental conditions would essentially be the same whether or not the proposed project is implemented. As shown in **Table 4.4-9**, the buildout of the project and the uses allowed by the *General Plan*, including all known *General Plan* Amendments as well as regional growth, would result in noise level increases between 0.7 dB(A)  $L_{dn}$  along Elk Grove Boulevard to maximum noise level increases of 23.4 dB(A)  $L_{dn}$  along Poppy Ridge Road. Along 4 of the 20 roadway segments studied, the cumulative impact would not be significant because the cumulative increase would be less than 3.0 dB(A) and is de minimus within the meaning of CEQA Guidelines Section 15130. Along three of the segments studied, the cumulative impact would not be significant because there would be a cumulative increase of at least 3.0 dB(A), but the resulting noise level would not be above the Noise Compatibility threshold. Along eight of the segments studied, there would be a cumulative increase of at least 3.0 dB(A) and the resulting noise level would be above the Noise Compatibility threshold. However, the project contribution to the cumulative increase would be less than 1.0 dB(A) and would therefore be negligible or de minimus within the meaning of Guideline 15130. For those segments, the cumulative impact would also be less than significant.

**Table 4.4-9  
Cumulative Roadway Noise Levels**

Roadway	Existing Land Use	Existing L <sub>dn</sub>	Cumulative L <sub>dn</sub> w/ project	Total Increase in L <sub>dn</sub>	project Increase in L <sub>dn</sub>	Significant Cumulative Impact
<b>State Route 99</b>						
Elk Grove Blvd. to Grant Line	Commercial, Agriculture	74.5	75.2	+0.7	+0.2	No
<b>Elk Grove Blvd.</b>						
I-5 to Franklin Blvd.	Residential, Agriculture	67.3	73.9	+6.6	+0.5	No
Franklin Blvd. to Bruceville Rd.	Residential, Agriculture	68.7	73.0	+4.3	+0.1	No
Bruceville Rd. to W. Stockton Blvd.	Residential, Agriculture, Commercial	69.9	74.5	+4.6	+0.0	No
E. Stockton Blvd. to Elk Grove-Florin	Residential, Commercial	71.8	72.6	+0.8	+0.1	No
<b>Poppy Ridge Rd.</b>						
Bruceville Rd. to W. Stockton Blvd.	Residential, Agriculture	47.5	70.9	+23.4	+2.8	Yes
<b>Hood Franklin Rd.</b>						
I-5 to Franklin Blvd.	Agriculture, Agriculture/Residential	59.3	69.0	+9.7	+0.3	No
<b>Bilby Rd.</b>						
Franklin Blvd. to Bruceville Rd.	Residential, Agriculture	55.2	67.8	+12.6	+6.5	Yes
<b>Kammerer Rd.</b>						
Bruceville Rd. to W. Stockton Blvd.	Agriculture	56.2	68.1	+11.9	+0.8	No
<b>Grant Line Rd.</b>						
Waterman Rd. to Bradshaw Rd.	Agriculture, Industrial	65.7	72.5	+6.8	+0.5	No
<b>Franklin Blvd.</b>						
Bilby Rd. to Elk Grove Blvd.	Residential, Agriculture	60.6	71.0	+10.4	-0.3	No
<b>Bruceville Rd.</b>						
Kammerer Rd. to Bilby Rd.	Agriculture	58.7	67.6	+8.9	+1.4	No
Bilby Rd. to Poppy Ridge Rd.	Agriculture	59.3	64.4	+5.1	+0.7	No
Poppy Ridge Rd. to Elk Grove Blvd.	Agriculture	59.5	71.9	+12.4	+0.3	No
Elk Grove Blvd. to Laguna Blvd.	Residential, Agriculture/Residential	65.0	72.6	+7.6	+0.6	No
<b>West Stockton Blvd.</b>						
Kammerer Rd. to project Access	Agriculture	73.0 <sup>1</sup>	72.3	N/A	-0.7	No
project Access to Poppy Ridge Rd.	Agriculture	73.0 <sup>1</sup>	72.3	N/A	-0.71	No
Poppy Ridge Rd. to Elk Grove Blvd.	Agriculture, Commercial	73.0 <sup>1</sup>	72.3	N/A	-0.7	No
<b>Elk Grove – Florin Rd.</b>						
E. Stockton Blvd. to Elk Grove Blvd.	Residential, School, Park, Commercial	63.5	64.2	+0.7	+0.1	No
<b>Waterman Rd.</b>						
Grant Line Rd. to Elk Grove Blvd.	Residential	64.0	70.3	+6.3	+0.5	No

*Source: Impact Sciences, Inc. Calculations provided in Appendix 4.4. Noise levels were determined assuming the land use was approximately 50 foot from the roadway centerline, except along SR-99 where land use were assumed to be 100 feet from the centerline. No attenuation due to existing noise walls or other sound reduction techniques was assumed.*

<sup>(1)</sup> Noise levels from Bollard & Brennan, Inc, May 12, 1999; Noise level assumes combined noise from SR-99 and West Stockton Blvd.

Along the remaining two segments studied, there would be a cumulative increase of approximately 3.0 dB(A) or greater. The resulting noise level would be above the Noise Compatibility threshold, and the project would make more than a negligible contribution. These locations include segments along Poppy Ridge Road and Bilby Road where there are existing residential uses. The extent to which these cumulative noise level increases would result in significant noise impacts at the existing uses depends on the proximity of the uses to the roadways, and the exposure of residential outdoor activity areas. Some of the residential uses along these roadways may be protected by future noise walls and some uses are on larger lots with substantial setbacks from the roadways that would alleviate cumulative noise conditions. Nonetheless, the project's contribution to cumulative ambient noise level increases along these roadway segments is considered to be significant.

It should be noted that areas along the road segments that would experience substantial cumulative noise impacts have been approved or are proposed for future single-family residential uses under Specific Plans. As such, the acceptable noise compatibility threshold in the future would be changed to residential, which has an acceptable compatibility threshold of 60 dB(A). However, all future projects within these areas would be responsible for conducting a noise analysis and providing appropriate noise attenuation measures to reduce noise level to acceptable levels.

Noise levels along West Stockton Boulevard within the project site would be similar to those under project conditions. Similar to project conditions, the cumulative traffic, which is almost entirely project-related traffic due to the realignment of West Stockton Boulevard through the project site, could expose proposed on-site uses to exterior noise levels that exceed City thresholds. Without project-specific noise attenuation features incorporated into the design of on-site uses, this impact would be significant.

All project-specific noise impacts associated with a parking lot noise, electrical and mechanical equipment, and on-site residential land uses would be mitigated to a less than significant level. As such, the project contribution to cumulative noise level and potential impact to future uses, such as in the South Pointe and Laguna Ridge Conceptual Study Area, are considered to be less than significant. In addition, these projects will be required to conduct environmental documentation and incorporate mitigation measures to reduce any cumulative noise conditions to the extent feasible.

## **CUMULATIVE MITIGATION MEASURES**

project specific mitigation measures 4.4-1(a) through 4.4-1(f) would apply to cumulative noise impacts, but would not reduce impacts to a less than significant level. Implementation of vibration mitigation measures 4.4-3 (a) and 4.4-3(b) for cumulative projects would reduce impacts to a less than significant

level. Mitigation measures 4.4-4(a) and 4.4-4(b) would not be sufficient to reduce cumulative traffic noise levels to a less than significant level.

## **UNAVOIDABLE SIGNIFICANT IMPACTS**

Short-term construction and cumulative construction noise impacts would be significant and unavoidable. Long-term and cumulative traffic noise would be significant and unavoidable.