

4.4 NOISE

Development of the project would result in noise impacts related to construction activities, traffic increases, on-site activity, and cumulative development. Construction noise would affect sensitive receptors adjacent to the site and in the surrounding area. These construction impacts would be short-term and primarily related to grading and building activities at the property. This impact is considered significant but mitigable. The project would incrementally increase the amount of traffic on nearby roadway corridors, which would cause roadway noise levels throughout the project vicinity to increase, and would significantly affect sensitive receptors along two segments of Madonna Road. This impact would be considered significant and unavoidable. Cumulatively, the project would contribute to existing roadway noise levels already in exceedance of the City standard. This is considered a significant and unavoidable impact.

4.4.1 Setting

The City of San Luis Obispo General Plan Noise Element (1996) provides information regarding the physical characteristics of noise and the existing noise environment in the area. This Noise Element is herein incorporated in its entirety per State CEQA Guidelines Section 15150. The following is a summary of the information contained in the Noise Element and pertinent additional information and is intended to provide sufficient background to allow consideration of the potential noise impacts of the proposed development.

a. Overview of Sound Measurement. Noise level (or volume) is generally measured in decibels (dB) using the A-weighted sound pressure level (dBA). The A-weighting scale is an adjustment to the actual sound power levels to be consistent with that of human hearing response, which is most sensitive to frequencies around 4000 Hertz (about the highest note on a piano) and less sensitive to low frequencies (below 100 Hertz). In addition to the actual instantaneous measurement of sound levels, the duration of sound is important since sounds that occur over a long period of time are more likely to be an annoyance or cause direct physical damage or environmental stress. One of the most frequently used noise metrics that considers duration as well as sound power level is the equivalent noise level (Leq). The Leq is defined as the steady A-weighted level that is equivalent to the same amount of energy as that contained in the actual time-varying levels over a period of time. Typically Leq is summed over a one-hour period.

The sound pressure level is measured on a logarithmic scale with the 0 dB level based on the lowest detectable sound pressure level that people can perceive (an audible sound that is not zero sound pressure level). Decibels cannot be added arithmetically, but rather are added on a logarithmic basis. A doubling of sound energy is equivalent to an increase of 3 dB. Because of the nature of the human ear, a sound must be about 10 dB greater than the reference sound to be judged as twice as loud. In general, a 3 dB change in community noise levels is noticeable, while 1-2 dB changes are generally not perceived.

The actual time period in which noise occurs is also important since noise that occurs at night tends to be more disturbing than that which occurs during the daytime. The Day-Night Average Level (Ldn) recognizes this characteristic by weighting the hourly Leqs over a 24-hour period. The weighting involves the addition of 10 dB to nighttime noise levels to account for the greater amount of disturbance associated with noise at this time period.



b. Sensitive Receptors. Noise exposure goals for various types of land uses reflect the varying noise sensitivities associated with those uses. Residences, hospitals, schools, and libraries are most sensitive to noise intrusion and therefore have more stringent noise exposure targets than manufacturing or agricultural uses that are not subject to impacts such as sleep disturbance.

Noise sensitive land uses near the Dalidio property include the residential areas to the southwest and west, as well as, Laguna Lake Park to the west of the site. The nearest residential areas are separated from the site by Prefumo Creek. Madonna Road separates Laguna Lake Park from the Dalidio Property. Noise sensitive land uses located adjacent to the proposed Prado Road Interchange improvements include a mobile home park located northeast of the proposed interchange site. No noise sensitive receptors are located in the area of the future LOVR connector from the site.


c. Regulatory Setting. The City identifies the State Office of Noise Control land use compatibility guidelines as the standards for development within the City. Figure 4.4-1 shows the ranges of noise exposure, for various land uses, which are considered acceptable, conditionally acceptable or unacceptable by the State Office of Noise Control guidelines. An acceptable noise environment is one in which development may be permitted without requiring specific noise studies or specific noise-reducing features. A conditionally acceptable noise environment is one in which development should be permitted only after noise mitigation has been designed as part of the project, to reduce noise exposure to acceptable levels. In unacceptable noise environments development in compliance with the guidelines is generally not possible. As outlined in the Noise Element, the City's acceptable interior and exterior transportation-related noise levels for noise-sensitive uses are 45 dBA Ldn and 60 dBA Ldn, respectively.


d. Existing Conditions. The primary sources of noise within the City of San Luis Obispo corporate boundary and Urban Reserve Line include vehicular traffic on roads and highways, train operation from the Union Pacific Railroad (UPRR), and airport activities at the San Luis Obispo Airport. A major noise source in the City is U.S. Highway 101. In addition, the project site is located about two miles northwest of the San Luis Obispo County Airport, in the direct flight path of one of the airport's runways. The UPRR rail line is located more than two miles from the site. Noise from the UPRR rail line does not affect the site.


Noise levels in the project vicinity were projected during the development of the City's Noise Element in 1996. The City mapped noise exposure contours based on the Ldn methodology and the Federal Highway Traffic Noise Prediction Model for existing major noise sources including freeways, primary arterial highways, and railroads. The contours established in the Noise Element were intended as a screening tool to identify those locations that will require a noise analysis. Continued growth within the City, and the region, since the development of the Noise Element in 1996 and the corresponding increase in traffic has altered the noise environment at the project site. In order to characterize the recent (year 2003) ambient noise environment, noise levels created by vehicular traffic traveling along the roadway segments




LAND USE CATEGORY	COMMUNITY NOISE EXPOSURE						
	Ldn or CNEL, dBA						
	55	60	65	70	75	80	85
RESIDENTIAL - LOW DENSITY SINGLE FAMILY, DUPLEX, MOBILE HOMES							
RESIDENTIAL - MULTI-FAMILY							
TRANSIENT LODGING - MOTELS, HOTELS							
SCHOOLS, LIBRARIES, CHURCHES, HOSPITALS, NURSING HOMES							
AUDITORIUMS, CONCERT HALLS, AMPHITHEATRES							
SPORTS ARENA, OUTDOOR SPECTATOR SPORTS							
PLAYGROUNDS, NEIGHBORHOOD PARKS							
GOLF COURSES, RIDING STABLES, WATER RECREATION, CEMETERIES							
OFFICE BUILDINGS, BUSINESS COMMERCIAL AND PROFESSIONAL							
INDUSTRIAL, MANUFACTURING, UTILITIES, AGRICULTURE							

 **NORMALLY ACCEPTABLE**
 Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

 **NORMALLY UNACCEPTABLE**
 New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

 **CONDITIONALLY ACCEPTABLE**
 New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

 **CLEARLY UNACCEPTABLE**
 New construction or development should generally not be undertaken.

Source: Guidelines for the Preparation and Content of Noise Elements of the General Plan, California Office of Planning and Research, 1998.

Noise Compatibility Matrix

Figure 4.4-1

which would be most affected by the project were calculated, using existing traffic volumes. The results are presented in Table 4.4-1. As shown in Table 4.4-1, noise levels along all study area roadways exceed the City’s 60 dBA Ldn noise exposure standard for residential uses.

Table 4.4-1 Existing Roadway Noise Levels in the Site Vicinity

Roadway	Ldn at nearest receptor	Distance to Nearest Receptor (ft)	Threshold (Ldn)	Existing Impact?
Madonna Road				
West of LOVR	60.2	60	60	Yes
LOVR to Oceanaire Dr	68.0	60	60	Yes
Oceanaire Dr to Dalidio Dr	68.5	80	60	Yes
Dalidio Dr to El Mercado	69.1	80	60	Yes
El Mercado to 101 SB ramp	69.7	80	60	Yes
101 SB ramp to 101 NB ramp	68.9	80	60	Yes
101 NB ramp to Higuera St.	69.1	60	60	Yes
Los Osos Valley Road				
101 NB ramp to Higuera St	68.0	50	60	Yes
Higuera Street				
Madonna Rd to LOVR	69.4	50	60	Yes
North of South St	67.5	50	60	Yes

Source: Traffic data from Fehr and Peers, November 2003

On August 8-9, 2000, project noise consultants Bollard & Brennan, Inc. conducted short-term traffic noise level measurements adjacent to the proposed Prado Road interchange site. Continuous hourly noise level measurements were also conducted adjacent to U.S. Highway 101 and Prado Road at one location. These noise measurements indicated that existing noise levels at approximately 180 feet from the U.S. Highway 101 centerline are about 72 dB Leq, and that noise levels at approximately 100 feet from the Prado Road centerline are about 61 dB Leq. Noise modeling of existing conditions conducted by Bollard & Brennan, Inc. indicated that U.S. Highway 101 noise levels currently exceed the Caltrans exterior noise level criterion of 67 dB Leq for residential and hotel/motel land uses at the Embassy Suites Hotel, but an no other locations. Existing noise levels at the mobile home park northeast of the U.S. Highway 101/Prado Road Interchange site are an acceptable 63 dB Leq. Under future conditions (year 2020 without the project), noise levels at the mobile home park would be about 65 dB Leq.

4.4.2 Impact Analysis

a. Methodology and Significance Thresholds. Existing and future traffic noise levels were quantified using the Federal Highway Administration Highway Noise Prediction Model (FHWA), standard noise modeling equations, and current and forecasted traffic volumes. Construction noise was estimated based on methodologies contained in the Handbook of Noise Control (C.M. Harris, 1979) and adapted to a spreadsheet program.

Pursuant to the State CEQA Guidelines, a project would result in a significant noise impact if it would result in:

- 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 ground-borne vibration or ground-borne 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 threshold of significance for operational noise impacts is based on the Noise Compatibility Criteria adopted by the City from the State Office of Noise Control and the recommendations of the Federal Interagency Committee on Noise (FICON). The FICON recommendations were developed as a result of studies that relate aircraft noise levels to the percentage of people highly annoyed by various noise levels. Although these recommendations were developed specifically for aircraft noise impacts, they are considered applicable to all noise sources that use noise exposure metrics such as the Ldn and Community Noise Equivalent Level (CNEL). The level of significance changes with increasing noise exposure, such that smaller changes in ambient noise levels result in significant impacts at higher existing noise levels, as illustrated in Table 4.4-2.

Table 4.4-2 Significance of Changes in Cumulative Noise Exposure

Ambient Noise Level Without Project (Ldn or CNEL)	Significant Impact
< 60 dB	+ 5.0 dB or more
60 – 65 dB	+ 3.0 dB or more
> 65 dB	+ 1.5 dB or more

Project impacts are considered significant when project-related activities result in exposure of sensitive receptors to unacceptable noise levels as defined in the Noise Compatibility Criteria. Where the existing noise levels currently exceed Noise Compatibility Criteria, the recommendations in Table 4.4-2 will be used to determine the significance of project related noise level increases.

For the purposes of evaluating noise impacts related to the Prado Road interchange and other improvements within Caltrans right-of-way, the Caltrans/FHWA exterior noise level significance criterion of 67 dB Leq for residential and hotel/motel land uses is used.

b. Project Impacts and Mitigation Measures

- Impact N-1** **Project construction would temporarily generate high noise levels on-site. Because noise could exceed thresholds in the City General Plan Noise Element, impacts are considered Class II, significant but mitigable.**

The nearest sensitive receptors to the project site are the residences located southwest of the Dalidio property. These residences range from about 100 to 500 feet from where construction activities would take place on the Dalidio property, depending on the phase of the project. The grading phase of project construction tends to create the highest construction noise levels because of the operation of heavy equipment. Noise levels associated with heavy equipment typically range between 75 to 95 dBA at 50 feet from the source (EPA, 1971). Continuous operation of this equipment during a nine-hour workday can cause high noise levels above the ambient levels present at the site.



To estimate the average construction noise impact on the nearby homes, it was assumed that about five pieces of heavy equipment would be operating at various locations throughout the Dalidio property and at various distances from the homes. The intersection of the north-south and east-west centerlines of the commercial and office/business park areas was used to find an average distance. This distance is approximately 200 feet. It was also assumed that three pieces of heavy equipment would operate eight hours of a nine hour workday (8 AM – 5 PM) and two pieces (water truck, dump truck) would work about three hours each. Operation of this equipment would result in an increase in noise at the homes located west of Prefumo Creek. The noise level generated by the equipment is estimated to be about 80.1 dBA at 50 feet from the source. Assuming a 6 dB reduction for every doubling of the distance from the equipment, at 400 feet the noise level is estimated to be about 66 dBA Ldn. This average sound level would exceed the City's noise standards for residential use, and could cause periodic annoyance to nearby receptors, particularly if noise events occur at night. Because the estimated noise level exceeds the City's residential threshold for noise exposure, construction noise impacts are considered significant.

Construction of the Prado Road interchange on the east side of the freeway would also result in a temporary increase in noise levels. The closest sensitive receptors in the vicinity are the residences located more than 800 feet east of the interchange area on Prado Road and the mobile home park located northeast of the proposed interchange site. However, access to the construction area on the east side of U.S. Highway 101 is limited and may result in the an increase in construction-associated traffic traveling along Prado Road and Higuera Street, which would affect existing residences along these corridors. This temporary increase in noise levels along these roadways is considered significant.

Mitigation Measures. The following measures are recommended to reduce construction noise impacts on nearby residences:

- N-1(a)** Stationary construction equipment that generates noise that exceeds 65 dBA at the project boundaries shall be shielded with a barrier that meets a sound transmission class (STC) rating of 25.
- N-1(b)** All diesel equipment shall be operated with closed engine doors and shall be equipped with factory-recommended mufflers.
- N-1(c)** Whenever feasible, electrical power shall be used to run air compressors and similar power tools.
- N-1(d)** Construction activity for site preparation and for future development shall be limited to the hours between 7:00 AM and 7:00 PM, Monday through Friday and Saturday 8:00 AM to 6:00 PM. No construction shall occur on Sundays or State holidays (i.e. Thanksgiving, Labor Day). Construction equipment maintenance shall be limited to the same hours.
- N-1(e)** For all construction activity on the project site, additional noise attenuation techniques shall be employed as needed to ensure that noise remains within levels allowed by the City of San Luis Obispo noise standards. Such techniques may include, but are not limited to, the use of



sound blankets on noise generating equipment and the construction of temporary sound barriers between construction sites and affected uses.

N-1(f) The movement of construction-related vehicles, with the exception of passenger vehicles, along roadways adjacent to sensitive receptors shall be limited to the hours between 7:00 AM and 7:00 PM, Monday through Friday and Saturday 8:00 AM to 6:00 PM. No movement of heavy equipment shall occur on Sundays or State holidays (i.e. Thanksgiving, Labor Day). This measure does not apply to roadways where sound walls are currently in place.

Significance After Mitigation. With implementation of recommended mitigation measures, construction noise impacts would be less than significant.

Impact N-2 **Project-generated traffic would incrementally increase noise levels along roads in the project vicinity. The effect of this noise on off-site sensitive receptors in the area is considered a Class I, significant and unavoidable, impact.**

Implementation of the proposed project, in combination with other development in the site vicinity, would substantially increase human activity and related noise in the project site vicinity. Table 4.4-3 shows the estimated noise levels along roadways in the vicinity that would experience increases in noise due to project-generated traffic. The estimated noise levels for the existing conditions with and without the project were used to calculate these noise levels.

Table 4.4-3. Projected Noise Levels along Area Roadways

Roadway	Noise Level Along Roadways (dBA Ldn)			FICON Std	Significant?
	Existing*	Existing + Project	Project Change		
Madonna Road					
West of LOVR	60.2	64.0	3.8	1.5	Yes
LOVR to Oceanaire Dr	68.0	70.1	2.1	1.5	Yes
Oceanaire Dr to Dalidio Dr	68.5	69.5	1.0	1.5	No
Dalidio Dr to El Mercado	69.1	69.7	0.6	1.5	No
El Mercado to 101 SB ramp	69.7	70.1	0.4	1.5	No
101 SB ramp to 101 NB ramp	68.9	69.7	0.3	1.5	No
101 NB ramp to Higuera St.	69.1	70.1	0.5	1.5	No
Los Osos Valley Road					
101 NB ramp to Higuera St	68.0	68.9	0.9	1.5	No
Higuera Street					
Madonna Rd to LOVR	69.4	69.4	0.0	1.5	No
North of South St	67.5	67.6	0.1	1.5	No

Source: Traffic data from Fehr and Peers, November 2003

*Existing noise levels based on traffic data for Existing Baseline conditions, which includes approved planned development, such as Froom Ranch.

See Appendix D for calculations

The noise levels shown in Table 4.4-3 indicate that all the studied roadways in the project vicinity exceed the City’s threshold of 60 dBA Ldn under the Existing Baseline conditions without implementation of the proposed project. The table also shows that the proposed project would not contribute to significant increases in noise along most study area roadways, based on the suggested thresholds of the FICON recommendations. However, the project



would result in significant noise level increases of 3.8 dB Ldn and 2.1 dB Ldn along the segment of Madonna Road west of Los Osos Valley Road and the segment of Madonna Road between Los Osos Valley Road and Oceanaire Drive, respectively. Therefore, the project would result in potentially significant impacts from traffic related noise along these segments of Madonna Road.

Mitigation Measures. Implementation of the following measure would reduce project noise impacts to the extent feasible.

- N-2(a)** The applicant must contribute its fair share, as determined by the City, to the implementation of one or more of the mitigation approaches listed in policy N-1.2.16 of the Noise Element (refer to Appendix G of this EIR). Implementation of the measures must occur prior to project occupancy.

These measures may include rerouting traffic onto streets that do not adjoin sensitive receptors, construction of noise barriers, retrofitting buildings with noise-reducing features, and the establishment of financial programs to pay for noise mitigation and trip reduction programs.

Significance After Mitigation. Use of such techniques on the proposed project and the retrofitting of existing development would reduce project-generated vehicle noise impacts to the extent feasible. However, implementation of these techniques would not necessarily ensure that cumulative noise experienced at sensitive receptors would be reduced to less than significant levels at all locations. No additional mitigation measures are feasible due to economic, political, and physical constraints. Therefore, impacts would remain Class I, *Significant and Unavoidable*.

c. Cumulative Impacts.

- Impact N-3** **The proposed project, in combination with cumulative development in the vicinity would add to roadway corridor noise levels already above the 60 dBA Ldn City threshold. This is considered a Class I, significant and unavoidable impact.**

Because buildout of the surrounding area would increase noise levels on roadways either above the City's 60 dBA Ldn residential threshold or would contribute to noise levels already in exceedance of the threshold, the cumulative impact on roadway noise is considered significant. Table 4.4-4 below shows the roadways expected to experience the largest increase in noise due to buildout of the surrounding area.

This analysis accounts for cumulative increases in traffic associated with General Plan buildout. Cumulative increases in traffic on area roadways would generally increase noise levels in the area and would create significant impacts to noise-sensitive land uses adjacent to area roadways. Since the project would contribute to these cumulative noise increases beyond threshold levels, cumulative noise impacts are considered significant.



Table 4.4-4 Cumulative Noise Increases Along Area Roadways

Roadway	Noise Level Along Roadways (dBA Ldn)			
	Existing	General Plan Buildout*	Contribution of Project to Cumulative Noise Levels	Does Project Contribute to Significant Cumulative Noise Levels?
Madonna Road				
West of LOVR	60.2	64.7	3.8	Yes
LOVR to Oceanaire Dr	68.0	72.3	2.1	Yes
Oceanaire Dr to Dalidio Dr	68.5	71.4	1.0	Yes
Dalidio Dr to El Mercado	69.1	70.7	0.6	Yes
El Mercado to 101 SB ramp	69.7	70.6	0.4	Yes
101 SB ramp to 101 NB ramp	68.9	70.0	0.3	Yes
101 NB ramp to Higuera St.	69.1	69.8	0.5	Yes
Los Osos Valley Road				
101 NB ramp to Higuera St	68.0	70.8	0.9	Yes
Higuera Street				
Madonna Rd to LOVR	69.4	71.7	0.0	No
North of South St	67.5	68.7	0.1	Yes

*Includes project related traffic
 See Appendix D for calculations

Year 2020 post-Prado Road interchange noise levels experienced at the existing Embassy Suites hotel located in the northwest quadrant of the interchange would be 73 dB Leq, which would exceed Caltrans threshold of 67 dB Leq. However, under Caltrans protocol, the exterior noise level criteria are applied at the outdoor activity areas of hotel/motel uses. Since the affected hotel does not have such outdoor activity areas that could be affected by traffic noise, the project would not result in impacts on the hotel. Noise levels experienced at the other land uses adjacent to the proposed Prado Road interchange would not exceed Caltrans thresholds.

Mitigation Measures. Implementation of Mitigation Measure N-2(a) would reduce cumulative noise impacts to the extent feasible.

Significance After Mitigation. Use of such techniques as described in Mitigation Measure N-2(a) on all new development in the area and the retrofitting of existing development would reduce cumulative impacts to the extent feasible. However, implementation of these techniques would not necessarily ensure that cumulative noise experienced at sensitive receptors would be reduced to less than significant levels at all locations. No additional mitigation measures are feasible due to economic, political, and physical constraints. Therefore, impacts would remain Class I, *Significant and Unavoidable*.

