4.11 Noise

This section analyzes noise impacts from buildout of the 2045 General Plan. Impacts related to construction, traffic, on-site equipment, aircraft, and vibration are addressed.

4.11.1 Setting

a. Overview of Noise and Vibration

Noise

Sound is a vibratory disturbance created by a moving or vibrating source, which is capable of being detected by hearing organs (e.g., the human ear). Noise is defined as sound, which is loud, unpleasant, unexpected, or undesired and may therefore be classified as a more specific group of sounds. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and, in the extreme, hearing impairment (Caltrans 2013).

Noise levels are commonly measured in decibels (dB) using the A-weighted sound pressure level (dBA). The A-weighting scale is an adjustment to the actual sound pressure levels to be consistent with the human hearing response, which is most sensitive to frequencies around 4,000 Hertz (Hz) and less sensitive to frequencies around and below 100 Hz (Kinsler et al. 1999). Decibels are measured on a logarithmic scale, which quantifies sound intensity in a manner similar to the Richter scale used to measure earthquake magnitudes. A doubling of the energy of a noise source, such as a doubling of traffic volume, would increase the noise level by 3 dBA; similarly, dividing the energy in half would result in a decrease of 3 dBA (Crocker 2007).

Human perception of noise has no simple correlation with sound energy; the perception of sound is not linear in terms of dBA or in terms of sound energy. Two sources do not "sound twice as loud" as one source. It is widely accepted the average healthy ear can barely perceive an increase (or decrease) of up to 3 dBA in noise levels (i.e., twice [or half] the sound energy); a change of 5 dBA is readily perceptible; and an increase (or decrease) of 10 dBA sounds twice (or half) as loud (Crocker 2007).

Sound changes in both level and frequency spectrum as it travels from the source to the receiver. The most obvious change is the decrease in sound level as the distance from the source increases. The manner by which noise reduces with distance depends on factors such as the type of noise source (e.g., point or line), the path the sound will travel, site conditions, and obstructions. Noise levels from a point source (e.g., construction, industrial machinery, ventilation units) typically attenuate, or drop off, at a rate of 6 dBA per doubling of distance. Noise from a line source (e.g., roadway, pipeline, railroad) typically attenuates at about 3 dBA per doubling of distance (Caltrans 2013). Noise levels may also be reduced by intervening structures; the amount of attenuation provided by this "shielding" depends on the size of the object and the frequencies of the noise levels. Natural terrain features, such as hills and dense woods, and man-made features, such as buildings and walls, can substantially alter noise levels. Generally, any large structure blocking line of sight will provide at least a 5-dBA reduction in source noise levels at the receiver (Federal Highway Administration [FHWA] 2011). Structures can substantially reduce occupants' exposure to noise as well. The FHWA's guidelines indicate modern building construction generally provides an exterior-to-interior noise level reduction of 20 to 35 dBA with closed windows.

The time of day when noise occurs and the duration of the noise are also important. Most noise lasting for more than a few seconds is variable in its intensity. Consequently, a variety of noise descriptors have been developed. One of the most frequently used noise metrics is the equivalent noise level (L_{eq}), which considers both duration and sound power level. L_{eq} is defined as the single steady A-weighted level equivalent to the same amount of energy contained in the actual fluctuating levels over a period of time (essentially, the average noise level). Typically, L_{eq} is summed over a one-hour period (1H). L_{max} is the highest root mean squared (RMS) sound pressure level within the sampling period, and L_{min} is the lowest RMS sound pressure level within the measuring period (Crocker 2007). Normal conversational levels are in the 60 to 65 dBA L_{eq} range; ambient noise levels greater than 65 dBA L_{eq} can interrupt conversations (Federal Transit Administration [FTA] 2018).

Noise occurring at night tends to be more disturbing than noise occurring during the day. Community noise is usually measured using Day-Night Average Level (L_{dn}), which is the 24-hour average noise level with a +10 dBA penalty for noise occurring during nighttime hours (10:00 p.m. to 7:00 a.m.). Community noise can also be measured using Community Noise Equivalent Level (CNEL), which is the 24-hour average noise level with a +5 dBA penalty for noise occurring from 7:00 p.m. to 10:00 p.m. and a +10 dBA penalty for noise occurring from 10:00 p.m. to 7:00 a.m. (Caltrans 2013). Noise levels described by L_{dn} and CNEL usually differ by about 1 dBA. Quiet suburban areas typically have CNEL noise levels in the range of 40 to 50 CNEL, while areas near arterial streets are in the 50 to 60+ CNEL range.

Vibration

Groundborne vibration of concern in environmental analysis consists of the oscillatory waves that move from a source through the ground to adjacent structures. The number of cycles per second of oscillation makes up the vibration frequency, described in terms of Hz. The frequency of a vibrating object describes how rapidly it oscillates. The normal frequency range of most groundborne vibration that can be felt by the human body starts from a low frequency of less than 1 Hz and goes to a high of about 200 Hz (Crocker 2007).

While people have varying sensitivities to vibrations at different frequencies, in general they are most sensitive to low-frequency vibration. Vibration in buildings, such as from nearby construction activities, may cause windows, items on shelves, and pictures on walls to rattle. Vibration of building components can also take the form of an audible low-frequency rumbling noise, referred to as groundborne noise. Groundborne noise is usually only a problem when the originating vibration spectrum is dominated by frequencies in the upper end of the range (60 to 200 Hz), or when foundations or utilities, such as sewer and water pipes, physically connect the structure and the vibration source (FTA 2018). Although groundborne vibration is sometimes noticeable in outdoor environments, it is almost never annoying to people who are outdoors. The primary concern of vibration is that it can be intrusive and annoying to building occupants and vibration-sensitive land uses.

Vibration energy spreads out as it travels through the ground, causing the vibration level to diminish with distance away from the source. High-frequency vibrations diminish much more rapidly than low frequencies, so low frequencies tend to dominate the spectrum at large distances from the source. Discontinuities in the soil strata can also cause diffractions or channeling effects that affect the propagation of vibration over long distances (Caltrans 2020). When a building is impacted by vibration, a ground-to-foundation coupling loss will usually reduce the overall vibration level.

However, under rare circumstances, the ground-to-foundation coupling may actually amplify the vibration level due to structural resonances of the floors and walls.

Vibration amplitudes are usually expressed in peak particle velocity (PPV) or RMS vibration velocity. The PPV and RMS velocity are normally described in inches per second. PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal (Caltrans 2020). Table 4.11-1 summarizes the vibration damage criteria recommended by the FTA for evaluating the potential for architectural damage to buildings.

Table 4.11-1 Criteria for Vibration Damage Potential

Building Category	PPV (in/sec)
I. Reinforced concrete, steel, or timber (no plaster)	0.5
II. Engineered concrete and masonry (no plaster)	0.3
III. Non-engineered timber and masonry buildings	0.2
IV. Buildings extremely susceptible to vibration damage	0.12

in/sec = inches per second; PPV = peak particle velocity

Source: Federal Transit Administration (FTA). 2018.

b. Noise-Sensitive Land Uses/Sensitive Receivers

Noise-sensitive land uses are generally defined as locations where people reside or where the presence of unwanted sound could adversely affect the use of the land. Places where people live, sleep, recreate, worship, and study generally are considered to be sensitive to noise because intrusive noise can be disruptive to these activities. When community noise interferes with human activities or contributes to stress, public annoyance with the noise sources increases, and the acceptability of the environment for people decreases. The City defines noise-sensitive land uses as including the following:

- Residential uses
- Visitor lodging – hotels, motels, inns
- Schools
- Libraries
- Places of religious worship
- Hospitals
- Assisted living facilities
- Public parks

Noise-sensitive land uses are located throughout Solvang and its Sphere of Influence (defined as the Planning Area), as it is a predominantly residential city. The Planning Area also includes noise-sensitive land uses such as hotels and motels; group homes; churches; schools and other learning institutions; and libraries.

Vibration-sensitive receivers, which are similar to noise-sensitive receivers, include residences and institutional uses, such as schools, churches, and hospitals. However, vibration-sensitive receivers also include fragile/historic-era buildings and buildings where vibrations may interfere with sensitive equipment that is affected by vibration levels that may be well below those associated with human annoyance (e.g., recording studies or medical facilities with sensitive equipment).

c. Existing Noise Conditions and Major Noise Sources in the Community

Transportation Noise Sources

Roadways

The City's primary source of noise is ~~traffic~~ traffic-related from on-road vehicles and trucks. Vehicular noise has three main component sources: engine/ transmission noise, exhaust noise, and tire noise. State Highway 246, Alisal Road, Atterdag Road, and Alamo Pintado Road are the main roadways of concern related to noise because they carry high traffic volumes. Since State Highway 246 roughly bisects Solvang in the central portions of the City, it produces traffic noise that affects much of the area within the City. Table 4.11-2 provides existing (2015) roadway vehicle noise along roadways in the Planning Area. Additionally, Figure 4.11-1 shows the locations of major roadway noise sources in the City.

Aviation

The Santa Ynez Airport is a general aviation airport located approximately 5 miles east of the city; there are no commercial air services using the airport. The airport is primarily used to allow private aircraft owners to store and refuel their planes, for gliding, and serves as a staging ground for the Santa Barbara County Air Support Unit. The Santa Barbara County Airport Land Use Commission (ALUC) adopted an Airport Land Use Plan (ALUP) in 1993 and updated the Plan in 2022 establishing safety zones around the airport to protect the public from potential noise and safety impacts associated with aircraft operations. The ALUP also designates allowable and conditionally allowable land uses for the different safety zones. The currently adopted safety zones overlap a portion of the city's sphere of influence northwest of the city but do not overlap with city limits.

Industrial-Commercial Noise Sources

Industrial Sites

Industrial operations often involve the use of mechanical equipment, generators, and vehicles that contribute to noise levels at industrial sites, particularly if operations occur outdoors. Solvang has one area designated for industrial uses; the area is situated south of State Highway 246, generally located west of Adobe Canyon Creek. Currently this area consists of several light industrial operations, such as sale of building materials, home improvement services, landscaping, and aggregate mining.

Commercial Sites

Most of the commercial businesses in Solvang are aligned along State Highway 246, Alisal Road, and the southern portions of Atterdag Road and Alamo Pintado Road. Commercial uses typically generate noise from heating, ventilation, and air conditioning (HVAC) equipment, on-site truck deliveries, trash hauling, and parking lot activity.

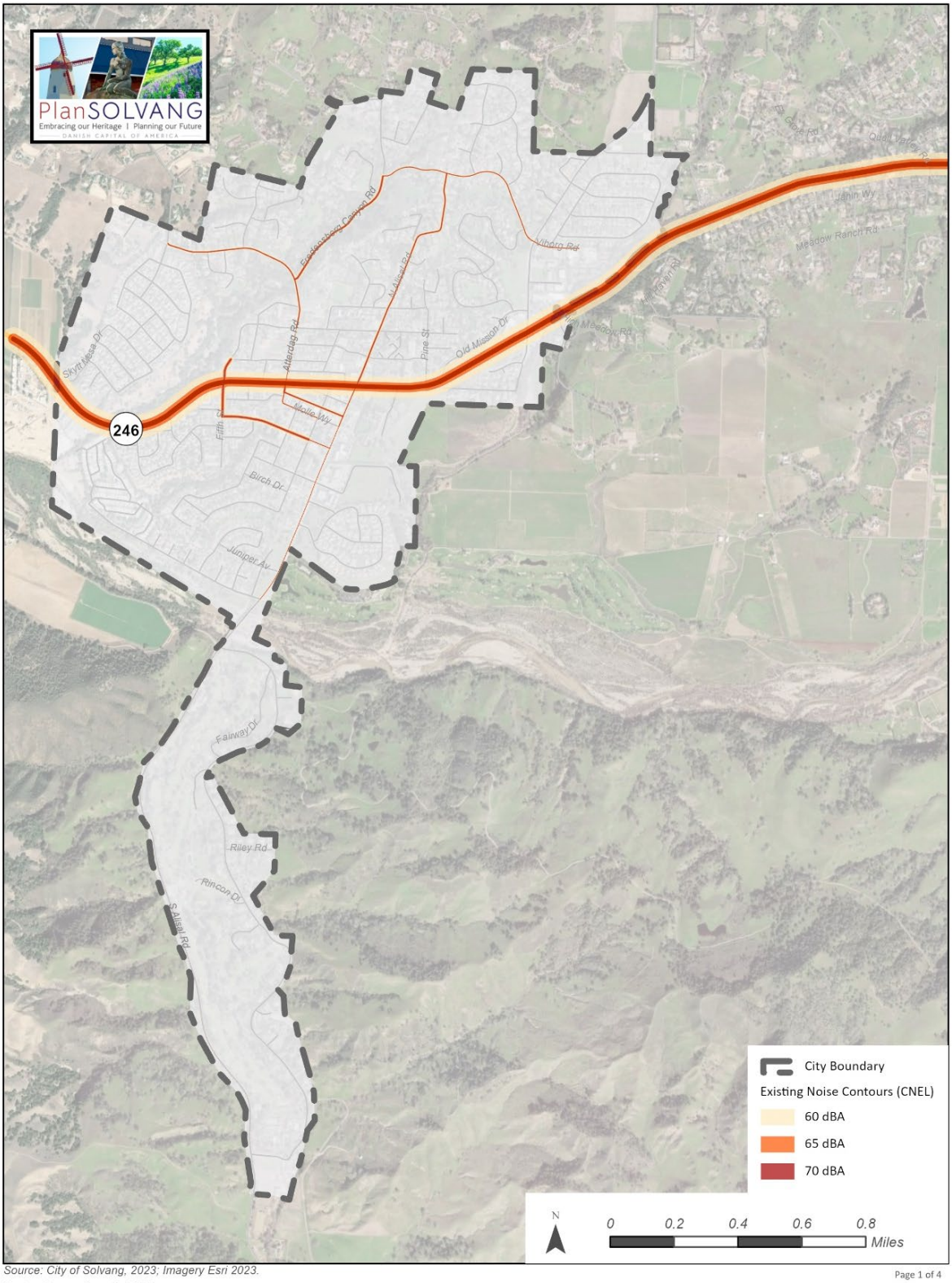
Table 4.11-2 Existing (2015) Traffic Noise Levels Along Roadway Segments

Roadway	Segment	2015 Existing ADT	Existing Traffic Noise Level at 50 feet (dBA CNEL)
SR 246	5th Street to Nykobing	15,621	68.8
SR 246	4th Street to 5th Street	12,467	67.8
SR 246	Alisal Road to 1st Street	12,667	68.0
SR 246	Old Mill Road to Alisal Road	12,393	67.9
SR 246	Alamo Pintado Road to Old Mill Road	14,292	68.5
Alisal Road	Viborg Road to Eucalyptus Drive	1,231	56.2
Alisal Road	Laurel Avenue to Maple Avenue	1,483	56.9
Alisal Road	Maple Avenue to SR 246	1,515	57.0
Alisal Road	SR 246 to Copenhagen Drive	1,240	53.4
Alisal Road	Molle Way to Oak Street	606	50.2
Alisal Road	Oak Street to Elverhoy Way	634	50.5
Alisal Road	Fijord Drive to Rancho Alisal Drive	27	36.3
Squire Lane	Viborg Road to Chalk Hill Road	2,033	58.3
Atterdag Road	Chalk Hill Road to Laurel Avenue	2,004	55.4
Atterdag Road	Laurel Avenue to Elm Avenue	336	47.4
Atterdag Road	Elm Avenue to SR 246	681	50.6
Atterdag Road	SR 246 to Copenhagen Drive	2,162	58.4
Atterdag Road	Copenhagen Drive to Copenhagen Drive	807	53.5
Atterdag Road	Copenhagen Drive Molle Way	838	53.7
5th Street	Elm Avenue to SR 246	3,090	60.3
5th Street	SR 246 to Copenhagen Drive	3,120	60.5
5th Street	Copenhagen Drive to Oak Street	3,152	60.6
Copenhagen Drive	Atterdag Road to 1st Street	1,465	57.0
Viborg Road	Alisal Road to Squire Lane	687	53.5
Molle Way	2nd Street to 1st Street	724	53.0
Molle Way	1st Street to Alisal Road	36	41.3
Oak Street	2nd Street to 1st Street	2,784	59.8
Oak Street	1st Street to Alisal Road	572	52.7
Oak Street	2nd Street to 5th Street	2,669	59.7
Elverhoy Way	1st Street to Alisal Road	29	39.7

ADT = average daily traffic; dBA = decibel using A-weighted sound pressure level; CNEL = Community Noise Equivalent Level

Source: Data provided by DKS Associates, 2023.

Figure 4.11-1 Existing Roadway Vehicle Noise Contours – Section 1



Source: City of Solvang, 2023; Imagery Esri 2023.
Date: December 6, 2023

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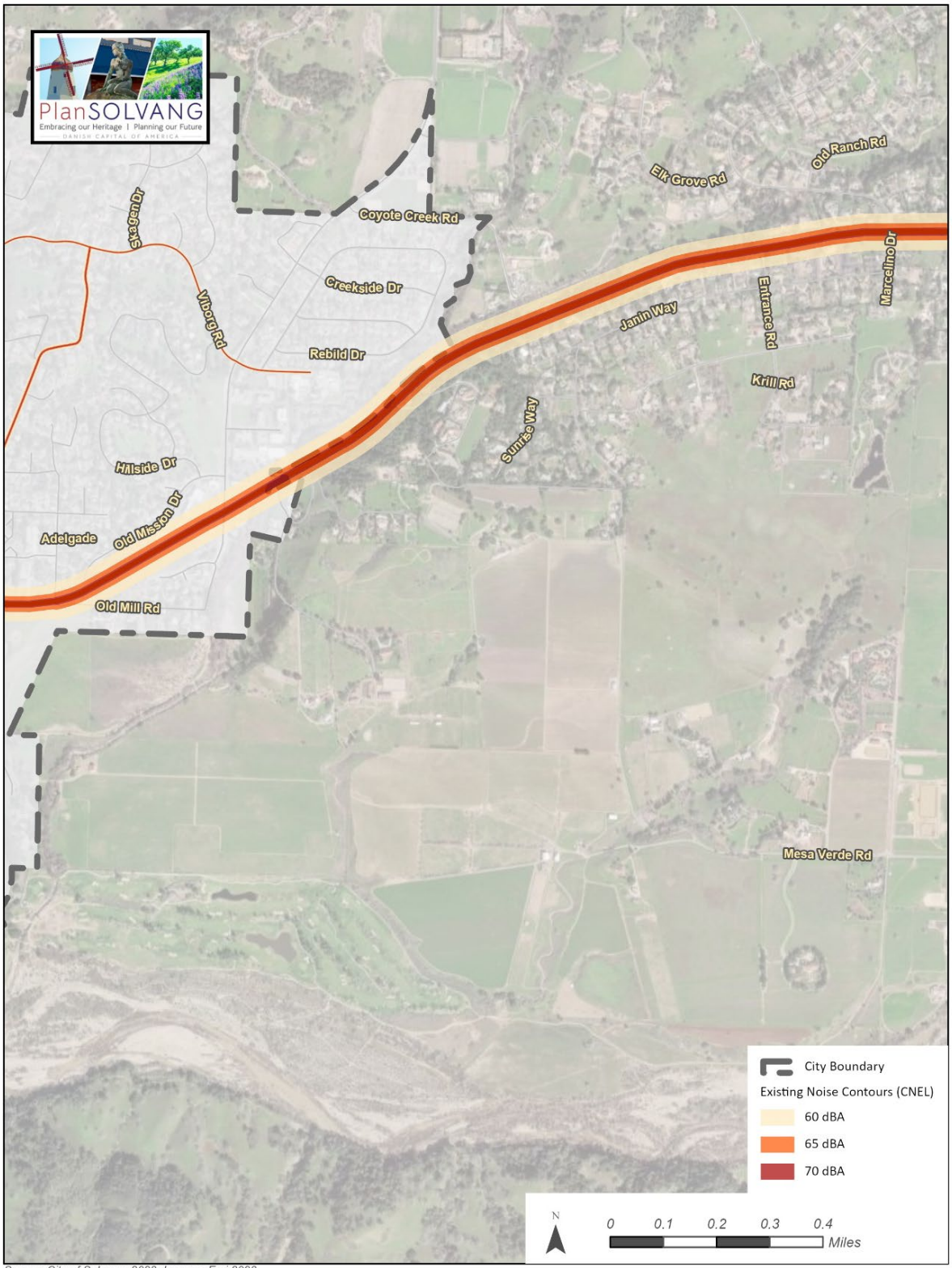
Figure 4.11-2 Existing Roadway Vehicle Noise Contours – Section 2

Source: City of Solvang, 2023; Imagery Esri 2023.
Date: December 6, 2023

Figure 4.11-3 Existing Roadway Vehicle Noise Contours – Section 3



Source: City of Solvang, 2023; Imagery Esri 2023.
Date: December 6, 2023

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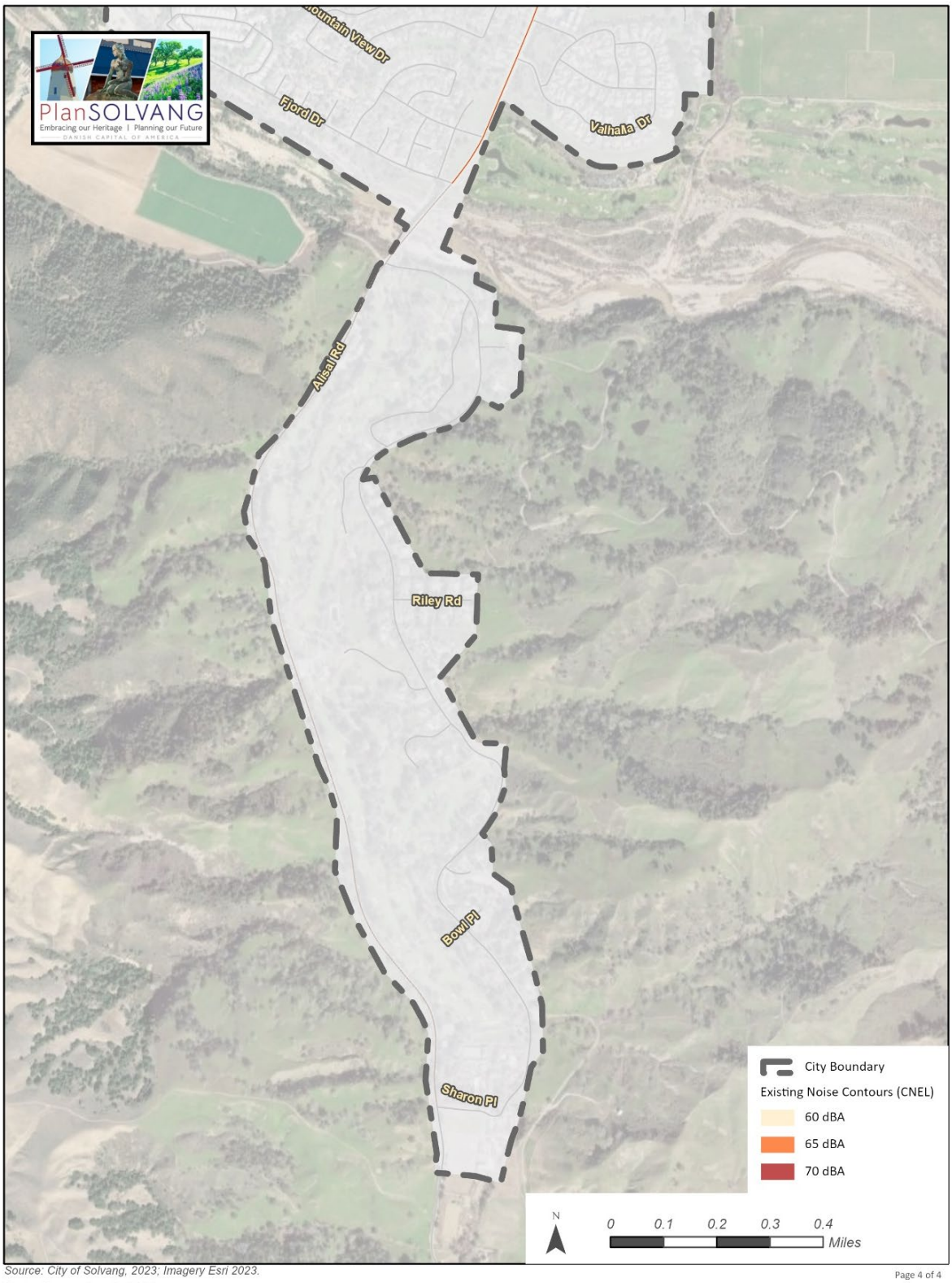
Figure 4.11-4 Existing Roadway Vehicle Noise Contours – Section 4



Source: City of Solvang, 2023; Imagery Esri 2023.
Date: December 6, 2023

4.11.2 Regulatory Setting

a. Federal Regulations

There are no federal noise requirements or regulations that apply directly to the implementation of the GP Update. However, there are federal regulations that influence the audible landscape, especially for projects where federal funding is involved. For example, Federal Highway Administration (FHWA) requires abatement of highway traffic noise for highway projects through rules in the Code of Federal Regulations (23 CFR Part 772), the Federal Transit Administration (FTA), and Federal Railroad Administration (FRA). Each agency recommends thorough noise and vibration assessments through comprehensive guidelines for any highway, mass transit, or high-speed railroad projects that would pass by residential areas.

Department of Housing and Urban Development

The Federal Department of Housing and Urban Development (HUD) sets environmental criteria and standards in Title 24 of CFR, Part 51. New construction proposed in areas that exceed 65 dBA L_{dn} must incorporate noise attenuation features to maintain interior noise levels at 45 dBA L_{dn}. Development in areas exceeding 65 dBA L_{dn} requires further attenuation features. In general, the HUD regulations match the California state regulations discussed below.

Federal Transit Administration

The FTA provides reasonable criteria for assessing construction noise impacts based on the potential for adverse community reaction in their *Transit and Noise Vibration Impact Assessment Manual* (FTA 2018). For residential uses, the daytime noise threshold is 80 dBA L_{eq} for an 8-hour period.

Occupational Health and Safety Administration

The federal government regulates occupational noise exposure common in the workplace through the Occupational Health and Safety Administration (OSHA) under the EPA. Noise limitations would apply to the operation of construction equipment and could also apply to any proposed industrial land uses. Noise exposure of this type is dependent on work conditions and is addressed through a facility's Health and Safety Plan, as required under OSHA, and is not addressed further in this analysis.

b. State Regulations

California General Plan Guidelines

State law requires general plans to include a Noise Element under Government Code Section 65302(f). The California General Plan Guidelines, published by the Governor's Office of Planning and Research, indicate acceptable, specific land use types in areas with specific noise exposure. The guidelines also offer adjustment factors that may be used to arrive at noise acceptability standards that reflect the noise control goals of the community, the community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution. These Guidelines are advisory, and local jurisdictions have the authority to set specific noise standards based on local conditions.

California Building Code

CCR Title 24, Building Standards Administrative Code, Part 2, Chapter 12, and the California Building Code codify the State noise insulation standards. These noise standards apply to new construction in California to control interior noise levels as they are affected by exterior noise sources and interior noise sources from separate areas. The regulations specify that interior noise levels shall not exceed 45 dB CNEL/L_{dn} in any habitable room, as well as specifying sound transmission class requirements for walls, floors, and ceilings around sleeping units.

California Green Building Code

CALGreen (2022) Section 5.507.4, Acoustical Control, regulates construction of non-residential uses within the 65 dBA CNEL/L_{dn} contour of an airport, freeway, expressway, railroad, industrial noise source, or other fixed source. According to Section 5.507.4.1.1 "buildings exposed to a noise level of 65 dB L_{eq} (1-hr) during any hour of operation shall employ sound-resistant assemblies as determined by a prescriptive method (CALGreen Section 5.507.4.1) or performance method (CALGreen Section 5.507.4.2).

Projects may demonstrate compliance through the prescriptive method if wall and roof-ceiling assemblies exposed to the noise source meet a composite sound transmission class (STC) rating of at least 50 or a composite outdoor/indoor transmission class (OITC) rating of no less than 40, with exterior windows of a minimum STC of 40 or OITC of 30. Projects may demonstrate compliance through the performance method if wall and roof-ceiling assemblies exposed to the noise source are constructed to provide an interior noise environment that does not exceed 50 dB L_{eq}-1-hr in occupied areas during hours of operations.

c. Local Regulations

City of Solvang General Plan Noise Element

The current City of Solvang General Plan Noise Element (2012) is intended to reduce the exposure of people to excessive noise through proactive long-range planning. It sets standards for the compatibility of land uses with ambient noise from transportation sources (identified as "community noise"). Under Policy 1.a of the current Noise Element, the City requires that all new development meet the noise compatibility guidelines shown in Table 4.11-3. These guidelines describe the ranges of community noise exposure that are acceptable, conditionally acceptable, or unacceptable for various noise-sensitive land uses in the City. For areas where the noise environment is conditionally acceptable for a particular land use, the City only allows development after noise mitigation has been incorporated into the project's design to reduce noise to acceptable levels.

The current Solvang General Plan contains land use compatibility noise standards and policies related to noise, but the current policies would be replaced by the 2045 General Plan. However, there are no proposed changes to the noise compatibility standards, shown in Table 4.11-3.

Table 4.11-3 Land Use Compatibility for Community Noise Environments

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

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

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

Normally Unacceptable: New construction or development should 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.

Clearly Unacceptable: New construction or development should not be undertaken.

dBA = A-weighted sound pressure level; DNL = Day-Night Average Level

Source: City of Solvang 2045 General Plan, April 2023.

Solvang Municipal Code

Chapter 11 of the Solvang Municipal Code contains additional noise level standards. Relevant sections in the noise ordinance include the following:

- **Chapter 11-8-3: Performance Standards – Institutional District**
  - The Municipal Code Section 11-9-3 requires the volume of sound, measured during calm air conditions, generated by or resulting from any use, other than motor vehicles, operated in any lot shall not exceed sixty-five (65) decibels at any point along the boundary of or outside of the lot upon which such use is located.
  - The ground vibration inherently and recurrently generated by or resulting from any use, other than motor vehicles, operated on any lot shall not be perceptible without instruments at any point along the boundary of or outside of the lot upon which such use is located.
- **Chapter 11-9-3: Performance Standards – M Light Industrial District**
  - The Municipal Code Section 11-9-3 requires that volume of sound measured outside during calm air conditions, generated by any use on a property shall not exceed 75 dB(A) at or beyond any point along the property boundary upon which such use is located. However, in

no case shall the volume of sound exceed 65 CNEL at the location of any nearby noise sensitive uses, as defined in the noise element of the City's general plan.

- The ground vibration inherently and recurrently generated by or resulting from any use, other than motor vehicles, operated on any lot shall not be perceptible without instruments at any point along the boundary of or outside of the lot upon which such use is located.

- **Chapter 11-12-21.: Hours of Construction:**
  - Hours of construction shall be limited to seven-thirty (7:30) a.m. to five-thirty (5:30) p.m. weekdays. No construction shall be allowed on Saturday, Sunday, state or national holidays except as approved in writing by the public works director, or designee, or in the case of an emergency for the immediate preservation of life, health, or property. Notwithstanding the foregoing, an individual property owner or tenant solely (not including any volunteer or paid construction crew) in addition to the above permissible hours of construction may also construct, repair, or remodel his or her real property or any structure on such property, pursuant to obtaining the required permits, during the hours of five-thirty (5:30) p.m. to eight (8:00) p.m. on weekdays and eight (8:00) a.m. to eight (8:00) p.m. on Saturday, Sunday and national legal holidays. All noise or sounds associated with the construction, gardening and/or maintenance activities of said property shall not create any inconvenience or annoyance to the general public beyond the boundary lines of the property.

4.11.3 Impact Analysis

a. Methodology and Significance Thresholds

Methodology

Short-Term Construction Noise

Short-term construction noise levels that could occur with implementation of the proposed project are based on reference noise levels published by the FTA.

Stationary On-Site Operational Noise

Stationary noise sources (i.e., on-site operational noise) were analyzed in context of typical mechanical equipment on commercial, industrial, residential, and mixed-use development such as heating, ventilation, and air conditioning (HVAC) units.

Mobile Off-site Operational Noise

Roadway vehicle noise levels for the 2045 General Plan were estimated using the FHWA roadway vehicle noise prediction model methodology. Roadway vehicle noise impacts are analyzed based on average daily trip (ADT) roadway volume for existing conditions and the amount of growth expected under the 2045 General Plan, as well as data regarding speeds and number of lanes. The FHWA model predicts noise levels through a series of adjustments to a reference sound level. These adjustments account for distances from the roadway, roadway vehicle volumes, vehicle speeds, car/truck mix, number of lanes, and road width.

Groundborne Vibration

Development facilitated by the 2045 General Plan would not include substantial vibration sources associated with operation. Construction activities have the greatest potential to generate groundborne vibration affecting nearby noise-sensitive receptors. Construction vibration levels that could occur due to development facilitated by the 2045 General Plan are based on reference vibration levels published by the FTA.

Significance Thresholds

CEQA Guidelines Appendix G provides the following significance thresholds to determine if a project would have a potentially significant impact on noise and vibration. For the purposes of this EIR, implementation of the 2045 General Plan may have a significant adverse impact if it would:

1. Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?
2. Generate excessive groundborne vibration or groundborne noise levels?
3. If located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels?

Specific Thresholds of Significance

For the purposes of this analysis, the following thresholds of significance are used to evaluate the significance of noise and vibration resulting from implementation of the 2045 General Plan.

Short-term Construction Noise

Development facilitated by the 2045 General Plan could have a significant impact if temporary construction noise during permitted daytime hours exposed noise-sensitive receivers to significantly adverse noise levels, or if construction noise occurred outside the hours detailed in Municipal Code Section 11-12-21. As the City does not define a quantitative construction noise threshold, for purposes of analyzing impacts from short-term construction projects facilitated by the 2045 General Plan, the City has determined that the FTA construction criteria are applicable to the 2045 General Plan. The FTA provides reasonable criteria for assessing construction noise impacts based on the potential for adverse community reaction in their *Transit and Noise Vibration Impact Assessment Manual* (FTA 2018). For residential uses, the daytime noise threshold is 80 dBA $L_{eq(8hr)}$ for an 8-hour period. Short-term construction noise would be significant if it exceeds this threshold.

Stationary On-site Operational Noise

Stationary on-site operational noise impacts were analyzed using Chapter 11 of the City's Municipal Code above.

Mobile Off-site Operational Noise

A project normally has a significant effect on the environment related to noise if it substantially increases the ambient noise levels for adjoining areas. Changes of less than 1 dBA are usually indiscernible. Changes of 1 to 3 dBA are detectable under quiet, controlled conditions. Most people can detect changes in sound levels of approximately 3 dBA under normal, quiet conditions. A change of 5 dBA is readily discernible to most people in an exterior environment. Typically, a CNEL of 60

dBA and below is considered an acceptable noise level for noise sensitive uses and an area with a CNEL above 65 dBA is considered a degraded noise environment for noise sensitive uses. Therefore, less of an increase from roadway noise is allowed. Based on similar criteria from the Federal Aviation Administration (FAA), the following thresholds of significance are used to assess roadway vehicle noise impacts at sensitive receiver locations:

- Greater than 1.5 dBA CNEL increase for ambient noise environments of 65 dBA CNEL and higher;
- Greater than 3 dBA CNEL increase for ambient noise environments of 60-64 dBA CNEL;
- Greater than 5 dBA CNEL increase for ambient noise environments of less than 60 dBA CNEL and where the resulting future noise level would exceed 60 dBA CNEL.

Exposure to Aircraft Noise

For a plan or project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, if the plan or project exposes people residing or working in the project area to excessive noise levels such as noise levels exceeding normally acceptable noise levels in the General Plan.

Vibration

The City has not adopted a significance threshold to assess vibration impacts during construction and operation. Therefore, criteria from the FTA are used to evaluate potential construction vibration impacts related to potential building damage from construction (FTA 2018). Construction vibration impacts from development would be significant if vibration levels exceed the FTA criteria shown in Table 4.11-1 above.

Impact of the Environment on the Project

As a result of the Supreme Court decision regarding the assessment of the environment's impacts on projects (*California Building Industry Association (CBIA) v. Bay Area Air Quality Management District* (BAAQMD), 62 Cal. 4th 369 (No. S 213478) issued December 17, 2015), it is generally no longer the purview of the CEQA process to evaluate the impact of existing environmental conditions on a 2045 General Plan. Therefore, this environmental analysis does not consider the potential impacts of the environment (i.e., existing noise) on the project.

b. Project Impacts and Mitigation Measures

Threshold:	Would the project result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Impact NOI-1 CONSTRUCTION OF INDIVIDUAL PROJECTS FACILITATED BY THE 2045 GENERAL PLAN WOULD TEMPORARILY INCREASE NOISE LEVELS, POTENTIALLY AFFECTING NEARBY NOISE-SENSITIVE LAND USES. DEVELOPMENT FACILITATED BY THE 2045 GENERAL PLAN WOULD ALSO INTRODUCE NEW NOISE SOURCES AND CONTRIBUTE TO INCREASES IN OPERATIONAL NOISE. IMPLEMENTATION OF MITIGATION MEASURE NOI-1 AND THE CONTINUED REGULATION OF NOISE, CONSISTENT WITH THE CITY CODE AND IMPLEMENTATION OF POLICIES FROM THE 2045 GENERAL PLAN WOULD MINIMIZE DISTURBANCE TO ADJACENT LAND USES. STATIONARY OPERATIONAL AND MOBILE NOISE WOULD NOT EXCEED STANDARDS. HOWEVER, SHORT-TERM CONSTRUCTION NOISE IMPACTS WOULD BE SIGNIFICANT AND UNAVOIDABLE EVEN WITH MITIGATION.

Short-term Construction

Noise from individual short-term construction projects facilitated by the 2045 General Plan would temporarily increase noise levels at nearby noise-sensitive receptors. Since project-level details are not currently available for future projects that would be facilitated by the 2045 General Plan, it is not possible to determine exact noise levels, locations, or time periods for construction of such projects, or construction noise at adjacent properties. However, noise estimates for typical short-term construction activities have been provided below.

Short-term construction activities would generate noise from phases such as demolition, site preparation, grading, building construction, and paving activities. Each phase of construction has a specific equipment mix and associated noise characteristics, depending on the equipment used during that phase. Short-term construction noise would typically be higher during the more equipment-intensive phases of initial construction (i.e., demolition, site preparation, and grading work) and would be lower during the later construction phases (i.e., building construction and paving). Table 4.11-4 illustrates typical noise levels associated with construction equipment at a distance of 50 feet and 100 feet from the noise source.

Neither the Solvang Municipal Code nor the 2045 General Plan contain quantitative limits for short-term construction noise. In lieu of City-specific standards, the FTA criteria for assessing short-term construction noise impacts are used. For residential uses, the FTA daytime noise threshold is 80 dBA L_{eq} for an 8-hour period. Although, due to the dynamic nature of construction, noise levels would typically be lower during times of construction activity.

Noise would typically drop off at a rate of about 6 dBA per doubling of distance. Therefore, noise levels would be about 6 dBA lower than shown in Table 4.11-4 at 200 feet from the noise source and 12 dBA lower at a distance of 400 feet from the noise source. The construction noise levels shown in Table 4.11-4 may exceed the FTA's daytime noise threshold of 80 dBA L_{eq} for an 8-hour period, depending on the equipment used and the distance in which the equipment is operating compared to noise-sensitive receptors.

The following goals, policy, and action item from the 2045 General Plan would minimize potential adverse noise-related impacts from construction sources.

- **Goal SAF-11:** To reduce, minimize and manage noise and vibration to the greatest extent feasible.
- **Goal 3:** Establish measures to control non-transportation noise impacts.
- **Policy 3.2:** The City shall evaluate noise generated by construction activities and subject them to the requirements of the Community Noise Ordinance.
- **Action Item A:** Require construction activity to comply with limits established in the Community Noise Ordinance.

Table 4.11-4 Typical Noise Levels for Construction Equipment

Equipment	Estimated Noise Levels at Nearest Sensitive Receptors (dBA L_{eq})	
	50 feet	100 feet
Air Compressor	80	74
Backhoe	80	74
Concrete Mixer	85	79
Dozer	85	79
Grader	85	79
Jack Hammer	88	82
Loader	80	74
Paver	85	79
Pile-drive (Impact)	101	95
Pile-driver (Sonic)	95	89
Roller	85	79
Saw	76	70
Scarified	83	77
Scraper	85	79
Truck	84	78

Source: Federal Transit Administration (FTA). 2018. *Transit Noise and Vibration Impact Assessment*. November.

As discussed above, project-level details are not currently available for future development that would be facilitated by the 2045 General Plan, it is not possible to determine exact noise levels, locations, or time periods for construction of such projects, or construction noise at adjacent properties. Therefore, short-term construction noise levels associated with future projects may exceed the FTA's daytime construction noise limits, and impacts would be potentially significant.

Implementation of Mitigation Measure NOI-1 would reduce short-term construction noise impacts associated with future development facilitated by the 2045 General Plan. However, as exact details of future project-specific construction activities are unknown at this time, short-term construction noise could still exceed the daytime significance threshold or potentially need to occur during the more sensitive nighttime hours for concrete pours or pumps that need to run overnight for water resources projects. Consequently, implementation of Mitigation Measure NOI-1, while it would reduce short-term construction noise impacts, would not ensure that short-term construction noise impacts would be reduced to below the significance threshold of 80 dBA L_{eq} during the daytime at residential uses and other sensitive receptors in all cases. Therefore, the 2045 General Plan's short-

term construction noise impacts would remain significant and unavoidable. It should be noted that the identification of this program-level impact does not preclude the finding of less-than-significant impacts for subsequent projects analyzed at the project level.

Operation

STATIONARY OPERATIONAL NOISE

Stationary operational sources of noise are expected to include air conditioning units, loading dock activities, outdoor restaurant dining and music activities, and parking lot vehicle movements. Special noise sources such as music (live or otherwise), sound amplification devices, and tenant-specific noise sources would require a site-specific noise analysis prior to building permit approval.

The following policies and actions from the 2045 General Plan would minimize potential adverse noise-related impacts from stationary sources.

- **Updated Goal SAF-11:** To reduce, minimize and manage noise and vibration to the greatest extent feasible.
- **Updated SAF-11.2: Noise Mitigation in Design.** The City shall require the use noise mitigation measures where appropriate in the design of new development and redevelopment, especially for residential or other noise-sensitive land uses adjacent to major roads or noise-generating commercial or industrial areas to ensure internal noise levels of the receiving noise-sensitive uses remain at acceptable levels.
- **New Policy SAF-11.3: Sensitive Areas.** The City shall ensure acceptable noise levels are maintained near schools, hospitals and other noise sensitive areas through proper land use decisions and site plan review.
- **Goal 1:** Incorporate noise considerations into land use planning decisions.
- **Policy 1.1:** In order to maintain acceptable limits of noise for various land uses throughout the community, the City will continue to utilize its current Noise/Land Use Compatibility Matrix contained in Table 4.11-3 of the Noise Element, which specify the maximum noise levels allowable for new developments impacted by transportation noise sources operating on public and quasi-public property. Sources on private property would be subject to the City's Noise Ordinance requirements, as described in Policy 3.1 of this Noise Element.
- **Action Item B**: Incorporate noise reduction features into new development during site planning to mitigate anticipated noise impacts on affected noise-sensitive land uses. The noise referral zones identified in this Noise Element, which show areas that are currently and in the future potentially exposed to noise levels greater than 55 dBA (CNEL) or greater, can be used to identify locations of potential conflict. New development will be permitted only if appropriate mitigation measures are included such that the standards contained in this Element and the City's Noise Ordinance are met.
- **Action Item C:** Enforce the State of California Uniform Building Code that specifies that the indoor noise levels for residential living spaces not exceed 45 dB L_{dn}/CNEL due to the combined effect of all noise sources. The State requires implementation of this standard when the outdoor noise levels exceed 60 dB L_{dn} /CNEL. The Noise Referral Zones (60 CNEL) can be used to determine when this standard needs to be addressed. The Uniform Building Code (specifically, the California Administrative Code, Title 24, Part 6, Division T25, Chapter 1, Subchapter 1, Article 4, Sections T25-28) requires that "Interior community noise levels (CNEL/ L_{dn}) with windows closed, attributable to exterior sources shall not exceed an annual CNEL or L_{dn} of 45 dB in any habitable room." The Code requires that this standard be applied to all new hotels, motels,

apartment houses and dwellings other than detached single-family dwellings. Additionally, the standard should be applied to single family homes.

- **Goal 3:** Establish measures to control non-transportation noise impacts.
- **Policy 3.1:** The City shall continue to enforce its Community Noise Ordinance to mitigate noise conflicts between adjacent land uses. The Noise Ordinance establishes noise limits that cannot be exceeded at the property line. The Noise Ordinance, because it is a City statute, can only control noise generated on private property. Therefore, the primary function of the Noise Ordinance is to control stationary noise sources and construction noise.
- **Action Item A:** Enforce the Community Noise Ordinance, which is the most effective method to control community noise impacts from non-transportation noise sources.

Implementation of these policies and actions would ensure that noise from new developments is analyzed and mitigated to acceptable levels prior to approval of these projects. Noise impacts from operational use of residential-scale HVAC units, industrial equipment, and other stationary noise sources would be reduced by policies and actions in the 2045 General Plan. Therefore, the 2045 General Plan's stationary operational noise impact would be less than significant.

MOBILE OPERATIONAL NOISE

Implementation of the 2045 General Plan would allow additional development to occur in the Planning Area, which would generate new vehicle trips that could incrementally increase the exposure of land uses along roadways to operational roadway vehicle noise. Figure 4.11-5 shows the 60, 65, and 70 dBA CNEL noise contours from roadways and highways for future (year 2045) roadway vehicle scenarios. The complete distances to the 60, 65, and 70 dBA CNEL noise contours for roadway segments are included in Appendix F. Using ADT data provided by DKS Associates (DKS Associates 2023), Table 4.11-5 shows the estimated increase in roadway vehicle noise on study roadway segments compared to existing.

The following policies and actions in the 2045 General Plan would reduce roadway vehicle noise:

- **Goal SAF-11:** To reduce, minimize and manage noise and vibration to the greatest extent feasible.
- **SAF11.1 – Roadway Project Noise Mitigation:** The City shall work with Caltrans to require the inclusion of noise mitigation measures along Highway 246 near residential units in the design of new roadway projects where necessary to maintain acceptable noise levels for adjacent uses.
- **Policy SAF-11.3: Sensitive Areas.** The City shall ensure acceptable noise levels are maintained near schools, hospitals and other noise sensitive areas through proper land use decisions and site plan review.
- **Goal 2:** Establish measures to reduce noise impacts from traffic noise sources.
- **Policy 2.1:** The City shall require the construction of barriers to mitigate sound emissions where necessary or where feasible.
- **Action Item A:** Encourage the use of walls and berms in the design of residential or other noise-sensitive land uses adjacent to major roads or commercial or industrial areas.
- **Policy 2.2:** The City shall require the inclusion of noise mitigation measures in the design of new roadway projects in Solvang. This may include, but not be limited to, the new or extended roadways included in Section 3.0 of the City's 2008 Circulation Element, including the extension of Maple Avenue east to Pine Street, the extension of Fjord Drive from Alisal Road west along the Santa Ynez River then north to Mission Drive, and the regional bypass road that would be

created by extending Santa Rosa Road from Highway 101 to State Route 154 along the south side of the Santa Ynez River.

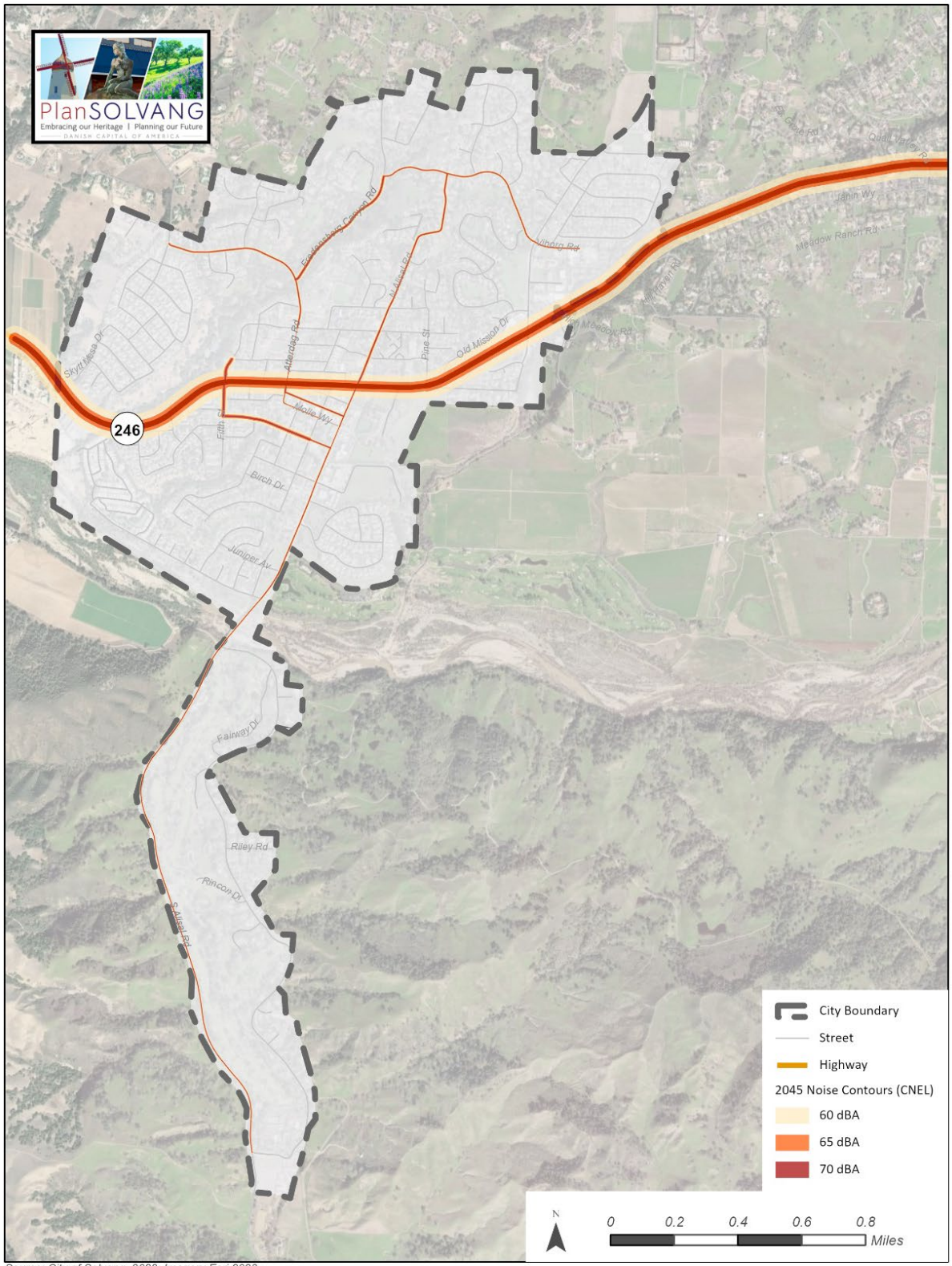
In addition, the 2045 General Plan includes policies in the Mobility Element that support facilitating development to promote regional transportation goals included in Connected 2050 to improve access to transit, improve access to alternative transportation, and mitigate adverse environmental effects. These policies include:

- **Policy MOB-1.11: Regional Coordination for Roadway Management.** The City shall coordinate with SBCAG, the City of Buellton, the Chumash Tribe, Santa Barbara County, the California Department of Transportation, and other jurisdictions in the planning and funding of regional transportation alternatives. Mission Drive (SR 246) shall not be widened to four lanes through the Village Area instead, emphasis shall be placed on developing regional transportation alternatives.
- **Policy MOB-2.7: New Facilities in Existing Neighborhoods.** The City shall encourage the installation of sidewalks, pedestrian paths, bikeways, and wheelchair ramps in existing neighborhoods, where appropriate and support Safe Routes to Schools funding.
- **Policy MOB-4.1: Complete Streets**. The City shall create guidelines to facilitate the installation of non-automobile serving infrastructure along its streets, including sidewalks and bike trails.
- **Policy MOB-5.1: VMT Management.** The City shall work with SBCAG and the Santa Barbara County Air Pollution District to identify trip and VMT reduction opportunities.
- **Policy MOB-5.2: TDM.** The City shall encourage employers to promote carpooling, public transportation, and allow telecommuting.

With implementation of the policies included in the proposed Mobility Element, the 2045 General Plan would encourage alternative travel, equitable access, and a reduction in vehicle trips, consistent with the regional transportation goals of Connected 2050.

As shown in Table 4.11-5, a greater than 5 dBA CNEL traffic noise increase is estimated along the road extension on Alisal Road between Fijord Drive to Rancho Alisal Drive. However, the resulting traffic noise level along this roadway extension would be 53.9 dBA CNEL, which is considered by the City to be Normally Acceptable for all land use types (Table 4.11-3). Along all other roadway study segments, traffic noise increases would be less than significant.

Figure 4.11-5 Future 2045 Roadway Vehicle Noise Contours – Section 1



Source: City of Solvang, 2023; Imagery Esri 2023.
Date: December 6, 2023

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Figure 4.11-6 Future 2045 Roadway Vehicle Noise Contours – Section 2

Source: City of Solvang, 2023; Imagery Esri 2023.
Date: December 6, 2023

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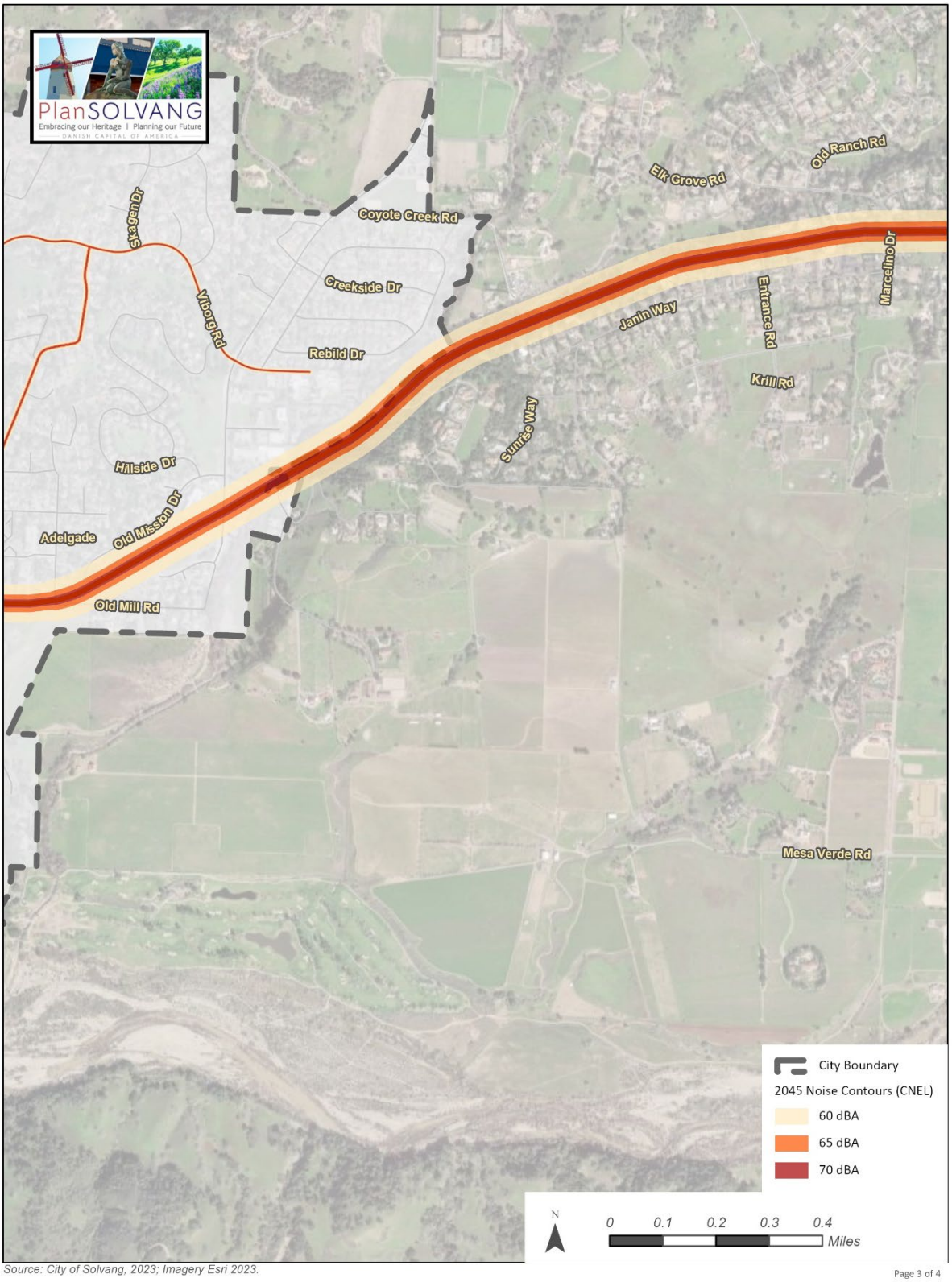
Figure 4.11-7 Future 2045 Roadway Vehicle Noise Contours – Section 3



Source: City of Solvang, 2023; Imagery Esri 2023.
Date: December 6, 2023

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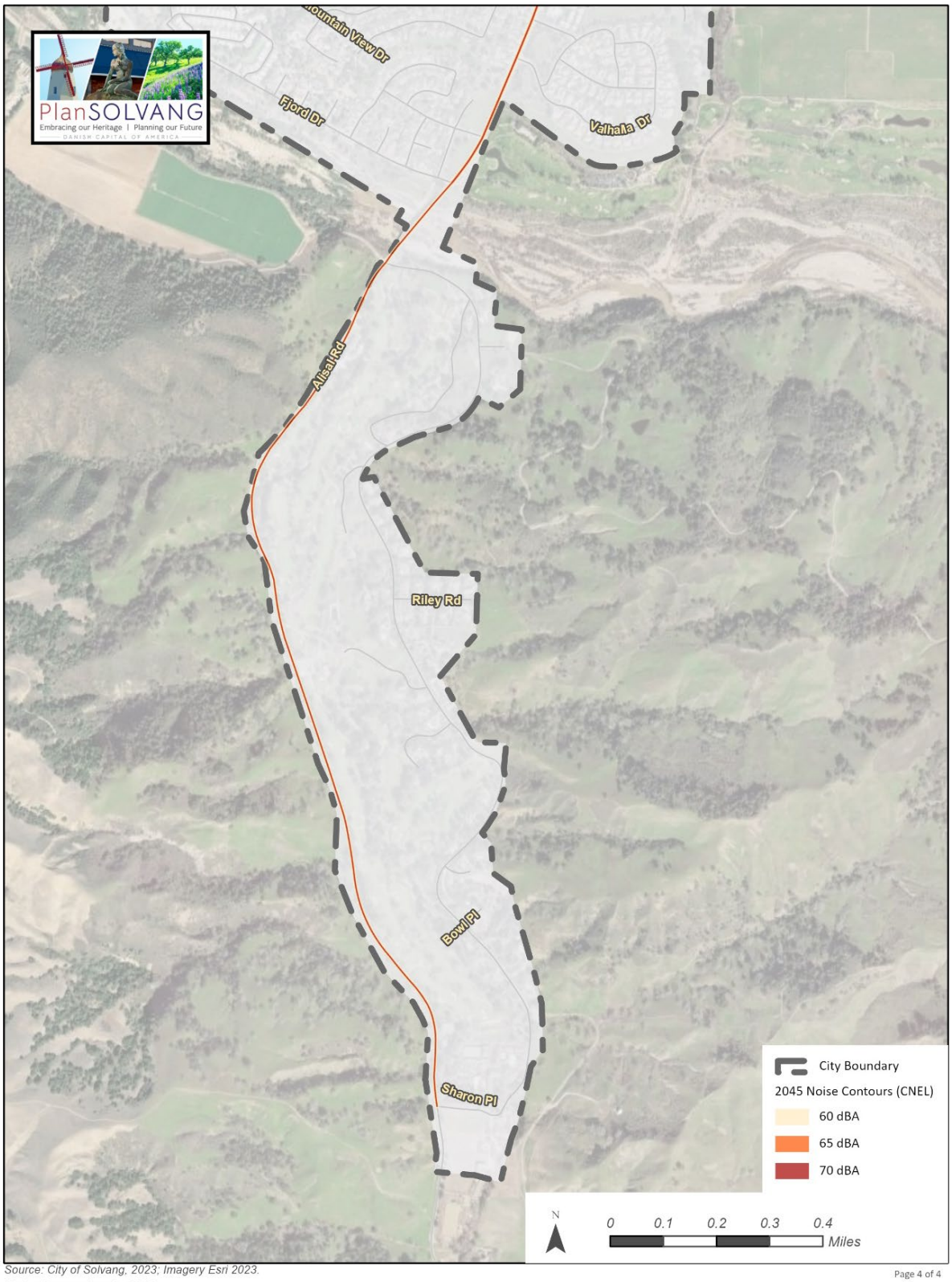
Figure 4.11-8 Future 2045 Roadway Vehicle Noise Contours – Section 4



Source: City of Solvang, 2023; Imagery Esri 2023.
Date: December 6, 2023

Table 4.11-5 Existing and Future Traffic Volumes

Roadway Segment	2015 Existing ADT	2045 GP - With Project ADT	Existing Roadway Vehicle Noise Level at 50 feet (dBA CNEL)	2045 Roadway Vehicle Noise Level at 50 feet (dBA CNEL)	Roadway Vehicle Noise Increase (dBA CNEL)	Significance Threshold dBA	Significant? Y/N
SR246 - 5th Street to Nykobing	15,621	18,989	68.8	69.6	0.8	1.5	N
SR246 - 4th Street to 5th Street	12,467	15,338	67.8	68.6	0.8	1.5	N
SR246 - Alisal Road to 1st Street	12,667	15,532	68.0	68.7	0.7	1.5	N
SR246 - Old Mill Road to Alisal Road	12,393	15,387	67.9	68.6	0.7	1.5	N
SR246 - Alamo Pintado Road to Old Mill Road	14,292	18,014	68.5	69.3	0.8	1.5	N
Alisal Road - Viborg Road to Eucalyptus Drive	1,231	1,595	56.2	57.2	1.0	5.0	N
Alisal Road - Laurel Avenue to Maple Avenue	1,483	2,028	56.9	58.5	1.5	5.0	N
Alisal Road - Maple Avenue to SR 246	1,515	2,017	57.0	58.5	1.4	5.0	N
Alisal Road - SR 246 to Copenhagen Drive	1,240	1,872	53.4	55.1	1.6	5.0	N
Alisal Road - Molle Way to Oak Street	606	1,191	50.2	53.1	2.9	5.0	N
Alisal Road - Oak Street to Elverhoy Way	634	1,913	50.5	55.2	4.8	5.0	N
Alisal Road - Fijord Drive to Rancho Alisal Drive	27	1,425	36.3	53.9	17.5	5.0	N[1]
Squire Lane - Viborg Road to Chalk Hill Road	2,033	3,005	58.3	59.7	1.4	5.0	N
Atterdag Road - Chalk Hill Road to Laurel Avenue	2,004	2,666	55.4	56.5	1.0	5.0	N
Atterdag Road - Laurel Avenue to Elm Avenue	336	391	47.4	48.1	0.7	5.0	N
Atterdag Road - Elm Avenue to SR 246	681	856	50.6	51.6	1.0	5.0	N
Atterdag Road - SR 246 to Copenhagen Drive	2,162	2,084	58.4	58.3	-0.1	5.0	N
Atterdag Road - Copenhagen Drive to Copenhagen Drive	807	623	53.5	53.0	-0.6	5.0	N

Roadway Segment	2015 Existing ADT	2045 GP - With Project ADT	Existing Roadway Vehicle Noise Level at 50 feet (dBA CNEL)	2045 Roadway Vehicle Noise Level at 50 feet (dBA CNEL)	Roadway Vehicle Noise Increase (dBA CNEL)	Significance Threshold dBA	Significant? Y/N
Atterdag Road - Copenhagen Drive Molle Way	838	664	53.7	53.2	-0.5	5.0	N
5th Street - Elm Avenue to SR 246	3,090	4,360	60.3	61.6	1.3	3.0	N
5th Street - SR 246 to Copenhagen Drive	3,120	3,563	60.5	61.6	1.0	3.0	N
5th Street - Copenhagen Drive to Oak Street	3,152	3,608	60.6	61.6	1.0	3.0	N
Copenhagen Drive - Atterdag Road to 1st Street	1,465	1,596	57.0	57.3	0.2	5.0	N
Viborg Road - Alisal Road to Squire Lane	687	1,344	53.5	55.7	2.2	5.0	N
Molle Way - 2nd Street to 1st Street	724	499	53.0	52.1	-0.9	5.0	N
Molle Way - 1st Street to Alisal Road	36	40	41.3	41.7	0.4	5.0	N
Oak Street - 2nd Street to 1st Street	2,784	4,052	59.8	61.3	1.5	5.0	N
Oak Street - 1st Street to Alisal Road	572	1,324	52.7	56.5	3.7	5.0	N
Oak Street - 2nd Street to 5th Street	2,669	3,887	59.7	61.2	1.5	5.0	N
Elverhoy Way - 1st Street to Alisal Road	29	42	39.7	41.3	1.6	5.0	N

Notes:

ADT = average daily traffic.

[1] While a greater than 5 dBA CNEL traffic noise increase is estimated along the road extension on Alisal Road between Fijord Drive to Rancho Alisal Drive, the resulting traffic noise level along this roadway extension would be 53.9 dBA CNEL, which is considered by the City to be Normally Acceptable for all land use types.

Source: DKS Associates, 2023.

Mitigation Measures

NOI-1 Adopt and Implement Construction Noise Reduction Measures

To minimize noise during construction, the City shall adopt a policy to include the following:

- Construction contractors shall implement the following measures for construction activities conducted within the City. Construction plans submitted to the City shall identify the following minimum measures on demolition, grading, and construction plans submitted to the City. The City Building Department shall verify that grading, demolition, and/or construction plans submitted to the City include these notations prior to issuance of demolition, grading and/or building permits.
  - **Mufflers.** During excavation and grading construction phases, all construction equipment, fixed or mobile, shall be operated with closed engine doors and shall be equipped with properly operating and maintained mufflers consistent with manufacturers' standards.
  - **Stationary Equipment.** All stationary construction equipment shall be placed so that emitted noise is directed away from the nearest sensitive receivers.
  - **Equipment Staging Areas.** Equipment staging shall be located in areas that will create the greatest distance feasible between construction-related noise sources and noise-sensitive receivers.
  - **Smart Back-up Alarms.** Mobile construction equipment shall have smart back-up alarms that automatically adjust the sound level of the alarm in response to ambient noise levels. Alternatively, back-up alarms shall be disabled and replaced with human spotters to ensure safety when mobile construction equipment is moving in the reverse direction in compliance with applicable safety laws and regulations.
  - **Electrically-Powered Tools and Facilities.** Electrical power shall be used to run air compressors and similar power tools and to power any temporary structures, such as construction trailers or caretaker facilities, where feasible.
  - **Noise Disturbance Coordinator**. The project applicant shall designate a "noise disturbance coordinator" responsible for responding to any local complaints about construction noise. The disturbance coordinator shall determine the cause of any noise complaint and shall require that reasonable measures be implemented to correct the problem. A telephone number for the disturbance coordinator and the City shall be posted at the construction site.
  - **Temporary Noise Barriers.** Erect temporary noise barriers, where feasible, when construction noise is predicted to exceed the acceptable standards (e.g., 80 dBA Leq at residential receivers, schools or other sensitive receptors during the daytime) or when the anticipated construction duration is greater than is typical (e.g., two years or greater) and there are sensitive receptors within 500 feet of the construction site. Temporary noise barriers shall be constructed with solid materials (e.g., wood) with a density of at least 1.5 pounds per square foot with no gaps from the ground to the top of the barrier. If a sound blanket is used, barriers shall be constructed with solid material with a density of at least 1 pound per square foot with no gaps from the ground to the top of the barrier and be lined on the construction side with acoustical blanket, curtain or equivalent absorptive material rated sound transmission class (STC) 32 or higher.

Significance After Mitigation

Implementation of Mitigation Measure NOI-1 would reduce potential impacts from noise during short-term construction and operation to less than significant levels by reducing noise source impacts, however, impacts would remain significant and unavoidable.

Threshold:	Would the project result in generation of excessive groundborne vibration or groundborne noise levels?

Impact NOI-2 CONSTRUCTION OF DEVELOPMENT FACILITATED BY THE 2045 GENERAL PLAN WOULD TEMPORARILY GENERATE GROUNDBORNE VIBRATION, POTENTIALLY AFFECTING NEARBY LAND USES. OPERATION OF DEVELOPMENT FACILITATED BY THE 2045 GENERAL PLAN WOULD NOT RESULT IN SUBSTANTIAL GROUNDBORNE VIBRATION. THIS IMPACT WOULD BE LESS THAN SIGNIFICANT WITH MITIGATION.

Construction of future development facilitated by the 2045 General Plan could intermittently generate groundborne vibration affecting nearby properties. Table 4.11-6 lists groundborne vibration levels from various types of construction equipment at various distances.

Table 4.11-6 Vibration Source Levels for Construction Equipment

Equipment		Approximate Vibration Level (in/sec PPV)			
		25 feet from Source	50 feet from Source	100 feet from Source	200 feet from Source
Caisson Drilling		0.089	0.031	0.011	0.004
Jackhammer		0.035	0.012	0.004	0.002
Large Bulldozer		0.089	0.031	0.011	0.004
Loaded Truck		0.076	0.027	0.010	0.003
Pile Driver (impact)	Upper range	1.519	0.537	0.190	0.067
	Typical	0.644	0.228	0.081	0.028
Pile Driver (sonic)	Upper range	0.734	0.260	0.092	0.032
	Typical	0.170	0.060	0.021	0.008
Small Bulldozer		0.003	0.001	<0.001	<0.001
Vibratory Roller		0.21	0.074	0.026	0.009

Source: Federal Transit Administration (FTA). 2018. *Transit Noise and Vibration Impact Assessment*. November.

As shown in Table 4.11-6, buildings and structures could experience the strongest vibration during the use of pile-drivers and vibratory rollers. Vibration levels from pile-drivers could approach 1.519 in/sec PPV at a distance of 25 feet from the source and 0.190 in/sec at 100 feet, and vibration levels from vibratory rollers could approach 0.21 in/sec PPV at a distance of 25 feet and 0.026 at 100 feet. The threshold for historic structures is 0.12 in/sec PPV; the threshold is higher for residential buildings at 0.2 in/sec PPV.

Vibration levels from typical equipment such as bulldozers and jackhammers would not exceed FTA thresholds for historic structures and residential buildings at a distance of 25 feet or greater. However, vibration levels from pile driving equipment and vibratory rollers may exceed FTA thresholds.

The following goal and policy in the 2045 General Plan would reduce construction vibration noise:

- **Goal SAF-11:** To reduce, minimize and manage noise and vibration to the greatest extent feasible.
- **Policy SAF-11.4: Vibration Impacts.** For projects involving the use of major vibration generating equipment (e.g. pile drivers, vibratory rollers) that could generate groundborne vibration levels in excess of 0.2 in/sec PPV, the City may require a project-specific vibration impact assessment to analyze potential groundborne vibrational impacts and may require measures to reduce ground vibration levels.

Because project-level details are not currently available for individual development projects that would be facilitated by the 2045 General Plan, it is not possible to determine which projects may use pile driving or vibratory rollers and their exact vibration levels, locations, or time periods for construction of such projects. Therefore, construction vibration levels may exceed FTA vibration levels for preventing architectural building damage, and impacts would be potentially significant. However, implementation of Mitigation Measure NOI-2 would reduce construction groundborne vibration impacts from future development facilitated by the 2045 General Plan to a level of less than significant.

Operation

New residential, commercial, industrial, and retail development facilitated by the 2045 General Plan would not involve substantial operational vibration sources such as railroads and subways. Therefore, the 2045 General Plan's operational groundborne vibration and noise impacts would be less than significant.

Mitigation Measures

NOI-2 Adopt and Implement Vibration Control Measures and Screening Distances

To reduce potential construction vibration impacts, the City shall adopt the following 2045 General Plan policy:

- Prior to issuance of a building permit for a project requiring pile driving during construction a) within 135 feet of fragile structures (historical resources, 100 feet of non-engineered timber and masonry buildings [e.g., most residential buildings], b) within 75 feet of engineered concrete and masonry (no plaster); c) a vibratory roller within 40 feet of fragile historical resources or 25 feet of any other structure; and/or d) a dozer or other large earthmoving equipment within 20 feet for a fragile historical structure or 15 feet of any other structure, the project applicant shall prepare a groundborne vibration analysis to assess and mitigate potential vibration impacts related to these construction activities. This vibration analysis shall be conducted by a qualified and experienced acoustical consultant or engineer. The vibration levels shall not exceed FTA architectural damage thresholds (e.g., 0.12 in/sec PPV for fragile or historical resources, 0.2 in/sec PPV for non-engineered timber and masonry buildings, and 0.3 in/sec PPV for engineered concrete and masonry). If vibration levels would exceed these thresholds, alternative uses such as drilling piles as opposed to pile driving, static rollers as opposed to vibratory rollers, and lower horsepower earthmoving equipment shall be used. If necessary, construction vibration monitoring shall be conducted to ensure FTA vibration thresholds are not exceeded.

Significance After Mitigation

Implementation of Mitigation Measure NOI-2 would reduce potential impacts from groundborne vibration to less than significant levels by providing screening distances, within which vibration analysis and vibration reductions measures may be required to reduce project vibration impacts to less than significant levels.

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

Impact NOI-3 THE 2045 GENERAL PLAN WOULD NOT EXPOSE PEOPLE RESIDING OR WORKING IN THE PLANNING AREA TO EXCESSIVE NOISE LEVELS FROM AIRPORT LAND USE. THERE WOULD BE NO IMPACT.

The closest airport to the Planning Area is the Santa Ynez Airport/Kunkle Field, which is approximately 2.3 miles east of the Planning Area. The Santa Ynez Airport Land Use Compatibility Plan (Santa Ynez ALUCP 2023) shows that the Planning Area is not in the Santa Ynez Airport/Kunkle Field's 65 CNEL noise contour. Because the Planning Area is not in a 65 CNEL or higher noise contour of any nearby airport, implementation of the 2045 General Plan would not expose people residing or working in the Planning Area to excessive noise levels. There would be no impact.

Mitigation Measures

No mitigation is required because there would be no impact.

4.11.4 Cumulative Impacts

Construction Noise

Short-term construction noise generated by projects facilitated by the 2045 General Plan, in combination with construction activities for other cumulative projects that may be constructed simultaneously could, without mitigation, substantially increase noise levels in the vicinity of future projects. Mitigation measures have been identified to reduce short-term construction noise from future projects facilitated by the 2045 General Plan. Therefore, unless construction of cumulative projects, including those facilitated by the 2045 General Plan, occur in close proximity to each other and simultaneously, noise from individual construction projects has a small chance of combining to create significant cumulative impacts. Although this scenario is unlikely, and mitigation measures would be implemented to the extent feasible, the potential remains for a cumulatively considerable increase in short-term construction noise from projects facilitated by the 2045 General Plan. The 2045 General Plan could make a substantial contribution to this cumulatively significant impact. Therefore, the cumulative impact related to short-term construction noise would be significant and unavoidable.

Operational Stationary Noise

Development facilitated by the 2045 General Plan would introduce new stationary noise sources to the ambient noise environment in and around the Planning Area, including new mechanical ventilation equipment. These sources may combine with noise from other nearby cumulative projects to result in higher noise levels. However, operational noise from these sources is localized

and rapidly attenuates within an urbanized setting due to the effects of intervening structures and topography that block the line of sight, and due to other noise sources closer to receptors that obscure project-related noise. Implementation of Solvang Municipal Code noise standards would ensure that noise from new stationary sources as part of cumulative development would be within acceptable levels. Therefore, the cumulative impact related to operational stationary noise would be less than significant.

Operational Mobile Noise

As discussed in Impact NOI-1, roadway vehicle noise increases from development facilitated by the 2045 General Plan would not contribute to noise level increases that exceed impact criteria and would not be cumulatively considerable. Therefore, in combination with mobile noise for other cumulative development, the cumulative impact related to operational mobile (roadway vehicle) noise would be less than significant.

Groundborne Vibration and Noise

Although there could be other cumulative projects simultaneously under construction near a development project facilitated by the 2045 General Plan, the potential for construction groundborne vibration and noise impacts exists within a limited area (e.g., within approximately 25 feet for a vibratory roller). Since no two construction cumulative projects would both be within 25 feet of a given sensitive structure, cumulative groundborne vibration and noise impacts would be less than significant.

Overall Level of Cumulative Significance

Cumulative noise impacts would be significant and unavoidable due to short-term construction noise.

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