

CHAPTER 10

NOISE



10.0 INTRODUCTION

Noise is unwanted sound that is unpleasant, loud, or disruptive to hearing. The impacts of noise can range from irritation and annoyance to physical damage and health impacts.

Noise can result from many sources and perception of noise varies from person to person. While some level of noise is generally accepted and expected in urban and suburban settings, moderate noise levels can interfere with normal daily activities, while excessive and sustained high noise levels can result in hearing loss, high blood pressure, and sleep disturbance.

Sensitivity to noise varies between differing land use types. Residential uses are highly sensitive to noise levels, particularly at night. Industrial uses have a relatively low sensitivity to noise levels. The City's maximum acceptable noise levels vary between land uses to reflect the range of sensitivity and the differing character of the varied land uses found in the City.

10.1 MEASURING NOISE LEVELS

The following terms explain how the City measures noise levels for compliance with City regulations.

Level. The standard measure of sound level is the decibel (dB) system which generally describes the intensity of sound and how loudly it is perceived by the human ear. A 10 dB increase is perceived by the human ear as a doubling of the loudness of a sound.

dBA. A-weighted or dBA emphasizes mid-range frequency components of sound in a manner similar to how sound is perceived by the human ear.

Variation. Variation reflects how noise impacts change over a period of time: noise at night is generally more impactful than noise during the day and sustained noise is more impactful than a brief noise. The following measures are applied in the City's standards for acceptable noise levels:

- **Lmax.** The highest measured sound level occurring over a given period of time
- **Leq.** Average or "Equivalent" noise level.
- **CNEL.** Community Noise Equivalent Level, a weighted average of noise over time. CNEL applies a 5-dBA weighting factor to the hourly Leq for noises occurring from 7:00 p.m. to 10:00 p.m. and a 10 dBA weighting factor applied to noise occurring from 10:00 p.m. to 7:00 a.m.
- **Ldn.** Day-Night Average Sound Level, or Ldn, is similar to the CNEL scale but without the adjustment for events occurring during the evening hours.

Lmax and Leq describe maximum noise levels; non-transportation noise levels specified in this General Plan are measured in Lmax and Leq.

CNEL and Ldn describe average noise levels and for general use are interchangeable; mobile source noise levels specified in this General Plan are measured in Ldn.

10.2 NOISE SENSITIVITY

While noise can be measured objectively through the use of a sound meter, an individual's experience of noise is somewhat subjective – some individuals are more noise sensitive than others. Figure 10-1 provides a general correlation to how people experience noise in the real world and defines when noise levels become damaging.

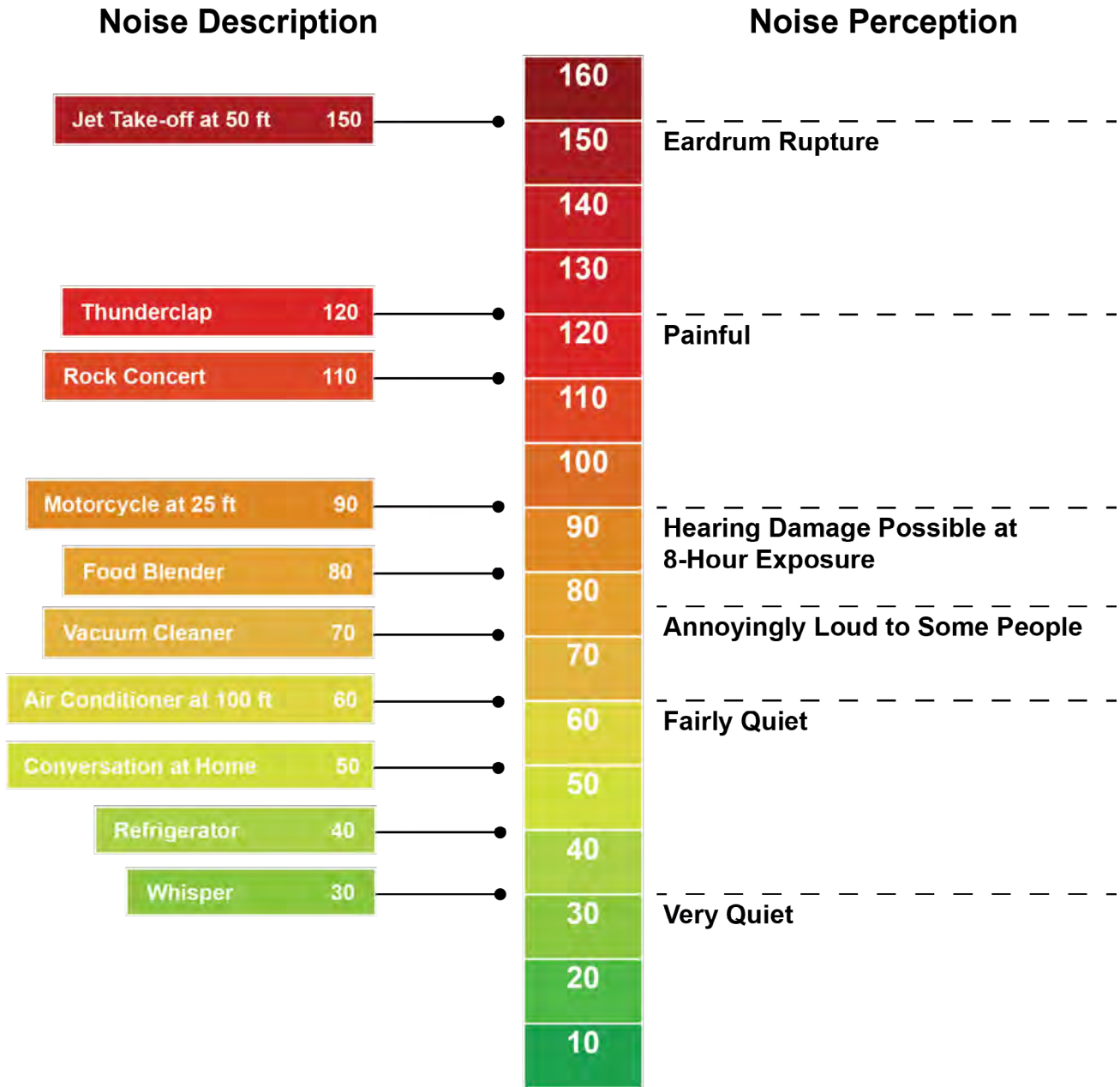


Figure 10-1: Sound Levels of Common Noise Sources

Land Use Category	Community Noise Exposure L _{dn} or CNEL, dB						
	55	60	65	70	75	80	85
Residential - Low Density Single, Family Duplex, Mobile Homes	Normally Acceptable		Conditionally Acceptable		Normally Unacceptable		
Residential - Multi-Family	Normally Acceptable		Conditionally Acceptable		Normally Unacceptable		
Transient Lodging - Hotels, Motels	Normally Acceptable		Conditionally Acceptable		Normally Unacceptable		
Schools, Libraries, Churches, Hospitals, Nursing Homes	Normally Acceptable		Conditionally Acceptable		Normally Unacceptable		
Auditoriums, Concert Halls, Amphitheaters	Normally Acceptable		Conditionally Acceptable		Clearly Unacceptable		
Sports Arena, Outdoor Spectator Sports	Normally Acceptable		Conditionally Acceptable		Clearly Unacceptable		
Playgrounds, Neighborhood Parks	Normally Acceptable		Conditionally Acceptable		Clearly Unacceptable		
Golf Courses, Riding Stables, Water Recreation, Cemeteries	Normally Acceptable		Conditionally Acceptable		Normally Unacceptable		
Office Buildings - Business, Commercial & Professional	Normally Acceptable		Conditionally Acceptable		Clearly Unacceptable		
Industrial, Manufacturing, Utilities, Agriculture	Normally Acceptable		Conditionally Acceptable		Clearly Unacceptable		
Normally Acceptable	<i>Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.</i>						
Conditionally Acceptable	<i>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.</i>						
Normally Unacceptable	<i>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.</i>						
Clearly Unacceptable	<i>New construction or development should generally not be undertaken.</i>						

Source: California Office of Planning and Research, General Plan Guidelines (2017), Appendix D.

Figure 10-2: Community Noise Compatibility Matrix

10-3 NOISE SOURCES IN RIO VISTA

MOBILE NOISE SOURCES

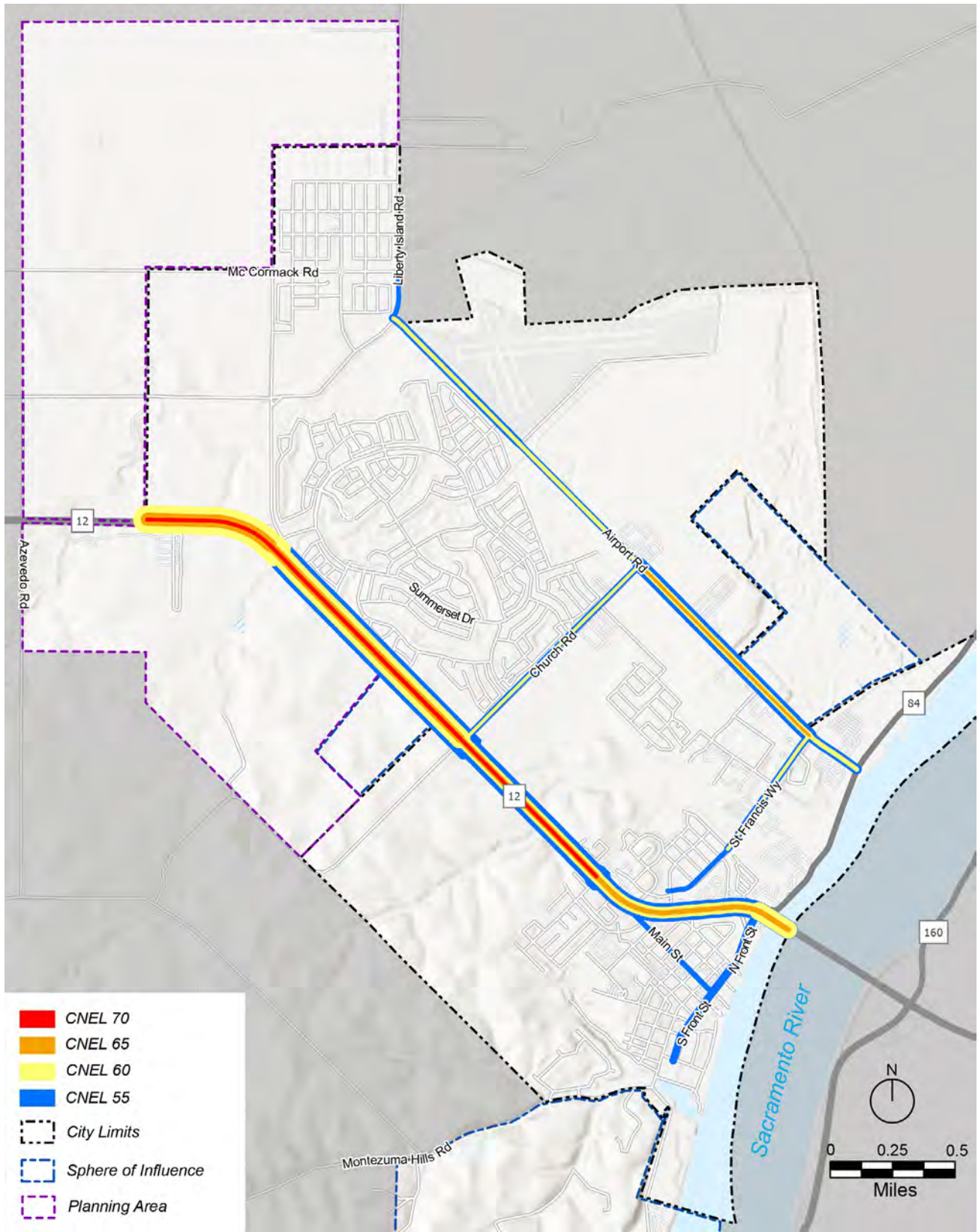
Automobile and truck traffic, including traffic generated by Rio Vista residents and traffic passing through the community, is the primary mobile noise source in Rio Vista. Figure 10-3 depicts the contours of existing noise levels (2023) associated with vehicle traffic in the City, and Figure 10-4 shows projected vehicle traffic noise contours for year 2045.

As shown on Figures 10-3 and 10-4, noise associated with existing and future vehicle traffic is greatest on Highway 12, with significant noise levels on Airport Road and Church Road by 2045. These existing and future noise levels result from both local (Rio Vista residents) traffic and the significant level of commuter and truck traffic that passes through Rio Vista.

Another mobile noise source in Rio Vista is the aircraft operations associated with the Rio Vista Municipal Airport. High levels of noise on airport land as well as in surrounding neighborhoods can result when aircraft takeoff and land. The operations of the City's airport have been evaluated in the Rio Vista Airport Land Use Compatibility Plan (ALUCP). The ALUCP modeled noise generated by aircraft operations for the year 2035, as shown on Figure 10-5.

Figure 10-5 depicts aircraft-related noise contours for year 2035 based on 23,305 annual operations. California Code of Regulations Title 21, Section 5012, establishes 65 dBA CNEL as the maximum acceptable level of aircraft noise for persons living in the vicinity of airports. As shown on this figure, no portion of the 65 dBA CNEL contour extends beyond the airport boundary and only a small portion of the 60 dBA CNEL boundary extends across Airport Road. Most or all residences of Rio Vista experience noise levels of 55 dBA CNEL or less, well within defined acceptable levels.

FIGURE 10-3: Existing Noise Levels – Mobile Sources



Source: Solano County 2016, 2022; US Census Bureau 2022; Interwest 2023; ESRI

STATIONARY NOISE SOURCES

In addition to the mobile or transportation related noise sources described previously, community members are also affected by various stationary noise sources. The following locations and activities can result in increased noise level from stationary sources.

Downtown Noise: Rio Vista is committed to economic development and creating a vibrant Downtown. Noise levels in Downtown have been measured as 64.3 dBA CNEL. As of 2024, the Rio Vista Municipal Code established acceptable noise levels of 75 dBA between the hours of 7:00 a.m. and 10:00 p.m., and 60 dBA between 10:00 p.m. and 7 a.m. As activities and special event in the Downtown increase, noise levels will also increase. The City's noise standards balance the interests of Downtown revitalization with maintaining acceptable noise levels for Rio Vista residents and businesses.

Nuisance Noise: Nuisance noise can result from various circumstances. A resident's activities may generate unacceptable noise levels and failing equipment may result in excessively loud noises. Pets left unattended, such as a barking dog, can result in long periods of excessive noise. Modified vehicles can generate noise in excess of legal standards. Such situations can impact adjoining property owners and affect their quality of life.

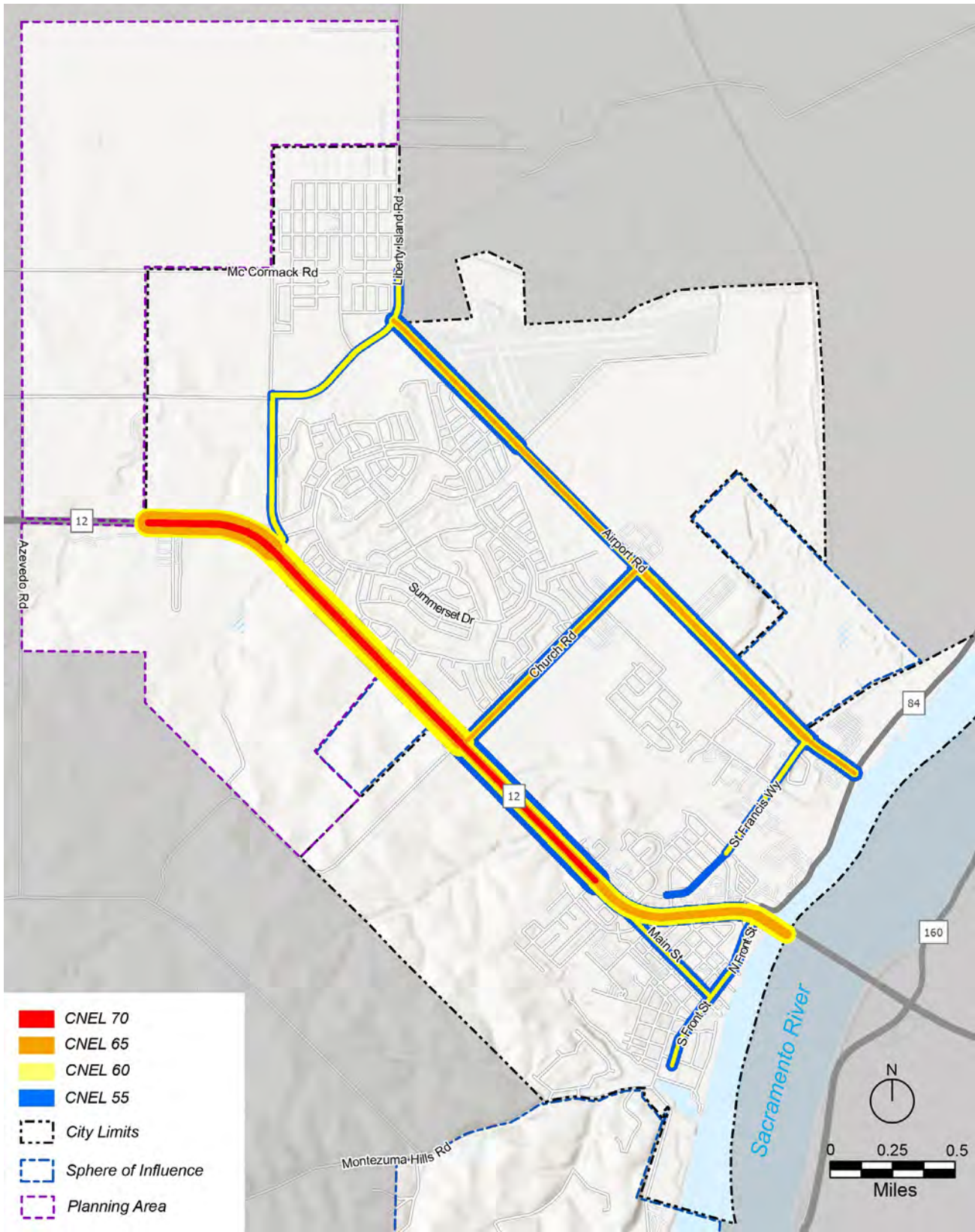
The City will always encourage residents to be considerate of neighbors and to make every effort to avoid bothersome levels of noise. When neighbors are unable to resolve such circumstances, the City may be called upon to enforce noise standards through the code enforcement process.

Construction Noise: Construction activities generate noise levels that exceed typical standards. While certain limitations can be applied, such as requiring mufflers on engines and limiting hours of construction, such activities will exceed typically acceptable noise levels. Due to the need to accommodate new development, construction is exempt from otherwise applicable noise limits.

Natural Gas Operations: Natural gas wells and transmission facilities (pipelines and compressors) are located within and around Rio Vista. The compressors are automatically activated from time to time and create high levels of noise while they are operating.

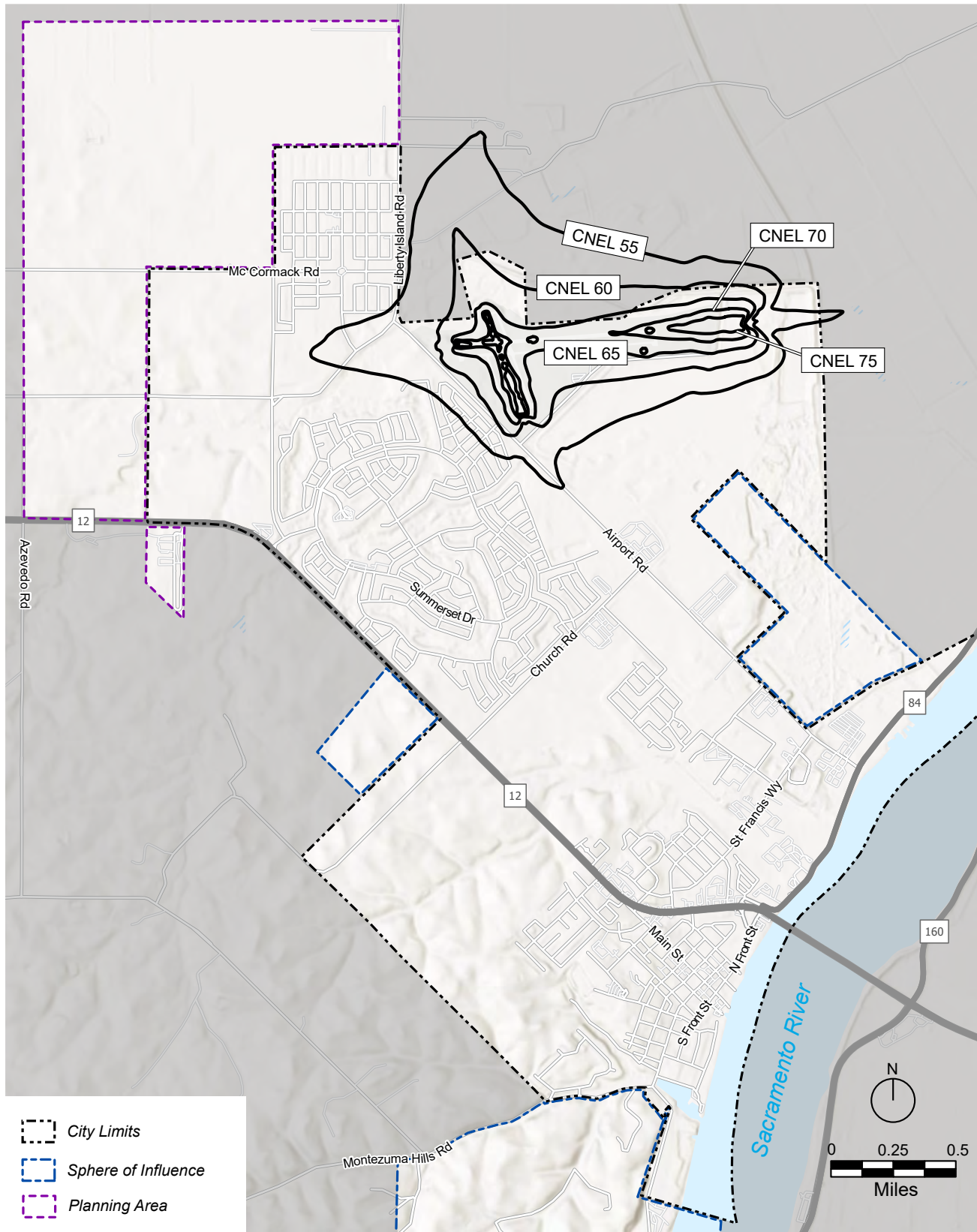
In some cases, natural gas wells are located in residential neighborhoods and have the potential to create noise impacts near residential development. When noise sensitive uses are approved and constructed near such facilities, the proposed development must ensure City noise standards will be met in the proposed noise sensitive use.

FIGURE 10-4: Projected 2045 Noise Levels - Mobile Sources



Source: Solano County 2016, 2022; US Census Bureau 2022; Interwest 2023; ESRI

FIGURE 10-5: Airport Noise Contours



Source: Solano County 2016, 2022; US Census Bureau 2022; Interwest 2023; ESRI

10.4 ACHIEVING COMPLIANCE WITH NOISE STANDARDS

When development projects are proposed, the City will consider how the proposed project complies with adopted noise standards as identified in Table 10.1 (Mobile Noise Sources) and Table 10.2 (Non-Transportation Noise Sources). For purposes of these standards, roadway vehicles and aircraft are considered Mobile Noise Sources, and all other noise generators are considered Non-Transportation Noise Sources.

Proposed development projects must demonstrate compliance with noise standards. This occurs as both a review of the noise setting to determine if a noise sensitive use is proposed in a high noise area and a review of the potential for the project to impact other land uses to determine if the proposed use has the potential to generate noise that exceeds City standards.

If this initial screening determines there is the potential for noise levels to be exceeded, the City may require an applicant to provide supplemental information regarding the proposed use and/or require the preparation of a noise analysis.

In cases where noise standards might be exceeded, the preferred approach is to minimize noise conflicts through project design, including adjusting the location or configuration of uses within the project. Additional remedies might include, but are not limited to, constructing sound barriers and incorporating noise-reducing construction techniques in proposed structures.

Table 10-1: Maximum Allowable Exterior and Interior Noise Levels for New Uses for Noise Generated by Mobile Noise Sources

Land Use	Outdoor Activity Areas - Ldn	Interior Peak 2 Hour - Ldn	Notes
All Residential	60	45	3, 4, 5
Transient Lodging	65	45	6
Hospitals and Nursing Homes	60	45	7
Theaters and Auditoriums	N/A	35	
Churches, Meeting Halls, Schools and Libraries	60	40	
Office Buildings	65	45	8
Commercial Buildings	65	50	8
Playgrounds and Parks	70	N/A	
Industrial Uses	N/A	55	

Notes:

1. Interior noise level standards are applied in noise-sensitive areas of the various land uses, with windows and doors in closed positions.
2. Interior noise refers to noise generated outside of a building and excludes noise associated with operations inside the building.
3. Outdoor activity areas for single-family residential uses are defined as backyards. For large parcels, the standard shall be applicable within a 100-foot radius of the residence.
4. For multi-family residential uses, the exterior noise level standard shall apply to common outdoor recreation areas.
5. Where it is not possible to reduce noise in outdoor activity areas to 60 dB Ldn or less using practical noise reduction measures, an exterior noise level of up to 65 dB Ldn may be allowed, provided interior noise levels are in compliance with this table.
6. Outdoor activity areas of transient lodging facilities include any outdoor areas designed for staff or guests to congregate.
7. Exterior noise level standards for hospitals are applicable only at clearly identified areas designated for outdoor relaxation by hospital staff, visitors or patients.
8. Only the exterior spaces of these uses designated for employee or customer relaxation must comply with the stated maximum noise levels.

NOISE

Table 10-2: Noise Standards for Locally Regulated (Non-Transportation) Noise Sources

	Time ³	Exterior Lmax	Areas ¹ Leq	Interior Lmax	Spaces ² Leq ⁴
All Residential and Lodging ⁵	Day	75	55	60	45
	Evening	70	50	55	40
	Night	65	45	45	35
Hospitals and Nursing Homes ⁶	Day	75	60	60	45
	Evening	75	55	55	40
	Night	70	45	45	35
Theaters and Auditoriums	Day	N/A	N/A	40	35
	Evening	N/A	N/A	40	35
	Night	N/A	N/A	40	35
Churches, Meeting Halls, and Libraries	Day	75	55	55	45
	Evening	70	50	55	40
Schools	Day	N/A	N/A	55	40
	Evening	N/A	N/A	55	40
Office Buildings ⁷	Day	75	60	60	45
	Evening	N/A	N/A	60	45
Commercial/Retail Buildings	Day	75	60	60	50
	Evening	70	55	60	50
Playgrounds and Parks	Day	75	60	N/A	N/A
	Evening	75	55	N/A	N/A
Industrial Uses ⁷	Day	80	70	60	50
	Evening	75	65	60	50

Notes:

1. Outdoor activity areas for single-family residential uses are defined as backyards. For large parcels, the standard shall be applicable within a 100-foot radius of the residence. Outdoor activity areas of lodging facilities include any outdoor areas designed for staff or guests to congregate.
2. Interior noise refers to noise generated outside of a building and excludes noise associated with operations inside the building.
3. Daytime hours = 7 am – 7 pm, Evening hours = 7 pm – 10 pm, Nighttime hours = 10 pm – 7 am.
4. Leq = Average or “Equivalent” noise level during the worst-case hour in which the building is in use.
5. Outdoor activity areas of transient lodging facilities include any outdoor areas designed for staff or guests to congregate.
6. Exterior noise level standards for hospitals and nursing homes are applicable only at areas designated for outdoor relaxation by staff, visitors, patients and residents.
7. Only the exterior spaces of these uses designated for employee or customer relaxation are considered sensitive to noise.
8. The outdoor activity areas of office, commercial, and park uses are not typically used during nighttime hours.

General Notes:

- a. The Table 10.2 standards shall be reduced by 5 dB for sounds consisting primarily of speech or music and for recurring impulsive sounds.
- b. If the existing ambient noise level exceeds the standards in Table 10.2, the noise level standards shall be increased by 5 dB.

10.5 NOISE (NE) GOALS, POLICIES, AND IMPLEMENTATION PROGRAMS

GOALS

Goal NE-1: Ensure that community members and/or businesses are not adversely impacted by unwanted or excessive noise levels.

POLICIES

Policy NE-1: New development shall be evaluated for compliance standards provided in Table 10-1. Where existing noise levels would exceed acceptable levels, it shall be the obligation of the applicant proposing the project to ensure noise levels are reduced to acceptable levels.

Policy NE-2: New development shall not generate operational noise levels that exceed the noise standards in Tables 10-2 on surrounding properties.

Policy NE-3: Where noise attenuation is required to meet the standards of this element, an emphasis shall be placed on site planning and project design, including, but are not limited to, building orientation, setbacks and building construction practices.

Policy NE-4: The use of sound walls will be allowed only if these other measures cannot achieve compliance with the noise standards of this General Plan. Where sound walls are required, the walls shall be designed to ensure the wall is visually attractive and compatible with the design of the proposed project and surrounding development.

Policy NE-5: When noise sensitive development is proposed in proximity to existing gas extraction facilities, the developer of the proposed project shall be responsible for meeting applicable noise standards within the proposed project.

Policy NE-6: Ensure that noise sensitive uses do not encroach into areas needed by noise generating uses.

Policy NE-7: Projects located within the CNEL 55 dB contour of the Rio Vista Municipal Airport, as depicted in the Airport Land Use Compatibility Plan (ALUCP), shall be reviewed for noise sensitivity and consistency with City and ALUCP noise standards.

Policy NE-8: Noise associated with construction activities shall be exempt from the noise standards cited in Table 10.2. However, construction related noise impacts shall be minimized as follows:

- The City shall limit construction activities to between the hours of 7 a.m. and 5 p.m. unless an exemption is granted in the City's review of the project's entitlement or permit.
- The City shall require all internal combustion engines used in conjunction with construction activities to be muffled according to the equipment manufacturer's requirements.

PROGRAMS

Program NE-1: Within any entitlement review, the project applicant shall provide a description of project operations and shall provide information as required, potentially including a noise study, to determine the project's consistency with City noise standards, as established in Tables 10.1 and 10.2.

Program NE-2: Maintain a map of locations of existing and proposed natural gas well sites for reference when reviewing land use entitlements.

Program NE-3: Where a noise sensitive land use is proposed near an existing fixed noise source, the applicant shall be responsible for demonstrating that the proposed project will comply with City noise standards.

Program NE-4: All proposed specific plans and PUDs and tentative maps shall be reviewed in terms of present and future noise levels and means of noise attenuation. The City will consider techniques such as site and building design, barriers, and traffic planning. Noise-reducing measures will be incorporated into the proposed Specific plan, PUD or tentative map as necessary to comply with City standards.

Program NE-5: Amend the Chapter 17.52 Noise Standards of the Rio Vista Municipal Code to address noise compatibility standards that may include, but are not limited to, the following:

- Noise performance standards for gas well operations (i.e., compressors) of 45 dBA (maximum) at the residential property line.
- Limits for mobile or short duration non-mobile noise emissions.
- Noise generated by added equipment that does not require zoning approval or a building permit.
- On-site vehicular operations, such as truck loading and unloading.
- Operation of construction equipment and maintenance equipment.
- Amplified music and outdoor entertainment in Commercial zones.
- Abatement of nuisance noise levels, including standards for nuisance noise and procedures for abatement of nuisance noise levels