

AIR QUALITY

Simply stated, ambient air quality is a measure of how healthy or clean is a region's air. Poor air quality can have negative health effects on residents, especially sensitive groups such as children, the elderly, and people with pre-existing respiratory conditions. Concentrations of air pollutants, primarily generated by human activity, contribute to poor air quality. Natural factors in Solano County such as terrain, wind, and sunlight can cause poor air quality conditions to persist even if regional emissions decline. Other factors, such as the presence of certain industries, can produce localized areas of poor air quality. The policies and implementation programs included in this section are intended to allow population and economic growth while improving the air quality in Solano County.

Planning Context

Solano County is situated on the boundary of two air basins, each under the jurisdiction of two different air quality management districts as shown in Figure 5-9. The southwestern portion of Solano County is located in the San Francisco Bay Area Air Basin (SFBAAB), and is managed by the Bay Area Air Quality Management District (BAAQMD). The northeastern portion of Solano County lies within the Sacramento Valley Air Basin (SVAB), and is managed by the Yolo-Solano AQMD (YSAQMD). The SFBAAB is characterized by complex terrain, consisting of coastal mountain ranges, inland valleys, and bays, which alter normal wind flow patterns. In this area, the Coast Range splits, allowing air to flow out of the SFBAAB, carrying pollution into the SVAB.

In contrast, the SVAB is relatively flat, bordered by the North Coast Mountain Range to the west and the Northern Sierra Nevada Mountains to the east. Air flows into the SVAB through the Carquinez Strait, the only break in the western mountain barrier, and moves across the Sacramento-San Joaquin River Delta. The mountains surrounding the SVAB create a barrier to airflow, which traps air pollutants when winds are calm or there is no precipitation to transport or remove them.

Regional air flow patterns affect air quality by transporting pollutants downwind of sources. Local conditions, such as moderate winds, disperse pollutants and reduce concentrations. When winds are calm, an inversion layer can develop, trapping pollutants in cooler air close to the ground with a cap of warmer air aloft. During summer mornings and afternoons, these inversions are present over much of the county. Summer sunshine then provides the energy needed for photochemical reactions to take place in the presence of **precursor pollutants** that form ozone.

Criteria Air Pollutants

Criteria air pollutants are the six most common air pollutants in the United States. Their sources and future trends are provided below.

Ozone is the primary component of smog. It is not directly emitted into the air, but instead is formed through photochemical reactions that combine precursor pollutants (Reactive Organic Gases [ROG] and Oxides of Nitrogen [NO_x]) in the

presence of sunlight. These reactants that form ozone are byproducts of fossil fuel combustion and the evaporation of chemical solvents and fuels.

Peak ozone concentrations often occur downwind of the precursor emission sources making ozone a pollutant of regional concern.

Emissions of ozone precursors have decreased over the past several years as a result of more stringent motor vehicle standards and cleaner burning fuels. Consequently, ozone concentrations in the SVAB and SFBAAB have declined as well, though concentrations in the SVAB have not declined as rapidly as in other urban areas because of its location and population growth, making it both a generator and receptor of pollutants.

Carbon monoxide (CO) is a colorless, odorless, and poisonous gas produced by incomplete combustion of carbon in fuels. The majority of CO emissions are from **mobile sources**, such as cars and trucks. The remainder of CO emissions is attributable to **stationary** and **area sources**, such as wood-burning stoves, incinerators, and factories. The highest concentrations are generally associated with cold, stagnant weather conditions that occur during the winter. In contrast to ozone, which is a pollutant of regional concern, CO is a pollutant of localized concern.

Nitrogen dioxide (NO₂) is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO₂ are combustion devices, such as boilers, gas turbines, and mobile and stationary internal-combustion engines. Because NO₂ is created and destroyed by reactions associated with ozone, the NO₂ concentration in a particular geographical area may not be representative of the local emission sources. The severity of the adverse health effects depends primarily on the concentration inhaled rather than the duration of exposure. Acute symptoms and prolonged impairment are typically experienced in the respiratory system.

Sulfur dioxide (SO₂) is produced by stationary sources such as coal and oil combustion, steel mills, refineries, and pulp and paper mills. The major adverse health effects associated with SO₂ exposure pertain to the upper respiratory tract. On contact with the moist mucous membranes, SO₂ produces sulfurous acid, which is a direct irritant. Concentration rather than duration of exposure is an important determinant of respiratory effects.

Particulate matter (PM) with diameter of 10 micrometers or less is referred to as PM₁₀. PM₁₀ consists of particulate matter emitted directly into the air, such as fugitive dust, soot, and smoke from mobile and stationary sources, construction operations, fires and natural windblown dust, and particulate matter formed in the atmosphere through other processes. Fine particulate matter (PM_{2.5}) includes a subgroup of smaller particles that have a diameter of 2.5 micrometers or less.

Health effects may include breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, alterations to the immune system, short-term and/or long-term illness. PM_{2.5} poses an increased health risk because the particles can deposit deep in the lungs and may contain substances that are particularly harmful to human health.

Direct emissions of PM increased slightly in the SVAB and SFBAAB between 1975 and 2005 and are projected to increase through 2020. These emissions come

largely from areawide sources, primarily because of development. Direct emissions from mobile and stationary sources have remained relatively steady.

Lead is a metal found naturally in the environment as well as in manufactured products. The major sources of lead emissions have historically been mobile and industrial sources. Since the phase-out of leaded gasoline, metal processing is currently the primary source of lead emissions. The highest levels of lead in the air are generally found near lead smelters. Other stationary sources include waste incinerators, utilities, and lead-acid battery manufacturers. In California, lead emissions and ambient lead concentrations have decreased dramatically over the past 25 years. Although the ambient lead standards are no longer violated, lead emissions from stationary sources still pose localized hazardous air quality in certain areas, and lead is classified as a toxic air contaminant by California Air Resources Board (ARB).

Toxic Air Contaminants

Concentrations of **toxic air contaminants** (TACs) are also used as indicators of ambient air quality conditions. A TAC is defined as an air pollutant that may cause or contribute to an increase in mortality or in serious illness, or that may pose a hazard to human health. TACs are usually present in minute quantities in the ambient air; however, their high toxicity or health risk may pose a threat to public health even at low concentrations.

According to the ARB, the majority of the estimated health risk from TACs can be attributed to relatively few compounds, the most important being PM from diesel-fueled engines (diesel PM).

Planning Efforts

Several site design and planning methods can be employed to minimize exposure of sensitive receptors to excessive concentrations of air pollutants and odors. Given the nature of planning in Solano County and the emphasis on focusing development in municipal areas; many of the following methods should be encouraged within the cities, or should be accomplished in coordination with cities. Methods advocated by local air quality management districts and the ARB include:

Abatement: since mobile-source emissions are of great concern, development should be planned such that the use of motor vehicles is not required to meet daily needs. Minimizing vehicle miles traveled (VMT) reduces mobile-exhaust pollutant emissions from the source, improving air quality, along with offering many other environmental and social benefits. Planning strategies for new or existing development in order to abate mobile-source air pollutant emissions include, but are not limited to, mixing of land use types (e.g., residential, office, retail, parks, and schools are within walking distance with pedestrian barriers minimized), creating a pedestrian- and bicycle-friendly environment through providing facilities and accessibility, providing convenient and efficient multi-modal transit options, and minimizing the supply of free parking at destinations.

In addition to abatement of mobile-source emissions, abatement of stationary-source emissions from utilities can occur through energy and water conservation strategies at the end use. Within the unincorporated county area, these techniques will receive more focus.

Ensure land use compatibility. The ARB guidance document “Air Quality and Land Use Handbook” recommends distances from which sensitive uses should be cited relative to pollutant emissions sources and visa-versa. For example, residential development should generally be set back approximately 500 feet from major roadways to reduce long-term exposure of the public to excessive concentrations of diesel PM. Similar recommendations exist for facilities that accommodate large numbers of commercial trucks, rail yards, ports, refineries, chrome platers, dry cleaning establishments, and gasoline stations.

In addition, odor-generating facilities, including, but not limited to, landfills or other waste disposal or transfer facilities, waste water treatment, food processing, refineries, manufacturing, rendering plant, and cattle or dairy operations should not encroach on residential or otherwise incompatible uses, and residential uses should not encroach on uses that may cause nuisance odors.

Implement Best Management Practices. Construction and agricultural activities, though typically short-term in nature, can generate large quantities of fugitive dust (PM) emissions. These emissions can cause nuisance if visible quantities of dust intrude onto neighboring property, can cause health problems, as discussed above, if sensitive persons are exposed, and can damage neighboring crops. Standard best management practices, such as regular watering or application of non-toxic soil stabilizers, episodic control to limit activity on days with high winds or forecast poor air quality, installation of wind-breaks, and reestablishment of ground cover on inactive areas can be very effective methods for controlling PM (dust).

To minimize short-term mobile-source emissions from construction or agricultural equipment, operators of older model equipment and pumps should be encouraged to seek engine upgrades through the appropriate air quality management district or ARB incentive program. Engine idling should be minimized when equipment is not in use.

Global Climate Change

It has been documented by the scientific community that increasing levels of greenhouse gases (GHGs) in the earth’s atmosphere are contributing to rising global average temperatures. The most abundant GHG is carbon dioxide (CO₂), which is a byproduct of fossil fuel combustion. CO₂ is removed from the atmosphere through sequestration by vegetation and dissolution into the ocean. These processes happen naturally, but human-generated emissions have outpaced these removal processes, resulting in excessive GHG concentrations accumulating in the atmosphere, and leading to a subsequent trend of unnatural global warming.

The planning practices noted above to reduce air pollutant emissions from motor vehicles and stationary and area sources also act to minimize CO₂ emissions from the same sources. Other GHGs, such as methane and nitrous oxide, have higher global warming potential, (or are more efficient at warming the climate than an equivalent mass of CO₂) but are emitted in smaller quantities. Using construction materials that sequester carbon, such as lumber, in place of more carbon-intensive materials, such as concrete are good practices to abate GHG emissions from new development. Encouraging renewable energy technology to support the energy needs of new and existing development can also mitigate potential

for increased energy demand and associated GHG emissions at the utility provider.

Since the transportation sector is responsible for the majority of GHG emissions in California and nationally, minimizing dependence on motor vehicles is a high priority. Legislation and Executive Orders on the subject of climate change in California (AB 32 and S-3-05) are interpreted to regulate stationary sources of emissions and high GWP-producing sectors. Mobile-source emissions of GHGs that can be attributed to land use decisions are not in themselves their own emissions sector. However, in order to achieve the goals mandated through state law, (specifically, reducing statewide total emissions to 1990 levels by the year 2020 and further reducing statewide GHG emissions in future years, with 30 years of population and economic growth in place), every emission sector will need to do its fair share to bring down the total, including land use.

Related Plans, Programs, and Policies

Air quality in Solano County is regulated by the U.S. Environmental Protection Agency (EPA), ARB, the YSAQMD, and BAAQMD. Each of these agencies develops rules, regulations, policies, and/or goals to comply with applicable standards. Although EPA regulations may not be superseded, both State and local regulations may be more stringent.

U.S. Environmental Protection Agency

The EPA is the federal agency charged with implementing national air quality programs. EPA's air quality mandates are drawn primarily from the federal Clean Air Act (CAA), which was enacted in 1970. The most recent major amendments to the CAA were made by Congress in 1990. The CAA required EPA to establish national ambient air quality standards (NAAQS).

California Air Resources Board

ARB is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementation of the California Clean Air Act (CCAA). The CCAA, which was adopted in 1988, required ARB to establish California ambient air quality standards (CAAQS). ARB has established CAAQS for sulfates, hydrogen sulfide, vinyl chloride, visibility-reducing particulate matter, and the above-mentioned criteria air pollutants. In most cases the CAAQS are more stringent than the NAAQS. In addition, the CAAQS incorporate a margin of safety to protect sensitive individuals.

Air Quality Management Districts

YSAQMD attains and maintains air quality conditions in the northeastern portion, while the BAAQMD's jurisdiction includes the southwestern portion of Solano County. Both districts prepare plans and programs for the attainment of ambient-air-quality standards, adopt and enforce rules and regulations, and issue permits for stationary sources. The districts also inspect stationary sources, respond to citizen complaints, and monitor ambient air quality and meteorological conditions.

Policies

Policy HS-42: Support land use, transportation management, infrastructure and environmental planning programs that reduce vehicle emissions and improve air quality.

Policy HS-43: Minimize health impacts from sources of toxic air contaminants, both stationary (e.g., refineries, manufacturing plants) as well as mobile sources (e.g. freeways, railyards, commercial trucking operations).

Policy HS-44: Promote consistency and cooperation in air quality planning efforts.

Policy HS-45: Coordinate with and provide incentives to agricultural producers to minimize the impacts of operations on air quality.

Policy HS-46: Promote GHG emission reductions by supporting carbon-efficient farming methods (e.g. methane capture systems, no-till farming, crop rotation, cover cropping, residue farming), installation of renewable energy technologies, protection of grasslands from conversion to other uses, and encouraging development of energy-efficient structures.

Implementation Programs

Regulations

Program HS-55: Consider a trip reduction ordinance and incentives to encourage employers to increase telecommuting, provide bicycle facilities, and access to public transit for employees, including County employees.

Related Policies: HS-42

Agency/Department: TBD

Funding Source: TBD

Time Frame: Ongoing

Development Review

Program HS-56: Require development proposals that introduce new sources of toxic air pollutants to prepare a health risk assessment as required under the Air Toxics "Hot Spots" Act (AB 2588, 1987) and, based on the results of the assessment, establish appropriate land use buffer zones around those areas posing substantial health risks.

Related Policies: HS-42, HS-43

Agency/Department: TBD

Funding Source: TBD

Time Frame: Ongoing

Ongoing Planning Efforts, Public Outreach and Education

Program HS-57: Develop a greenhouse gas emissions inventory according to the most recently established methodologies of the California Climate Action Registry or California Air Resources Board. At the time of writing this report the most recently established methodology is the California Climate Action Registry's General Reporting Protocol, Version 2.2.

Related Policies: HS-42, HS-43, HS-44, HS-45, HS-46

Agency/Department: TBD

Funding Source: TBD

Time Frame: Ongoing

Program HS-58: Develop a GHG emission reduction plan for Solano County and explore membership in the California Climate Action Registry which... (what does it do)?

Related Policies: HS-42, HS-43, HS-44, HS-45, HS-46

Agency/Department: TBD

Funding Source: TBD

Time Frame: Ongoing

Program HS-59: Comply with all federal and/or state GHG emission reduction targets to reduce the County's contribution to global climate change. The plan should include strategies to reduce vehicle miles traveled, energy consumption, and other sources of GHGs within the county.

Related Policies: HS-42, HS-43, HS-44, HS-45, HS-46

Agency/Department: TBD

Funding Source: TBD

Time Frame: Ongoing

Coordination with Other Agencies and Organizations

Program HS-60: Comply with California State Air Resources Board and Bay Area or Yolo-Solano Air Quality Management District rules, regulations, and recommendations for Solano County facilities and operations. Such operations shall comply with mandated measures to reduce emissions from fuel

consumption, energy consumption, surface coating operations, and solvent usage.

Related Policies: HS-42, HS-43, HS-45

Agency/Department: TBD

Funding Source: TBD

Time Frame: Ongoing

Program HS-61: Encourage coordination between the Bay Area and Yolo-Solano Air Quality Management Districts for consistency in air quality planning efforts.

Related Policies: HS-44

Agency/Department: TBD

Funding Source: TBD

Time Frame: Ongoing

Program HS-62: Use the guidelines presented in the California Air Resources Board's Air Quality and Land Use Handbook: A Community Health Perspective, or the applicable Air Quality Management District guidelines and recommendations available at the time, when establishing buffers around sources of toxic air contaminants or odorous emissions.

Related Policies: HS-43

Agency/Department: TBD

Funding Source: TBD

Time Frame: Ongoing

Program HS-63: Assess air quality impacts using the latest version of the California Environmental Quality Act Guidelines and guidelines prepared by the applicable Air Quality Management District.

Related Policies: HS-43, HS-44, HS-45

Agency/Department: TBD

Funding Source: TBD

Time Frame: Ongoing

Program HS-64: Encourage agricultural best management practices regarding herbicide and pesticide use, odor control,

FOR CAC REVIEW & DISCUSSION ONLY

Preliminary

fugitive dust control, and agricultural equipment emissions to minimize air quality impacts.

Related Policies: HS-45

Agency/Department: TBD

Funding Source: TBD

Time Frame: Ongoing

Program HS-65: Require the implementation of best management practices to reduce air pollutant emissions associated with the construction of all development and infrastructure projects.

Related Policies: HS-42, HS-43

Agency/Department: TBD

Funding Source: TBD

Time Frame: Ongoing

NOISE

Planning Context

This section describes actions that can be used to prevent noise conflicts between adjoining land uses. The County’s noise reduction and abatement strategy focuses on preventative techniques that protect noise-sensitive land uses from noise producing sources by:

- developing strategies for reducing excessive noise exposure through cost-effective measures and appropriate zoning that avoids placing incompatible land uses in proximity of each other;
- protecting existing regions of the county where noise levels are currently acceptable and also locations that are deemed “noise-sensitive”;
- protect existing noise-generating commercial and industrial uses from encroachment of new noise-sensitive developments;
- prevent new noise-generating commercial and industrial uses in Solano County from encroaching on noise-sensitive land uses; and
- provide sufficient information regarding existing and future community noise levels so that noise may be effectively considered in land use planning.

The County’s noise policies and implementation programs were created to support the County’s vision to create a place where people can live, work, and play in close proximity. To successfully integrate these lifestyle needs, noise

FOR CAC REVIEW & DISCUSSION ONLY

sources need to be designed, developed, and maintained in a way that does not affect residential neighborhoods, schools, hospitals, places of worship, and other noise-sensitive land uses. Industrial and commercial noise sources are essential for economic growth and, through careful planning, can continue to operate and grow to support the economy of the county.

Measuring Noise

Noise is defined as unwanted sound. It can cause stress and annoyance within a community. This section provides standards for analyzing future projects that may contribute to an increase in noise levels. The proposed policies and programs outline control measures for preventing excessive noise, while still allowing necessary noise sources to exist. The primary method for meeting these two goals is by separating noise-sensitive land uses, such as housing, schools and parks, from noise-producing land uses, such as highways, airports, and industry.

Because of the ability of the human ear to detect a wide range of sound, noise levels are expressed in logarithmic units called decibels (dB) to avoid a very large and awkward range in numbers. The audible range of hearing in humans is 0 dB to 130 dB. Above 130 dB damage may occur to the ear.

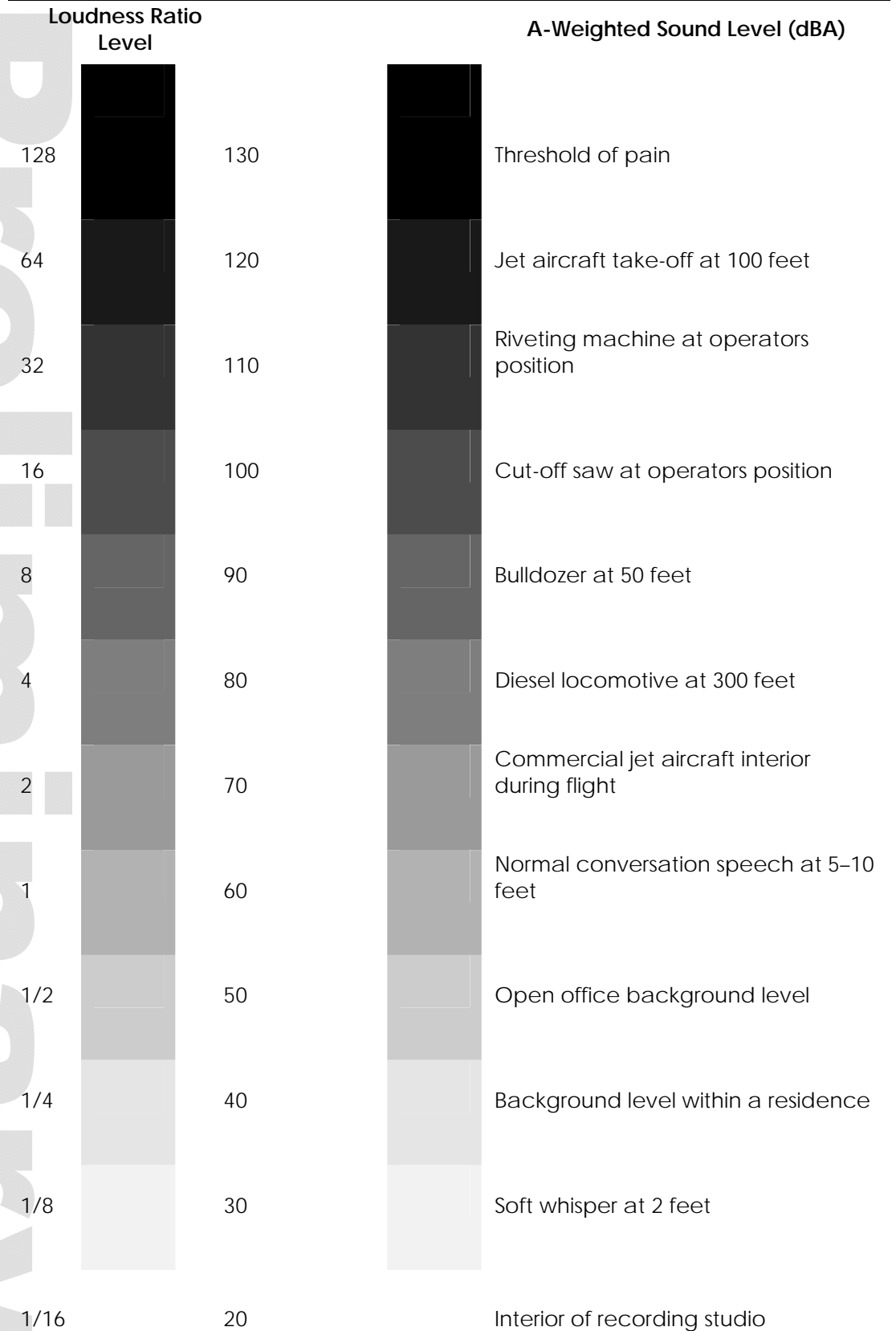
Because the human ear is not equally sensitive to all audible frequencies, a frequency-dependent rating scale was devised to relate noise to human sensitivity. An A-weighted dB (dBA) scale performs this compensation by discriminating against frequencies that are more sensitive to humans. The basis for compensation is the faintest sound audible to the average ear at the frequency of maximum sensitivity. This dBA scale has been chosen by most authorities for the purpose of regulating environmental noise. Typical indoor and outdoor noise levels are presented in Table 5-3.

With respect to how humans perceive and react to changes in noise levels, a 1 dBA increase is imperceptible, a 3 dBA increase is barely perceptible, a 6 dBA increase is clearly noticeable, and a 10 dBA increase is subjectively perceived as approximately twice as loud. For these reasons, a noise level increase of 3 dBA or more is typically considered to be substantial in terms of the degradation of the existing noise environment.

Two 24-hour descriptors commonly used to characterize ambient noise levels include the day-night noise level (L_{dn}) and the Community Noise Equivalent Level (CNEL). L_{dn} is the 24-hour energy mean (average) noise level with a 10 decibel (dB) "penalty" for noise events that occur during the noise-sensitive hours between 10:00 p.m. and 7:00 a.m. The L_{dn} descriptor attempts to account for the fact that noise during this specific period of time is a potential source of disturbance with respect to normal sleeping hours. The CNEL is similar to the L_{dn} described above, but with an additional 5 dB "penalty" added to single noise events that occur during the noise-sensitive hours between 7:00 p.m. to 10:00 p.m., which are typically reserved for relaxation, conversation, reading, and television. If using the same 24-hour noise data, the reported CNEL is typically approximately 0.5 dB higher than the L_{dn} . Noise levels of 60 dB L_{dn} /CNEL are often used as a benchmark when assessing noise levels. Outdoor noise levels that exceed 60 dB L_{dn} /CNEL are generally considered inappropriate in residential areas.

Table 5-3

Typical A-Weighted Sound Levels of Common Noise Sources



PRELIMINARY FOR CAC REVIEW & DISCUSSION ONLY

Noise Performance Standards

Daytime noise standards are typically set at noise levels that would not annoy or impede human interaction or function in outdoor activity areas. Nighttime noise standards are typically set to result in acceptable noise levels that would not interfere with sleep for most people inside a building with windows closed. In general, noise standards are designed to prevent annoyance or sleep disruption in sensitive members of the public.

Table 5-4 shows the acceptable noise levels for various land use categories, and is used when determining a proposed project's noise impact.

**Table 5-4
Land Use Noise Compatibility Guidelines**

Land Use Category	Community Noise Exposure (L _{dn} or CNEL, dBA)			
	Normally Acceptable ¹	Conditionally Acceptable ²	Normally Unacceptable ³	Clearly Unacceptable ⁴
All residential, lodging, schools, libraries, places of worship, nursing homes	<60	60–65	65–75	75+
Auditoriums, concert halls, amphitheaters		<70	70+	
Sports arena, outdoor spectator sports		<75	70+	
Playgrounds, neighborhood parks	<67.5		67.5–75	75+
Golf courses, riding stables, water recreation, cemeteries	<70		70–80	80+
Retail, movie theaters, restaurants	<65	65-75	75-80	80+
Office building, business commercial and professional	<67.5	67.5-77.5	77.5+	
Industrial, manufacturing, utilities, agriculture	<75	70–80	75+	
Noise-sensitive manufacturing and communications	<55	55-70	70-80	80+

**Table 5-4
Land Use Noise Compatibility Guidelines**

Notes:

CNEL = community noise equivalent level; dBA = A-weighted decibel; Ldn = day-night average noise level

¹ Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

² 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.

³ 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. Outdoor areas must be shielded.

⁴ New construction or development should generally not be undertaken.

⁵ These standards are not applicable for development within the airport compatibility review area. Development in the airport compatibility review areas are subject to standards in the applicable airport land use plan.

Source: State of California Governor’s Office of Planning and Research 2003, EDAW 2007

Table 5-5 provides acceptable interior noise levels for certain land uses.

**Table 5-5
Land Use Compatibility Standards for Interior Noise in dBA**

Land use	Maximum Allowable Interior CNEL
Residential	45
Transient lodging	45
School classrooms, libraries, churches	45
Hospitals, convalescent homes	45

Note: CNEL = community noise equivalent level; dBA = A-weighted decibel.

The acceptable interior noise level for other uses (offices, theaters, commercial, industrial) is dependant upon the specific nature of the indoor activity.

Tables 5-6 and 5-7 define noise performance standards for non-transportation noise sources. In addition, properties located within an influence area surrounding Travis Air Force Base, Rio Vista Municipal Airport or Nut Tree Airport are also subject to the more stringent noise/land use compatibility standards of the applicable Airport Land Use Compatibility Plan (ALUCP).

**Table 5-6
Noise Level Performance Standards for New Projects Affected By, or
Including, Nontransportation Noise Sources**

Noise Level Descriptor	Daytime (Decibel) (7 a.m.–10 p.m.)	Nighttime (Decibel) (10 p.m.–7 a.m.)
Hourly day-night average level (L _{eq})	60	45
Maximum equivalent levels (L _{max})	75	65

Notes:

Each of the noise levels specified shall be lowered by 5 decibels for simple tone noises, noises consisting primarily of speech, or music, or for recurring impulsive noises. These noise level standards do not apply to residential units established in conjunction with industrial or commercial uses (e.g., caretaker dwellings).

**Table 5-7
Noise Level Performance Standards for Nontransportation Noise Sources**

Cumulative Duration of a Noise Event ¹ (Minutes)	Maximum Exterior Noise Level Standards (Decibel)	
	Daytime ^{2,4}	Nighttime ^{3,4}
30–60	50	45
15–30	55	50
5–15	60	55
1–5	65	60
0–1	70	65

Notes:

¹ Cumulative duration refers to time within any one-hour period.

² Daytime = Hours between 7:00 a.m. and 10:00 p.m.

³ Nighttime = Hours between 10:00 p.m. and 7:00 a.m.

⁴ Each of the noise level standards specified may be reduced by 5 dBA for tonal noise (i.e., a signal which has a particular and unusual pitch) or for noises consisting primarily of speech or for recurring impulsive noises (i.e., sounds of short duration, usually less than one second, with an abrupt onset and rapid decay such as the discharge of firearms).

Noise Contours

The county noise environment can be described with contours derived from monitoring and modeling major sources of noise. A noise contour is a line overlaid on a map or aerial photograph that depicts where a certain noise level occurs. Future noise contours have been estimated with information about baseline and projected land development and associated transportation activity. The contours assist in setting policies for land use planning and establishment of development standards. Contours are provided for roadway noise, railroad noise, and aircraft noise.

Roadway Noise

Figure 5-10 shows the roadway noise contours for baseline year 2006. As the figure illustrates, major highways represent the major sources of noise. Figure 5-11 identifies the estimated roadway noise contours for year 2030 based upon future

estimated traffic levels. Interstates 80, 505, 680, 780 and State Route 12 are the most heavily traveled roadways in Solano County and therefore have the largest noise impact areas. Given the topographic complexity of Solano County, these contours should be considered conservative estimates of traffic noise exposure and not absolute lines of demarcation, to be supplemented by detailed and project-specific study as needed.

Railroad Noise

Figure 5-12 shows railroad noise contours along the Union Pacific Railroad (UPRR) tracks. Railroad activity in Solano County consists mainly of freight and passenger operations on the UPRR tracks. The UPRR tracks extend from the southwest portion to the northern portion of the county. It is difficult to predict future railroad noise exposure in Solano County without knowing if, or to what degree, railroad activity may change in the future. Therefore, figure 5-12 was developed using estimated distances to the 65- and 60-dB L_{dn} railroad noise contours for various numbers of future daily train activity in Solano County. The data assume that railroad operations in Solano County would occur uniformly throughout day and nighttime hours.

Aircraft Noise

Estimated noise contours for Travis Air Force Base are shown in Figure 5-13. Travis Air Force Base is located in the central portion of Solano County just east of the City of Fairfield, and is home to three Air Force Command Units. The base occupies approximately 7,100 acres of land, with two 11,000-foot runways oriented northeast-to-southwest away from existing housing developments. Military aircraft are not subject to the same noise standards as commercial aircraft and often fly lower flight patterns.

Estimated noise contours for Rio Vista Municipal airport are shown in Figure 5-14. Rio Vista Municipal Airport is located in the southwest corner of Solano County 3 miles north of the City of Rio Vista. Air traffic is equally divided between local and transient general aviation flights.

Estimated 2025 noise contours for Nut Tree Airport are shown in Figure 5-15. The Nut Tree Airport is located in the central portion of the county within the city limits of Vacaville. Air traffic consists of general aviation local flights with a higher number of transient flights.

Stationary Noise Source Control

Activities at industrial, commercial, recreational, and public service facilities can also generate noise levels that adversely affect adjacent sensitive land uses. From a land use planning perspective, stationary noise source control strategies focus on two goals: (1) preventing the introduction of new stationary noise sources near noise-sensitive areas, and (2) preventing encroachment of noise-sensitive uses on existing stationary noise sources. The first goal can be achieved by applying noise performance standards to proposed stationary noise sources. The second goal can be met by requiring that new noise-sensitive uses near existing stationary noise sources include project features that ensure compliance with noise performance standards.

Noise Reduction in Land Use and Site Planning

The major noise sources in Solano County consist of Interstate 80 and local traffic on city streets, commercial and industrial uses, active recreation areas of parks, outdoor play areas of schools, railroad operations, and aircraft overflights. To compensate for these high levels of noise, **buffering** can be used to mitigate noise issues by placing space between incompatible land uses. This reduces exposure by increasing the distance between a noise source and a noise-sensitive receptor. Land buffers can take many forms, including open space, frontage roads, recreational areas, and storage yards. The ability to reduce noise with this technique is limited by the surrounding land and characteristics of the noise source. Noise reduction is approximately minus 3 to 6 dB per doubling of distance from a line and point source, respectively.

Related Plans, Programs, and Policies

California Noise Insulation Standards (Title 24)

Title 24 of the California Code of Regulations establishes standards governing interior noise levels that apply to all new multi-family residential units in California. These standards require that acoustical studies be performed before construction at building locations where the existing L_{dn} exceeds 60 dB. Such acoustical studies are required to establish mitigation measures that will limit maximum L_{dn} levels to 45 dB in any habitable room.

Policies

Policy HS-47: Consider and promote land use compatibility between noise-sensitive² and noise-generating land uses when reviewing new development proposals.

Policy HS-48: Encourage design that minimizes negative effects of noise without compromising aesthetic values and pedestrian and auto connectivity.

Policy HS-49: Ensure that development in the vicinity of the Travis Air Force Base or the Rio Vista or Nut Tree airports is compatible with existing and projected airport noise levels.

Policy HS-50: Work with residents and businesses throughout the county to reduce conflicts due to noise issues.

Policy HS-51: Minimize conflicts between transportation noise sources and sensitive land uses.

² For the purposes of this chapter, noise-sensitive land uses include schools, hospitals, rest homes, long-term care, mental care facilities, and residences. Outdoor activity areas are considered to be the portion of a noise-sensitive property where outdoor activities would normally be expected (i.e., patios of residences and outdoor instructional areas of schools). Outdoor activity areas for the purposes of this section do not include gathering spaces alongside transportation corridors or associated public rights-of-way.

Implementation Programs

Regulations

Program HS-66:	Develop, adopt and implement a County noise ordinance that includes: <ul style="list-style-type: none">▪ performance standards and exemptions;▪ restrictions on noise-emitting construction activities based on standards for construction equipment;▪ regulations for mobile or single event types of noise emissions or noise generated by added equipment including truck loading and unloading, operation of construction equipment, and amplified music;▪ standards to ensure that the County personnel charged with enforcing such an ordinance are properly trained and equipped for on-site measurement techniques and other necessary tasks.▪ standardized, broadly accepted documented procedures for noise measurement collection to ensure that field measurements are conducted in a consistent manner.
----------------	--

Related Policies: HS-50

Agency/Department: TBD

Funding Source: TBD

Time Frame: Adopt by 2010

Funding, Physical Improvements, and Capital Projects

Program HS-67:	Trucks tend to generate noise in excess of applicable standards, but goods movement by truck is necessary to support the area's economy. Thus, continue to designate and maintain established truck routes where noise conflicts with land uses are least likely to occur.
----------------	--

Related Policies: HS-51

Agency/Department: TBD

Funding Source: TBD

Time Frame: TBD

Development Review

Program HS-68:

When reviewing new developments proposals,

Require noise abatement measures to ensure that noise levels will not exceed those indicated in Tables 5-4 and 5-5.

Require buffering between noise-sensitive land uses and noise sources unless a detailed noise analysis is conducted and noise abatement measures can be taken to reduce noise to acceptable levels as shown on Tables 5-4 and 5-5.

Where development projects produce, or are affected by, nontransportation-related noise, require the inclusion of project features that will enable the project to achieve acceptable levels specified in Table 5-6, as measured at outdoor activity areas of existing and planned noise-sensitive land uses.

Require noise mitigation to reduce construction and other short-term noise impacts as a condition of approval for development projects by applying the performance standards outlined in Table 5-7. The total noise level resulting from new sources and ambient noise shall not exceed the standards in Table 5-7, as measured at outdoor activity areas of any affected noise sensitive land use except:

- If the ambient noise level exceeds the standard in Table 5-7, the standard becomes the ambient level plus 5 dB.
- Reduce the applicable standards in Table 5-7 by 5 dB if they exceed the ambient level by 10 or more dB.

Under the conditions outlined below, require acoustical studies to be prepared as part of the development review process to ensure adequate analysis of proposed development and incorporation of noise-reducing features in project designs. Acoustical studies with appropriate noise abatement measures will be required for all discretionary projects where any of the following conditions apply:

- The project is located within the existing or future 60 dB CNEL transportation noise contours as measured at outdoor activity areas of noise-sensitive land uses
- The project will cause future traffic volumes to exceed 5,000 average daily trips on any roadway that fronts residential, institutional, and open space land uses or will cause traffic volume to increase by 25 percent or more, on any of these roadways.

FOR CAC REVIEW & DISCUSSION ONLY
Preliminary

FOR CAC REVIEW & DISCUSSION ONLY
 Preliminary

- The project will introduce noise or vibration sources associated with mechanical equipment operations, entertainment, maintenance, and facility operations.
- The project is a proposed residential use in the vicinity of existing and proposed commercial and industrial areas.
- The project is proposed in an area where existing noise levels exceed acceptable levels in Table 5-6 as measured at outdoor activity areas of noise sensitive land uses.

Where it is not possible to reduce noise levels in outdoor activity areas to 60 dB or less using practical application of the best-available noise reduction measures, an exterior noise level of up to 65 dB may be allowed, provided that all available exterior noise level reduction measures have been implemented.

Related Policies: HS-47, HS-49, HS-50, HS-51

Agency/Department: TBD

Funding Source: TBD

Time Frame: TBD

Program HS-69: Refer proposed development projects within areas requiring airport land use compatibility review to the Airport Land Use Commission. Ensure that new development complies with the noise standards contained within the ALUCPs. Maintain buffers between the airports and incompatible land uses.

Related Policies: HS-47, HS-50, HS-51

Agency/Department: TBD

Funding Source: TBD

Time Frame: TBD

Program HS-70: Promote the use of berms, landscaping, setbacks, or architectural design for noise abatement, in addition to conventional wall barriers, to enhance aesthetics and minimize pedestrian barriers. Development of noise-sensitive land uses in areas exposed to existing or projected levels of noise from transportation, stationary sources, or agricultural operations exceeding, or estimated to exceed, levels specified in Table 5-4 shall require transportation planning, traffic calming, site planning, buffering, sound insulation, or other methods to reduce noise exposure in

outdoor activity areas and interior spaces to the levels specified in Table 5-4.

Related Policies: HS-48

Agency/Department: TBD

Funding Source: TBD

Time Frame: TBD

Ongoing Planning Efforts, Public Outreach and Education

Program HS-71: Make public information readily available on noise abatement measures, the physical and psychological effects of noise on public health and welfare, and the meaning of noise levels and standards. Consider specific mailings to properties located in existing or projected 60 dB contours.

Related Policies: HS-50

Agency/Department: TBD

Funding Source: TBD

Time Frame: TBD

Coordination with Other Agencies and Organizations

Program HS-72: Locate industrial and other noise-generating land uses away from noise-sensitive land uses and/or require substantial noise sources to be completely enclosed within buildings or structures.

Related Policies: HS-47, HS-50

Agency/Department: TBD

Funding Source: TBD

Time Frame: TBD

Program HS-73: Identify locations and work with the California Department of Transportation to mitigate freeway noise in those locations where such noise adversely affects unincorporated residential land uses.

Related Policies: HS-51

Agency/Department: TBD

Funding Source: TBD

Time Frame: TBD

Climate Change

Climate change is a field of scientific study dealing with human effects on global climate. According to the U.S. Environmental Protection Agency³, certain findings are widely accepted by the scientific community:

- Gases like carbon dioxide (greenhouse gases), when introduced to the atmosphere, tend to have a warming effect on the earth;
- Human activities have increased the levels of greenhouse gases in the atmosphere since pre-industrial times; and
- The global climate warmed by an average of 1.0-1.7 degrees Fahrenheit from 1906–2005.

Greenhouse gases (GHGs) refer to gases that trap heat in the atmosphere. These include carbon dioxide (CO₂), methane, nitrous oxide, and fluorinated gases. The human activities during which these gases are emitted include burning, manufacturing, and transportation-related combustion of fossil fuels. Livestock and solid waste emissions also contribute to the build-up of GHGs.

The effects of climate change include increased global average temperature, subsequent altered precipitation patterns, thermal expansion of the ocean, and loss of polar and global sea ice extent. In Solano County, these changes would translate to sea level rise with possible coastal flooding, water and energy supply issues, and increased risk of wildfire. Global average temperature rise and indirect impacts associated with climate change could cause increased distribution of disease trajectories, increased hazards such as flooding, storms, and wildfires, other public health problems, habitat loss, and species endangerment and extinction.

Responding to climate change requires a two-pronged approach. On one hand, the County must adapt to change and prepare for the already-foreseeable effects of global warming that has already occurred and, on the other hand, the County must coordinate with agencies, residents, and businesses to modify behavior to decrease the countywide contribution to greenhouse gas emissions and associated impacts on the climate.

The California Global Warming Solutions Act of 2006 (Assembly Bill 32) was created by the state legislature to address the threat global warming poses to the state's "economic well-being, public health, natural resources, and the environment". The Act directs the ARB to "adopt a statewide greenhouse gas emissions limit equivalent to the statewide greenhouse gas emissions levels in 1990 to be achieved by 2020." This requires maintaining an inventory of emission levels as well as taking action to decrease emission levels to 1990 levels.

All jurisdictions in California have a responsibility to contribute to this effort with changes in operations, technology, and policies that enable residents and businesses to follow suit. This general plan provides the framework for Solano

³ EPA. Updated December 20, 2007, accessed December 31, 2007. <http://www.epa.gov/climatechange/science/stateofknowledge.html> State of Knowledge

FOR CAC REVIEW & DISCUSSION ONLY
 Preliminary

County's approach to climate change and GHG emission reduction. The types of policies that deal with climate change and GHG emissions are far ranging.

Table 5-2 shows the different policies that the county has incorporated into the general plan.

This table is in progress and will be finished when the other chapters are complete.

**Table 5-X
Climate Change Policies**

Issues	Chapter	Section	Policy/ies
	Land Use		
	Agriculture		
	Resources		
	Public Health and Safety		
	Economic Development		
	Transportation and Circulation		
	Public Facilities and Services		
	Housing		
	Park and Recreation		