# Noise Element

## Purpose and Intent

To protect people living and working in the city of San Diego from an excessive noise environment.

## Plan Issues

- As the city becomes more urban, background noise levels will increase.
- There is a need to address the condition of road surfaces and traffic congestion, since both contribute to vehicle noise, which is a major noise source in the city.
- Aircraft noise affects many areas of the city.
- There is a need to address the high noise levels from commercial and industrial uses near sensitive receptors.
- Train horns at roadway-rail grade crossings affect adjacent noise-sensitive uses in the city.

## Introduction

Noise in excessive levels can affect our environment and our quality of life. Noise is subjective since it is dependent on the listener's reaction, the time of day, distance between source and receptor, and its tonal characteristics. For instance, while a loud, backup signal of a delivery truck or a car alarm in the middle of the night might disrupt most people's sleep, the annoyance of invasive noise while watching television, playing, or studying varies depending on the listener's sensitivity.

Studies have shown that excessive noise can have adverse physiological and psychological effects. Extreme levels can cause pain and hearing loss. Continuous exposure to low-level noise can have such insidious, long-term effects as raising blood pressure, lessening the quality of sleep, or inhibiting children's ability to learn.

The most prevalent noise sources in San Diego are from motor vehicle traffic on interstate freeways, state highways, and local major roads and aircraft traffic. Local streets are not a major source of noise since traffic volume and speed are generally much lower than for freeways and major roadways. Aircraft noise is present in many areas of the city. Rail traffic and industrial and commercial activities contribute to the noise environment.

The city is primarily a developed and urbanized city, and an elevated ambient noise level is a normal part of the urban environment. However, controlling noise at its source to acceptable levels can make a substantial improvement in the quality of life for people living and working in the city. When this is not feasible, the city applies additional measures to limit the affect of noise on future land uses, which include spatial separation, site planning, and building design techniques that address noise exposure and the insulation of buildings to reduce interior noise levels.

The Noise Element provides goals and policies to guide compatible land uses and the incorporation of noise attenuation measures for new uses to protect people living and working in the city from an excessive noise environment. This purpose becomes more relevant as the city continues to grow with infill and mixed-use development consistent with the Land Use and Community Planning Element.

Many regulations, plans, and studies adopted by state, regional agency, military, or the city directly relate to the Noise Element and assist in its implementation as listed in Table NE-1.

## TABLE NE-1
## Related Regulations and Plans Used to Implement the Noise Element

| Regulation | Description |
|---|---|
| Airport Noise Compatibility Planning (Code of Federal Regulations, Part 150) | Part 150 identifies compatible land uses with various levels of noise exposure to noise by individuals for local jurisdictions to use as guidelines, since the federal government does not have local land use control. |
| California Environmental Quality Act (CEQA) | CEQA considers exposure to excessive noise an environmental impact. Implementation of CEQA ensures that during the decision-making stage of development, city officials and the public will be informed of any potentially excessive noise levels and available mitigation measures to reduce them to acceptable levels. |
| California Noise Insulation Standards (California Code of Regulations, Title 24) | Title 24 establishes an interior noise standard of 45-dBA for multiple unit and hotel/motel structures. Acoustical studies must be prepared for proposed multiple unit residential and hotel/motel structures within the Community Noise Equivalent Level (CNEL) noise contours of 60-dBA or greater. The studies must demonstrate that the design of the building will reduce interior noise to 45-dBA CNEL or lower. |
| California Airport Noise Standards (California Code of Regulations Title 21) | Title 21 establishes that the 65-dbA CNEL is the acceptable level of aircraft noise for persons living near an airport. |
| Air Installations Compatible Use Zones (AICUZ) Study (US Department of Defense) | The AICUZ study establishes land use strategies and noise and safety criteria to prevent the encroachment of incompatible land use from degrading the operational capability of military air installations. |
| Airport Land Use Compatibility Plans (ALUCP) (Public Utilities Code, §21670, et seq.) | The ALUCPs promote compatibility between airports and the land uses that surround them to the extent that these areas are not already devoted to incompatible land uses. The city is required to modify its land use plans and ordinances to be consistent with the ALUCPs or to take steps to overrule the Airport Land Use Commission (ALUC). |
| The City of San Diego Noise Abatement and Control Ordinance (Municipal Code Section 59.5.0101 et seq.) | Provides controls for excessive and annoying noise from sources such as refuse vehicles, parking lot sweepers, watercraft, animals, leaf blowers, alarms, loud music, and construction activities. |

# A. Noise and Land Use Compatibility

## Goal

- Consider existing and future noise levels when making land use planning decisions to minimize people's exposure to excessive noise.

## Discussion

The Noise Element affects the Land Use and Community Planning Element since excessive noise affects land uses, specifically, the quality of life of people working and living in the city. The planning of future noise-sensitive land uses should have a sufficient spatial separation or incorporate site design and construction techniques to ensure compatibility with noise-generating uses. In addition to residential, other noise-sensitive land uses generally include, but are not limited to hospitals; nursing facilities; intermediate care facilities; educational facilities; libraries; museums; places of worship; child care facilities, and certain types of passive recreational parks and open space. Future noise-generating uses in proximity to noise-sensitive uses must ensure that they do not expose sensitive uses to unacceptable noise levels.

The city uses the Land Use - Noise Compatibility Guidelines shown on Table NE-2 for evaluating land use noise compatibility when reviewing proposed land use development projects. A "compatible" land use indicates that standard construction methods will sufficiently attenuate exterior noise to an acceptable indoor noise level and people can carry out outdoor activities with essentially no noise interference. In general, evaluation of land use that falls into the "conditional compatible" noise environment should include consideration of the type of noise source, the sensitivity of the noise receptor, and the degree to which the noise source may interfere with speech, sleep, or other activities characteristic of the land use. Structures must be capable of attenuating exterior noise to an acceptable indoor noise level. For land uses indicated as incompatible, new construction should generally not be undertaken. Due to severe noise interference, outdoor activities are unacceptable and for structures, extensive mitigation techniques are required to make the indoor environment acceptable. Refer to Section H for a discussion of typical noise attenuation measures.

## Policies

NE-A.1. Separate excessive noise-generating uses and residential and other noise-sensitive land uses with sufficient spatial buffer of less sensitive uses.

NE-A.2. Assure the appropriateness of proposed developments relative to existing and future noise levels by consulting the guidelines for noise-compatible land use (shown on Table NE-1) to minimize the effects on noise-sensitive land uses.

NE-A.3. Limit future residential and other noise-sensitive land use in areas exposed to high levels of noise.

NE-A.4. Require an acoustical study showing the ability to meet noise guidelines for proposed developments in areas where the existing or future noise level exceeds or would exceed the "compatible" noise level thresholds as indicated on the Land Use - Noise Compatibility Guidelines (Table NE-2).

## TABLE NE-2 Land Use - Noise Compatibility Guidelines

| Land Use Category | Exterior Noise Exposure (dBA CNEL) | | | | | |
|---|---|---|---|---|---|---|
| | 60 | 65 | 70 | 75 | 80 | |
| *Open Space and Parks and Recreational* | | | | | | |
| Community & Neighborhood Parks; Open Space; Natural Resources Preservation; Park Maintenance Facilities | | | | | | |
| Outdoor Spectator Sports, Golf Courses; Athletic Fields; Outdoor Spectator Sports, Water Recreational Facilities; Horse Stables | | | | | | |
| *Agricultural* | | | | | | |
| Crop Raising & Farming; Aquaculture, Dairies; Horticulture Nurseries & Greenhouses; Animal Raising, Maintain & Keeping; Commercial Stables | | | | | | |
| *Residential* | | | | | | |
| Single Units; Mobile Homes; Senior Housing | | 45 | | | | |
| Multiple Units; Mixed Use Commercial/Residential; Live Work.<br>**Refer to Policies NE-D.2. & NE-D.3. regarding uses subject to aircraft noise.* | | 45 | 45* | 45* | | |
| *Institutional* | | | | | | |
| Hospitals; Nursing Facilities; Intermediate Care Facilities; Educational Facilities; Libraries; Museums; Places of Worship; Child Care Facilities | | 45 | | | | |
| Cemeteries | | | | | | |
| *Sales* | | | | | | |
| Building Supplies/Equipment; Food, Beverages & Groceries; Pets & Pet Supplies; Sundries, Pharmaceutical, & Convenience Sales; Wearing Apparel & Accessories | | | 50 | 50 | | |
| *Commercial Services* | | | | | | |
| Building Services; Business Support; Eating & Drinking; Financial Institutions; Assembly & Entertainment; Radio & Television Studios; Golf Courses | | | 50 | 50 | | |
| Visitor Accommodations | | 45 | 45 | 45 | | |
| *Offices* | | | | | | |
| Business & Professional; Government; Medical, Dental & Health Practitioner; Regional & Corporate Headquarters | | | 50 | | | |

## TABLE NE-2 Land Use - Noise Compatibility Guidelines

| Land Use Category | Exterior Noise Exposure (dBA CNEL) | | | | | |
|---|---|---|---|---|---|---|
| | 60 | 65 | 70 | 75 | 80 | |
| *Vehicle and Vehicular Equipment Sales and Services Use* | | | | | | |
| Commercial or Personal Vehicle Repair & Maintenance; Commercial or Personal Vehicle Sales & Rentals; Vehicle Equipment & Supplies Sales & Rentals | | | 50 | 50 | | |
| *Wholesale, Distribution, Storage Use Category* | | | | | | |
| Equipment & Materials Storage Yards; Moving & Storage Facilities; Warehouse; Wholesale Distribution; Mining & Extractive Industries | | | | 50 | 50 | |
| *Industrial* | | | | | | |
| Heavy Manufacturing; Light Manufacturing; Marine Industry; Research & Development; Trucking & Transportation Terminals | | | | 50 | 50 | |

### Land Use Compatibility

| | | |
|---|---|---|
| **Compatible** | **Indoor Uses** | Standard construction methods should sufficiently attenuate exterior noise to an acceptable indoor noise level. |
| | **Outdoor Uses** | Activities associated with the land use may be carried out. |
| **Conditionally Compatible** | **Indoor Uses** | Building structure must attenuate exterior noise to the indoor noise level indicated by the number for occupied areas; Section H of the Noise Element "Typical Noise Mitigation." |
| | **Outdoor Uses** | Feasible noise mitigate techniques should be analyzed and incorporated to make the outdoor activities acceptable. Refer to Section H of the Noise Element "Typical Noise Mitigation." |
| **Incompatible** | **Indoor Uses** | New construction should generally not be undertaken, extensive mitigation techniques are required to make the indoor environment acceptable for performance of activities. |
| | **Outdoor Uses** | Severe noise interference makes outdoor activities unacceptable. |

# B. Motor Vehicle Traffic Noise

## Goal

- Minimal excessive motor vehicle traffic noise on residential and other noise-sensitive land uses

## Discussion

Motor vehicle traffic noise is ubiquitous within the city. Excessive noise levels along major roads, interstate freeways, and state highways affect much of the urban environment. Traffic noise level is dependent upon volume, speed, flow, vehicle mix, and pavement condition as well as distance to the receptor.

The city has no control over the noise generated by vehicular traffic on state freeways and highways. For these and more appropriately for city-controlled major roads, the city can, however, influence daily traffic volumes and reduce peak-hour traffic by promoting alternative transportation modes and integration of mixed-use infill development. In addition, local roadway design features and traffic management and calming techniques can minimize noise from traffic speed and frequent vehicle acceleration and deceleration, and innovative roadway paving material can further reduce traffic noise. Future use of hybrid transit buses could help to reduce noise along mixed-use transit corridors. For noise-sensitive land uses adjacent to freeways and highways, these uses should be buffered from excessive noise levels by intervening, less sensitive, industrial-commercial uses or shielded by sound walls or landscaped berms.

## Policies

NE-B.1. Encourage noise-compatible land uses and site planning adjoining existing and future highways and freeways.

NE-B.2. Consider traffic calming design and traffic control measures that minimize motor vehicle traffic noise in noise-sensitive land use areas with due consideration to traffic impacts that may be created.

NE-B.3. Require noise reducing, site design, and/or traffic control measures for new development in areas of high noise to ensure that the mitigated levels meet acceptable decibel limits.

NE-B.4. Require new development to provide facilities which support the use of alternative transportation modes such as walking, bicycling, carpooling and, where applicable, transit to reduce peak-hour traffic.

NE-B.5. Designate local truck routes to reduce truck traffic in noise-sensitive land uses areas.

NE-B.6. Work with Caltrans to landscape freeway-highway, rights-of-way buffers and install noise barriers.

## C. Trolley and Train Noise

### Goal

- Minimal excessive fixed rail-related noise on residential and other noise-sensitive land uses

### Discussion

Daily traffic from passenger and freight train and trolley operations produces noise that may disrupt adjacent noise-sensitive uses. Trains can generate high, yet relatively brief, intermittent noise events. The interaction of the steel wheels and rails is a major component of train noise. Factors that influence the overall rail noise include the train speed, train horns, type of engine, track conditions, use of concrete cross ties and welded track, the intermittent nature of train events, time of day, and sound walls or other barriers. When operating in residential areas, trains are required to travel at a reduced speed to minimize noise.

Federal regulations require trains to sound their horns at all roadway-rail grade crossings and the warning sound of train horns is a common sound experienced by communities near the rail corridor. In an effort to minimize excess train horn noise, the federal government allows local jurisdictions to establish train horn "quiet zones." This requires the implementation of supplementary and alternative safety measures to compensate for loss of the train horn usage.

The California High-Speed Rail Authority is studying two potential corridors for high-speed rail service that would connect the San Diego region to other regions in the state. Air turbulence noise generated from high-speed train traffic may affect noise-sensitive uses along the potential rail corridors.

### Policies

NE-C.1. Encourage noise-compatible land uses and site planning near the rail corridors and trolley lines.

NE-C.2. Work with the San Diego Association of Governments (SANDAG), Caltrans, MTS, California High-Speed Rail Authority, and passenger and freight rail operators to install noise attenuation features, including rail and wheel maintenance, and grade separation along existing and future rail corridors if freight or passenger rail or trolley operations adversely affect existing adjacent residential or other noise-sensitive uses.

NE-C.3. Establish train horn "quiet zones" consistent with the federal regulations, where applicable.

NE-C.4. Work with the SANDAG, Caltrans, MTS, and passenger and freight rail operators to install grade separation at existing roadway-rail grade crossings as a noise and safety measure.

# D. Aircraft Noise

## Goal

- Minimal excessive aircraft-related noise on residential and other noise-sensitive land uses

## Discussion

Aircraft noise primarily affects communities within an airport influence area. The noise impact or the perceived annoyance depends upon the noise volume, length of the noise event and the time of day. In general, aircraft noise varies with the type and size of the aircraft, the power the aircraft is using, and the altitude or distance of the aircraft from the receptor. Another variable affecting the overall impact of noise is a perceived increase in aircraft noise at night.

Aircraft noise is one of the factors that the state-required Airport Land Use Compatibility Plan addresses and has established policies for land use compatibility. The Airport Land Use Compatibility Plan, as discussed in the Land Use Element, incorporates the California Airport Noise Standards that establishes the 65-dBA CNEL as the boundary for the normally acceptable level of aircraft noise for noise-sensitive land uses including residential uses near airports.

Uses that have outdoor areas exposed to high levels of aircraft noise cannot mitigate noise levels to an acceptable level due to overflights. Noise-sensitive uses that have outdoor areas used daily by the occupants, such as schools for children and childcare centers are incompatible in areas that exceed the 65-dBA CNEL since mitigation measures cannot reduce exposure to outdoor play areas from prolonged periods of high aircraft noise.

*San Diego International Airport (SDIA)*

San Diego International Airport (SDIA) at Lindbergh Field is the commercial air carrier airport serving the region. Various industrial, commercial, and residential uses surround the airport. Primarily commercial air carrier aircraft with a limited number of general aviation corporate jet aircraft use SDIA. Normally, aircraft arrive from the east and depart to the west. Noise from aircraft taking off and climbing affect more areas west or adjacent to SDIA, whereas noise from aircraft approaching and landing affects few areas east of the airport. Commercial aircraft noise has been declining due to advances in engine technology. However, noise will affect more areas as operations at SDIA increase in the future.

SDIA requires a variance from the California Airport Noise Standards in order to operate with noise affecting residential uses in excess of the 65-dBA CNEL. As the airport operator, the San Diego County Regional Airport Authority has implemented monitoring and mitigation measures to minimize aircraft noise affecting residential areas. SDIA prohibits most late night takeoffs to help limit noise impacts. As a mitigation measure, the Quieter Home Program retrofits affected homes to reduce interior noise levels to an acceptable level.

*Marine Corps Air Station (MCAS) Miramar*

MCAS Miramar operates a mixture of jet fighter, transport, and helicopter aircraft. Noise from military air installations presents different noise issues compared to civilian airports. Military readiness requires constant training. Aircraft training includes touch and goes (takeoffs and landings with a close-in circuit around the airport), aircraft carrier simulated landings, practice instrument approaches, and normal departures to and arrivals from other installations or training areas. As a result, noise can affect more areas than from civilian airports. Helicopter noise can be an annoyance since helicopter noise events last longer and pulsate compared with noise from the faster moving jet fighter.

As indicated by the Air Installations Compatibility Use Zones (AICUZ) study, adjacent industrial and commercial uses are compatible with MCAS Miramar's noise levels. Noise from MCAS Miramar affects residential areas in surrounding communities. To minimize aircraft noise impact on residential areas, the Marine Corps implements noise abatement and monitoring programs as described in the AICUZ study.

*Brown Field and Montgomery Field*

Noise levels from Brown Field and Montgomery Field municipal airports are not as extensive as the noise levels from San Diego International Airport and MCAS Miramar. Typically, the smaller general aviation aircraft, both propeller and jet aircraft operate from Brown and Montgomery Fields.

Due to the length of its runways, Montgomery Field cannot accommodate all types of general aviation aircraft. Noise-compatible commercial and industrial uses are adjacent to the airport. Aircraft noise affects residential areas in surrounding communities. To minimize the impact on residential areas, Montgomery Field has a noise-monitoring program to assess aircraft noise and regulations, including a nighttime noise-based curfew and a weight limit for aircraft using the airport.

General aviation propeller and jet aircraft as well as law enforcement and military aircraft use Brown Field. Noise-compatible open space and industrial uses are primarily adjacent to Brown Field. Aircraft noise affects residential uses to the west of the airport.

*Airports Outside of the City*

Aircraft noise from airports outside of the city is also less extensive. Military aircraft operations at Naval Air Station (NAS) North Island and Naval Outlying Field (NOLF) Imperial Beach primarily use the airspace over the Pacific Ocean and the San Diego Bay. Occasionally, there are single event noises from aircraft operating from NAS North Island that can affect land uses adjacent to San Diego Bay. The primary traffic pattern for helicopters training at NOLF Imperial Beach is along the Tijuana River Valley and then offshore. Overflight noise from general aviation aircraft operating at Gillespie Field has the potential to affect residential areas in the city west of the airport. Aircraft noise from commercial air carrier operations at the Tijuana International Airport in Mexico primarily affect open space and industrial uses adjacent to the international border in the Otay Mesa area.

*Heliports*

The noise levels associated with operations at a heliport depend upon the flight path, the helicopter types used, the number of operations, and the time of day. Helicopter activity from military helicopters, private, police, fire/rescue, medical, and news/traffic monitoring helicopters contribute to the general noise environment in the city. In particular, low-flying helicopters are a source of noise complaints in the city, especially at night. Within the city, most helicopters operate from existing airports. Emergency medical or public safety helicopters primarily use the few certified off-airport heliports.

## Policies

NE-D.1. Encourage noise-compatible land use within airport influence areas in accordance with federal and state noise standards and guidelines.

NE-D.2. Limit future multiple-unit residential within airport influence areas to the 70-dBA CNEL airport noise contour.

NE-D.3. Ensure that future multiple-unit residential uses within airport influence areas that are located between the 65-dBA and 70-dBA CNEL airport noise contour do not subject occupants to prolonged exposure to high noise levels in outdoor areas.

NE D.4. Discourage outdoor uses in areas greater than the 65-dBA CNEL airport noise contour where aircraft operations would expose people to prolonged periods of high noise levels.

NE D.5. Encourage civilian and military airport operators, to the extent practical, to monitor aircraft noise, implement noise-reducing operation measures, and promote pilot awareness of where aircraft noise affects noise-sensitive land uses.

# E. Commercial and Mixed-Use Activity Noise

## Goal

- Minimal exposure of residential and other sensitive land uses to excessive commercial and mixed-use-related noise.

## Discussion

Noise generated by ground floor commercial operations, maintenance, truck deliveries, and vehicular and pedestrian traffic can affect adjacent and aboveground floor residential areas. Noise attenuation methods in mixed-use buildings are essential to minimize excessive noise associated with nonresidential uses. Day and night commercial/entertainment activities and special and sporting events in the Centre City and other mixed residential/commercial-use areas located citywide can generate urban noise throughout the year. The city requires bars and nightclubs over five thousand square feet to minimize excessive noise to surrounding uses by limiting their hours of operation. The city's noise ordinance also limits noise levels to 65-dBA during the day and 60-dBA during the night generated on-site by commercial uses to minimize the effect of noise on adjacent sensitive land uses.

## Policies

NE-E.1. Encourage the design and construction of commercial and mixed-use structures with noise attenuation methods to minimize excessive noise to the residential land use and other noise-sensitive land uses.

NE-E.2. Encourage mixed-use developments to site loading areas, parking lots, driveways, trash enclosures, mechanical equipment, and other noisier components away from the residential component of the development.

NE-E.3. Limit the hours of truck deliveries to commercial uses abutting residential uses and other noise-sensitive land uses to minimize excessive noise unless there is no feasible alternative or there are overriding transportation benefits by scheduling deliveries at other hours.

NE-E.4. Limit hours of commercial/entertainment operations to minimize excessive noise to residential and other noise-sensitive land uses.

NE-E.5. Limit on-site noise levels generated by commercial uses.

NE-E.6. Encourage mixed-use and residential developments adjacent to commercial/ entertainment uses to notify potential residents that noise from related activities, such as music, delivery vehicles, pedestrian and vehicular traffic, and other urban noise may affect them.

# F. Industrial Activity Noise

## Goal

- Minimal exposure of residential and other noise-sensitive land uses to excessive industrial-related noise.

## Discussion

Industrial land uses have the potential to be a noise source. The degree of noise generated by industrial uses is dependent upon various factors, including type of industrial activity, hours of operation, and the location relative to other land uses. Outdoor truck activity, air compressors, and generators are potential noise sources associated with industrial use that can interfere with activities conducted on noise-sensitive land uses, which include residential uses. The city enforces the Noise Abatement and Control ordinance, which limits noise levels to 75-dBA generated on-site by industrial uses to minimize the effect of excessive industrial-related noise.

## Policies

NE-F.1. Provide for sufficient spatial separation between industrial uses and residential and other noise-sensitive land uses or utilize other feasible mitigation measures to reduce the noise source, interrupt the noise path, or insulate the receptor to minimize the exposure of residential and other noise-sensitive land uses to excessive industrial-related noise.

NE-F.2. Encourage the design and construction of industrial uses to minimize excessive off-site noise impacts to residential and other noise-sensitive land uses.

NE-F.3. Limit outdoor industrial activities or operations to minimize excessive noise where it affects residential and other noise-sensitive land uses.

NE-F.4. Limit the hours of operation of high noise-generating industrial equipment where it affects residential and other noise-sensitive land uses.

NE-F.5. Limit the hours of truck deliveries to industrial uses abutting residential uses and other noise-sensitive land uses to minimize excessive noise unless there is no feasible alternative or there are overriding transportation benefits by scheduling deliveries at other hours.

NE-F.6. Limit on-site noise levels generated by industrial uses to the 75-dBA to minimize excessive industrial-related noise.

# G. Construction, Refuse Vehicles, Parking Lot Sweepers, and Public Nuisance Noise

## Goal

- Minimal exposure of residential and other noise-sensitive land uses to excessive construction, refuse vehicles, and parking lot sweeper-related noise.

## Discussion

Construction, refuse vehicle, and parking lot sweeper activity in all land use areas will temporarily elevate noise levels. The city recognizes that construction, refuse vehicle, and parking lot sweeper activities are necessary and noise control of these activities is limited. In an urban environment, public nuisance noise such as barking dogs, leaf blowers, loud music, or car alarms can be disturbing, excessive, or offensive and cause discomfort or annoyance. The city enforces the Noise Abatement and Control Ordinance, which addresses and limits excessive noise from these activities.

## Policies

NE-G.1. Limit the hours of operation for non-emergency construction activity in residential areas.

NE-G.2. Limit the hours of operation for refuse vehicle and parking lot sweeper activity in residential areas.

NE-G.3. Limit the hours of operation for refuse vehicles and parking lot sweepers on commercial uses if their activity results in an excessive noise level that adversely affects adjacent residential uses.

NE-G.4 Limit public nuisance noises considered disturbing, excessive, or offensive and causing discomfort or annoyance to any reasonable person of normal sensitiveness residing in an area.

# H. Typical Noise Attenuation Methods

## Goal

- Attenuate the effect of noise on future residential and other noise-sensitive land uses by applying feasible noise mitigation measures.

## Discussion

Noise impacts can typically be abated in four basic methods: by reducing the sound level of the noise generator, by interrupting the noise path between the source and receiver, by increasing the distance between the source and receiver, and by insulating the receiver (building material and construction methods). All of the methods help to reduce interior noise levels, but only the first three help to reduce outside noise levels with the exception of aircraft noise. Tables NE-3 and NE-4 contains a list of the potential noise mitigation methods.

*Reducing the Source Noise*

Structure, vehicle, engine design or the use of mufflers may successfully quiet certain noise sources. Although the city has little direct control over noise produced by vehicles because state and federal noise regulations pre-empt local regulations, the most efficient and effective means of abating noise from transportation systems is to reduce the noise at the source. Noise generated by aircraft, motor vehicles, and trains, for example, may be abated through improved engine design. Traffic calming and traffic management techniques and the use of low-noise road surfaces can help to reduce traffic noise from motor vehicles. Noise generated by land uses, such as industrial uses, may be abated through site design, structure design and construction, quieter machinery, and the limiting of noise-producing operations. This method most directly assigns the responsibility to the generator of the noise. Table NE-4 identifies potential methods to reduce noise generation at the source.

*Interrupting the Noise Path*

Strategically placing walls and/or landscaped berms, utilizing natural land and/or built forms or a combination of two or more of these methods, between the noise source and the receptor may minimize noise. Generally, effective noise shielding requires a continuous, solid barrier with a mass, which is large enough to block the line of sight between source and receiver. Variations may be appropriate in individual cases based on distance, nature, and orientation of buildings behind the barrier, and a number of other factors. Garages or other structures can help to shield residential units and outdoor living areas from non-aircraft noise. The shape and orientation of buildings can also help to avoid reflecting the noise from a building surface to adjacent noise-sensitive buildings. Sound walls are the least preferable method due to the aesthetic concerns.

Table NE-4 identifies potential methods to interrupt the noise path between the source and the receptor.

*Separating the Noise Source*

Spatial separation or isolation of the noise source from the potential receiver may minimize the effects of noise. Site planning techniques that incorporate spatial buffers along freeways, for example, may reduce the noise level affecting adjacent noise-sensitive land uses. Developing noise-compatible commercial or industrial uses in these buffer areas may also help to interrupt the noise path. Due to overflights, sufficient isolation of aircraft noise is impractical. Table NE-4 identifies potential site planning methods that can be used to separate noise sources from noise-sensitive uses.

*Insulating the Noise Receiver*

Acoustical structures, enclosures, or construction techniques can help to abate the noise problem by insulating the receiver. The proper design and construction of buildings can help to reduce interior noise levels. Nearby noise sources should be recognized in determining the location of doors, windows, and vent openings. Sound-rated windows (extra thick or multipaned), doors and wall construction materials and insulation are also effective as specified in CCR Title 24 in reducing interior noise levels. The difference in sound (noise) levels from the exterior to the interior of a structure indicates the sound transmitted loss through the window, door, or wall. A Sound Transmission Class (STC) rating specifies the noise level reduction that windows, doors, wall construction materials, and insulation provide. For example, if the exterior of a structure is exposed to 75-dBA and 45-dBA is measured on the interior of the structure, then a reduction of 30-dBA is achieved. Typically, higher STC ratings indicate greater interior noise reductions.

The use of proper construction methods should make certain that doors and windows are fitted properly; openings sealed; joints caulked; and plumbing constructed to ensure adequate insulation from structural members. Sound-rated doors and windows will have little effect if left open. This may require installation of air conditioning for adequate ventilation. Table NE-2 indicates the acceptable interior noise level for land use types. Table NE-3 depicts potential noise mitigation methods to insulate the noise receiver.

## Policies

NE-H.1. Require noise attenuation measures to reduce the noise to an acceptable noise level for proposed developments to ensure an acceptable interior noise level, as appropriate, in accordance with California's noise insulation standards (CCR Title 24) and Airport Land Use Compatibly Plans.

NE-H.2. Apply CCR Title 24 noise attenuation measures requirements to reduce the noise to an acceptable noise level for proposed single-family, mobile homes, senior housing,

and all other types of residential uses not addressed by CCR Title 24 to ensure an acceptable interior noise level, as appropriate.

NE-H.3. Consider noise attenuation measures and techniques addressed by the Noise Element as well as other feasible attenuation measures not addressed as potential mitigation measures to reduce the effect of noise on future residential and other noise-sensitive land uses to an acceptable noise level.

NE-H.4. Support state regulation streamlining to allow standardized noise attenuation building and construction materials as an option to current requirements for acoustical evaluation.

## TABLE NE-3
## Typical Noise Attenuation Methods to Insulate the Noise Receive

| Noise Level Reduction | Typical Mitigation Methods |
|---|---|
| *15-20 dBA* | *Mitigation 1, 2, and 3*<br>1. Air conditioning or mechanical ventilation.<br>2. Double-paned glass.<br>3. Solid core doors with weather stripping and seals. |
| *20-25 dBA* | *Mitigation 1, 2, and 3 plus*<br>4. Stucco or brick veneer exterior walls or wood siding w/one-half inch thick fiberboard underlayer.<br>5. Glass portions of windows/doors not exceed 20 percent.<br>6. Exterior vents facing noise source shall be baffled. |
| *25-30 dBA* | *Mitigation 1 through 6 plus*<br>7. Interior sheetrock of exterior wall attached to studs by resilient channels or double walls.<br>8. Window assemblies, doors, wall construction materials, and insulation shall have a lab-tested STC rating of 30 or greater. |

## TABLE NE-4 Potential Noise Attenuation Methods

| Reducing the Source Noise* |
|---|
| *Traffic Noise* |
| Traffic Calming/Traffic Management Techniques |
| Low-Noise Road Surfaces |
| *Commercial and Industrial Noise* |
| Sound insulation of buildings, for walls, windows, doors, opening, ventilations etc. |
| Screens and Enclosures |
| Silencers, attenuators, or mufflers in connection with rotating machinery and ducts/pipes leading to and from building |
| Limiting of noise-producing operations |
| *Interrupted the Noise Path** |
| Landscaped Berms |
| Natural Land Forms |
| Noise-Compatible Structures/Buildings |
| Landscaping/Vegetation |
| Walls |
| *Separating the Noise Source** |
| Provide distance buffer between the noise source and the noise-sensitive use |
| Locate noise-compatible uses such as vehicle parking, open spaces, commercial uses, between the noise source and the noise-sensitive areas. |
| *Insulate the Noise Receiver* |
| Refer to Table NE-3. |

*These methods are not applicable for aircraft noise.