

Source: Hodges & Shutt survey of 14 U.S. airports.
 Annual operations at airports ranged from 150,000 to 300,000.
 All airports had air traffic control towers.

Safety Compatibility Policy Issues

Accident Locations versus Distance from Runway

FIGURE 6B

airport land use compatibility plan

Table 6A

Open Space in the Vicinity of Urban General Aviation Airports

Airport	Lakes/ Reservoirs/ Flood Plains		Open Parks/ Recreational Facilities/ School Grounds		Agricultural/ Undeveloped Lands		On Airport Property		Total Open Space	Total Airport Vicinity	Total Open Space
	Acres	%	Acres	%	Acres	%	Acres	%	Acres	Acres	%
Bowman Field KY	0	0	161	7	201	9	153	6	515	2,350	22
Buchanan Field CA	48	1	67	2	283	8	80	2	478	3,500	13
Fullerton Muni CA	0		97	4	130	5	10	1	237	2,380	10
Hayward Air Terminal CA	0		128	4	129	4	90	3	347	3,000	11
John Wayne CA	0		130	4	234	7	238	8	602	3,100	19
North Perry FL	7	1	8	1	423	10	335	8	773	3,980	19
Opa Locka FL	174	3	352	7	35	1	525	10	1,086	5,060	21
Palo Alto CA	1,212	53	163	7	0	0	22	1	1,397	2,295	61*
Reid-Hillview CA	52	2	150	6	99	4	79	3	380	2,380	18
South County CA	0	0	0	0	1,108	42	87	4	1,105	2,390	46
Spirit of St. Loui MO	0	0	0	0	1,930	47	167	4	2,097	4,080	51
Torrance Muni CA	0	0	0	0	62	2	89	3	151	3,000	5
Average									764	3,126	25

* San Francisco Bay: 770 acres

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- Agricultural and undeveloped lands.
- Water bodies and flood plains.
- Open parks, recreational facilities, and school grounds.
- On-airport property.

Only those open spaces larger than about 2 to 3 acres were included in the computations. No attempt was made to identify steep terrain, ditches, fences, posts, trees, or other such individual obstacles that may occur in the otherwise open areas. Roads and auto parking lots were not included in the tabulation.

The results indicate that open space comprises from as little as 5% to over 60% of the overall environs of the studied airports. The average for the 12 airports is 25%. For all but three of the airports, agricultural and undeveloped lands comprised the largest category of existing open space, thus posing the question of whether the land will remain open in the future.

Relationship of Open Space to Aircraft Accident Sites

A comparison between the aircraft accident sites and the open spaces around each of the 12 airports reveals that some 33% of the accidents appear to have occurred within these areas. Although this percentage is higher than the 25% figure that would be expected from a purely random distribution of accident locations in the airports' environs, it is not enough higher to be statistically conclusive. A much greater sampling of aircraft accident locations plus better data as to whether the accident sites were indeed in open areas would be necessary to provide a more definitive conclusion.

LAND USE RESTRICTIONS

There are three basic purposes for establishment of safety-related land use restrictions in the environs of an airport:

- To avoid hazards which can cause an aircraft accident;
- To protect people and property on the ground when accidents occur; and
- To minimize injury to the occupants of aircraft involved in accidents.

The first of these objectives seeks to reduce the frequency with which accidents occur; the latter two address the severity of the accidents that happen. Although the approaches to achieving each of these objectives overlap in many respects, they also have important differences. The following discussion highlights basic safety compatibility concepts and issues.

Hazards to Flight

Hazards to flight fall into two basic categories:

- Obstructions to the airspace required for flight to, from, and around an airport; and
- Other forms of interference with safe flight, navigation, or communication.

Airspace Obstructions

The airspace needed for operation of aircraft around an airport is defined by Part 77 of the Federal Aviation Regulations and, for airports with instrument approaches, by the U.S. Standards for Terminal Instrument Procedures (TERPS). In most circumstances, the latter is the less restrictive set of criteria.

Limiting the heights of structures to the heights indicated by the Part 77 surfaces provides an ample margin of safety for normal aircraft operations. The guidance provided by Part 77 is not absolute, however. Deviation from the Part 77 standards does not necessarily mean that a safety hazard exists, only that offending objects must be evaluated by the Federal Aviation Administration and that mitigative actions such as marking or lighting be taken if appropriate.

In some locations, such as adjacent to a runway, objects exceeding the Part 77 height limits may not be regarded as a hazard. On the other hand, tall objects in the approach corridors may pose risks even though they do not penetrate the defined Part 77 surfaces. Such objects also can adversely affect the minimum instrument approach altitudes allowed in accordance with TERPS standards.

Other Flight Hazards

Other land use characteristics can also affect flight safety. The characteristics can be visual, electronic, or physical in nature. Visual hazards include distracting lights (particularly lights which can be confused with airfield lights), glare, and sources of smoke. Electronic hazards include any uses which interfere with aircraft instruments or radio communication. The principal physical hazards, other than the height of structures, are bird strikes. Although the risk of bird strikes is most serious along the corridors required for takeoffs and landings, the concern extends to elsewhere in the airport vicinity. Any land uses which can attract birds should be avoided, but those which are artificial attractors are particularly inappropriate because they generally need not be located near airports.

Protecting People and Property on the Ground

Regardless of measures taken to prevent near-airport aircraft accidents, some inevitably occur. The most effective means of limiting the severity component of the risks of injury to persons or damage to property on the ground due to these accidents is to control the density and type of land use development in the areas most susceptible to having an accident. The question this poses is one of how much control is appropriate when protecting against a type of event that has a very low likelihood of occurring, but which may have significant consequences if it does. Although there are no absolute answers to this question, there are several important issues to consider.

Form of Restriction

Restrictions on airport area land use can take various forms. The primary intent, however, usually is to limit the number of people in the accident-prone areas. Limiting the potential property damage is generally considered less of a priority. In this context, the basic measure of land use restrictiveness thus is the number of people per acre. Two sets of variables in this basic measure are:

- **Gross Acre versus Net Acre** -The area to be reviewed can be measured in terms of the entire area, regardless of streets or parcel lines (its gross acreage) or the area of a given parcel (the net acreage). Because safety area land use restrictions are more effective when applied at a general plan or large development level than they are for small, individual parcels, measurement on a gross acre basis is more suitable. Gross acreage is also easier to calculate.
- **Average versus at Any Time** - Limitations on the numbers of people per acre sometimes are stated as a never-to-exceed maximum and sometimes as an average measured over an indicated period (typically 2, 8, or even 24 hours). A combination of the two also is possible (e.g., an average of x people per acre over an 8-hour period, not to exceed $2x$ at any time). It is recommended that restrictions be stated as a never-to-exceed maximum and the level set accordingly. This is the same approach as that taken by fire codes for buildings. An averaging approach assumes that an accident will not occur when a higher-than-average number of people is present.

Acceptable Development Density

The question of where to set density limits is dependent upon the degree of accident risk - the frequency (or probability) and the severity, that the community finds acceptable. The available accident location data (the limited study cited earlier together with other, more extensive, but less precise, data) clearly indicate that accident probabilities increase with closer proximity to runway ends both because of the greater concentration of aircraft over those areas and because the aircraft are flying at low altitude.

Federal Aviation Administration guidelines recommend that, whenever possible, airports should directly own the locations most critical to safety, the runway protection zones. These areas should be limited to little, if any, development and as few people as possible.

At most airports, the majority of property beyond the runway protection zones is typically in private ownership. The FAA offers no specific guidance regarding land use restrictions in this area. Nonetheless, the FAA recognizes that safety concerns extend beyond the runway protection zones by making acquisition of additional property eligible for federal grants.

Some airports and local communities have set development density limitations ranging between 10 and 100 people per acre for various parts of runway approach corridors. To put these figures into perspective, the following examples are cited:

- A single-story office structure having one occupant per 100 square feet of floor area (the maximum occupancy load allowed under the Uniform Building Code) and covering 25% of the lot would have 100 people per acre.
- Typical light industrial uses tend to average 35 to 50 people per acre, as do two-story motels.
- Shopping centers are likely to average about 75 people per acre during busy periods.
- Restaurants may have over 100 people per acre; fast-food restaurants can exceed 150.
- Residential land uses are usually measured in terms of dwelling units per acre rather than people per acre; however, assuming a typical subdivision density of 4 to 6 dwelling units per acre and an average of 4 people in each residence, the number

of people per acre would range from 16 to 24 under normal circumstances. Clearly, the densities can be much greater on special occasions.

An additional factor to be taken into account in protecting people on the ground is their ability to move out of harm's way. Certain types of land uses consequently are considered unacceptable in vulnerable areas regardless of the number of people present. Primary among such uses are elementary and secondary schools, hospitals, and nursing homes.

Clustering Versus Spreading of Development

Given that the tradeoffs between safety and economic concerns usually dictate some amount of development near airports, particularly those in urban areas, a question to be considered is whether it is better for this development to be clustered or spread out.

- The premise behind the concept of clustering is that, in most off-airport accidents, the aircraft are under some degree of control when forced to land. Clustering thus allows a greater amount of open space toward which the pilot can aim. In addition to reducing the risks for people on the ground, open space also provides benefits for aircraft occupants, as addressed below. The disadvantage of clustering is that it allows an increased number of people to be in the potential impact area of an uncontrolled crash.
- A uniform spreading of development, on the other hand, provides fewer emergency landing spots and increases the chance of someone on the ground being injured. On the plus side, however, a uniform distribution of development limits the maximum number of people who could possibly be in an impact area.

A compromise between these two strategies probably represents the optimum approach in most cases. This approach entails limiting the maximum occupancy level of a small area, but otherwise clustering development so as to provide the greatest amount of large open areas.

Uses in Structures versus Ones Not in Structures

Sometimes a distinction is made between the acceptable number of people per acre in land uses where people are outdoors versus those where the people are in a building or other enclosed area.

- The theory is that people outdoors have more of a chance to see a plane coming as well as more directions in which they can move to vacate the impact area. A greater concentration of people thus is often considered acceptable for such land uses.

Buildings, on the other hand, provide substantial protection from the crash of a small airplane, particularly when the aircraft is still under control as it descends. If a fire subsequently ensues, historically, a relatively infrequent occurrence, it is unlikely to engulf the entire building instantly.

Taking both of these factors into account, it is suggested that, for airports used only by small aircraft, the acceptable number of people in a given area be equal for uses in or not in structures. For airports used by business jets and other medium to large aircraft, a greater restriction on the number of people in structures is appropriate.

Minimizing Injury to Aircraft Occupants

As suggested above, the premise behind land use controls intended to minimize the severity of injury to aircraft occupants in the event of an off-airport accident is that, in most instances, aircraft are under control during the descent. If the aircraft has sufficient altitude, the pilot has some choice as to where to attempt an emergency landing. In circumstances involving an aircraft that is out of control as it descends, the character of the land uses below are not likely to have a significant effect on the survivability of the crash.

An open space does not have to be very large to enable a successful emergency landing. The objective is for the occupants to survive the accident with limited injury. Damage to the aircraft is irrelevant in these circumstances. An area as small as 75 feet by 300 feet (about 0.5 acre or the size of a football field) can be adequate for a survivable emergency landing in a small plane if the area is relatively free of objects such as overhead lines and large trees and poles that can send the plane out of control at the last moment. Because the pilot's discretion in selecting an emergency landing site is reduced when the aircraft is at low altitude, open areas preferably should be larger and spaced more closely in those locations overflown at low altitude. The chance of a pilot seeing and successfully landing in a small open space also would be increased if there are more such spots from which to choose.

INVERSE CONDEMNATION

A frequently mentioned concern with regard to establishment of airport/land use restrictions for safety purposes, as well as for noise, is that they might constitute inverse condemnation, a taking of private property without just compensation. The discussion in this section examines the issue of inverse condemnation as it applies to airport compatibility planning. The emphasis is on the operational implications of inverse condemnation.

The material is presented from a professional planning perspective. It is not a legal opinion.

Legal Basis for Regulation

A land use regulation must not be so restrictive that it causes a "taking" of a landowner's property without just compensation. This legal directive is derived from the Fifth Amendment to the United States Constitution which states "nor shall property be taken for public use, without just compensation." In the context of land use regulation, a property can be said to have been taken by inverse condemnation if a land use regulation or decision is so restrictive as to deprive the land owner of all reasonable use of the property. The application to airport approach protection measures is generally the same as for other purposes of land use regulation.

In California, the ability for local governments to regulate land use is an exercise of the police power granted by Article XI of the California Constitution. The enabling legislation for airport land use commissions is contained in Article 3.5 of the California Aeronautics Act. State, as well as federal, courts have upheld local land use regulations as long as: (1) they serve a legitimate governmental purpose; and (2) the application of the regulation to a specific property substantially serves that interest (the "nexus" test).

Defining the Public Purpose

It is generally easier to demonstrate a legitimate public purpose when a land use regulation "prevents a harm" rather than "confers a benefit;" however, this guideline is far from absolute. In the specific case of airport land use commissions, state enabling legislation clearly defines the purpose as being "to protect public health, safety, and welfare by ensuring the orderly expansion of airports and the adoption of land use measures that minimize the public's exposure to excessive noise and safety hazards...."

Regulation of land uses to assure compatibility with airport activities is widely held to be a legitimate public purpose. It is, after all, the purpose for the creation of airport land use commissions. However, there is a body of legal opinion which suggests that some approach protection measures (including aviation easements) are merely a transfer of rights from one private party to other private parties. That is, land owners adjacent to an airport give up certain rights (e.g., ability to build structures which would penetrate FAR Part 77 surfaces) which are then given to the users of the airport. In this legal view, no legitimate public purpose is being served and the action is not a valid exercise of the police power. If this view is accepted, any taking must be compensated.

Determining When a Taking Has Occurred

It is important to realize that the courts (including the United States Supreme Court) have found it a difficult task to determine when land use decisions constitute a taking. There is no set formula that can be used to determine when compensation is due a land owner. The courts have held that whether the need for compensation exists depends upon the particular circumstances of each case.

For a taking to have occurred, the property owner must be left without an economically viable use. The courts look to the value remaining in the property, *not* the value that was taken. Local land use regulations that have taken over 90% of the value of an individual's land have been upheld in the courts. Generally, the greater the range of remaining permitted uses, the easier it is to avoid a successful inverse condemnation suit.

Local governments are largely free to change land use designations and zoning at their discretion. These decisions are generally held to be legislative acts and courts will not substitute their judgment for those of elected officials. A landowner does not have "vested rights" to current zoning unless he/she has:

- A valid building permit;
- A vesting subdivision map; and
- A development agreement with the local government.

Vesting of rights to current zoning does not occur solely because a developer has constructed infrastructure (e.g., roads, and water lines).

Operational Implications

State law does not give ALUC's direct authority over land use. Implementation of an ALUC's policies is accomplished by the relevant city or county, to the extent that the local government concurs with the ALUC's policies. Therefore, it is a legitimate question whether it is possible for an ALUC to institute a taking through inverse condemnation. The local agency which implements the policies could be more readily sued. However, since the question here concerns the limitations which inverse condemnation presents in implementation of approach protection measures, the issue of which local agency could most readily be sued is not directly of interest.

Based upon the existing case law, limitations on occupant density, building height and similar measures can be implemented without inverse condemnation being a major concern. These types of limitations typically leave a wide range of economically viable uses. Retention of open space in a highly urbanized area is more likely to legitimately raise the issue of inverse condemnation. The ability to successfully preserve the remaining open space in the vicinity of urban airports will depend upon how two questions are answered:

- How are "open space" uses are defined?
- What percentage of each remaining parcel must be devoted to open space?

Defining Open Space

A definition of open space uses must be based upon a clear vision of the purpose of the open space. If the purpose of the open space is to provide emergency landing sites, the land would ideally be similar to a runway: free of structures, trees and water features; relatively smooth; and level.

If open space is defined to mean "no development" the potential for a successful inverse condemnation suit is quite high. No development is generally only a viable land use designation if the property's environmental constraints make development infeasible or inappropriate. If no development is the desired end, fee simple acquisition of the property would be the most appropriate implementation measure.

Alternatively, open space can be defined to include a range of uses which typically contain large amounts of land without structures and with low occupancy levels. In rural locations, agriculture (with some restrictions) is the ideal private use. However, in urban areas, there are only a few viable private uses which fit within the definition of open space.

- **Field Crops** -Flowers and specialty crops may be able to generate enough revenue to be supportable in a urban area. Many of these uses continue to operate in urbanized areas. A broader range of agricultural uses are practical in predominantly agricultural areas such as Imperial County.
- **Golf Courses** - Given the high demand experienced by existing golf courses, a new golf course could be a profitable enterprise. However, golf courses require a substantial amount of land, particularly for a standard 18-hole facility.

Cemeteries - Space for both human and pet cemeteries is extremely limited in highly urbanized locations; it is uncertain whether these uses would be viable in a commercial sense.

Unfortunately, this list of open space uses is so limited that inverse condemnation would remain a serious concern. However, if automobile parking lots are included in the definition of acceptable private open space, the list becomes more viable. Clearly, parking lots do not make desirable emergency landing sites, but they are generally preferable to buildings. Based upon anecdotal information, it appears that landing in a parking lot seldom injures those on the ground and is often survivable for occupants of light aircraft. Adding parking lots to the list of permitted open space uses could leave sufficient residual uses to avoid a taking if the open space zone was applied only to portions of the remaining open parcels. It might be possible to zone an entire parcel for open space uses if adjacent parcels are under the same ownership and a broad range of uses is permitted on the adjacent parcels.

Percentage of Open Space

Open space- in the form of landscaping is a part of every new development project. It is appropriate to explore the potential for arranging the site design of new development near an airport to cluster the landscaping to create emergency landing sites. An alternative approach is to require greater amounts of landscaping than is typically required. To be of value, the minimum size necessary for an emergency landing site is at least a half acre. If a substantial amount of a parcel remained developable, it may be possible to avoid a successful inverse condemnation suit. This strategy is most likely to be viable on larger parcels.

ESTABLISHED SAFETY COMPATIBILITY CRITERIA

As might be surmised from the preceding discussion, the wide range of individual circumstances, community concerns, and other issues results in a variety of land use safety compatibility criteria and existing conditions in the vicinity of airports. There are no established nationwide safety zone regulations or other criteria beyond the runway protection zones defined by the Federal Aviation Administration. The paragraphs below summarize some of the land use safety compatibility criteria established by selected federal, state, and local agencies.

Federal

Federal Aviation Administration

FAA standards offer little guidance regarding off-airport land use safety other than in the context of airport design and airspace requirements.

- **Airport Design** - As noted previously, the FAA has defined criteria for the dimensions of the runway protection zones located at each end of a runway. Ideally, the entire runway protection zones should be clear of all objects. The FAA strongly recommends that airports own this property outright or, when this is impractical, to obtain easements sufficient to control the land use. Acquisition of this property is eligible for FAA grants. Beyond the runway protection zones, the FAA has no specific land use criteria other than the height of objects. However, property in the approach zones within a distance of 5,000 feet from the runway primary surface also potentially can be acquired with federal grants if necessary to restrict the use of the land to activities and purposes compatible with normal airport operations.
- **Airspace** - Part 77 of the Federal Aviation Regulations (FAR), *Objects Affecting Navigable Airspace*, has been adopted as a means of monitoring and protecting the airspace required for safe operation of aircraft at an airport. These regulations require that the FAA be notified of certain proposed construction or alteration of objects, whether permanent or temporary or of natural growth, within a specified vicinity of an airport. Standards for determining what constitutes an obstruction to air navigation also are established, defined in terms of imaginary surfaces in the airspace. Although Part 77 gives the FAA no authority to enforce the standards and nothing in the regulations prohibit a state or local government from taking actions which are contrary to the federal standards, by doing so, the owner of an airport may be found in noncompliance with the conditions for receipt of airport development grant funds and become ineligible for future grants.

U.S. Department of Defense

Safety compatibility criteria for military air bases are set forth through the Air Installation Compatible Use Zone (AICUZ) program. The objective of this program is to encourage compatible uses of public and private lands in the vicinity of military airfields through the local communities' comprehensive planning process.

AICUZ standards establish a clear zone and two Accident Potential Zones (APZ's) at each runway end, the dimensions varying depending upon the type of aircraft using the

runway. For runways used only by light aircraft, the zones each have a width of 1,000 feet wide and the lengths are 3,000 feet for the clear zone and 2,500 feet each for APZ I and II. The alignment may be altered to follow the primary flight tracks.

Within each zone, the compatibility or incompatibility of possible land uses is specified. For example, residential uses are considered incompatible in the clear zone and APZ I and compatible only at low densities in APZ II. Retail land uses are unacceptable in the clear zone and may or may not be compatible in the APZ's depending upon on the density of use.

State of California

State Regulations

California state laws and regulations pertaining to off-airport safety compatibility are found in two primary locations:

- **State Aeronautics Act** -As is true at the federal level, California state regulations provide little guidance with respect to airport/land use safety compatibility. Perhaps the most significant provision is to give the State Division of Aeronautics enforcement powers regarding FAR Part 77. Article 2.7 of the statute prohibits any person from constructing any structure or permitting any natural growth at a height which would constitute a hazard to air navigation as defined in FAR Part 77 unless a state permit or federal exemption is obtained. This regulation applies to objects located within one mile of an airport boundary.
- **State Education Code** -This state law requires that any school district proposing to acquire a school site located within two miles of an airport boundary notify the Department of Education of this intended action. The Division of Aeronautics is then required to investigate the site and report back to the Department of Education.

California Division of Aeronautics Airport Land Use Planning Handbook

This document, prepared and revised by the Division of Aeronautics in 1993, is intended as a guide for Airport Land Use Commissions and other local agencies. It contains no regulations, only recommendations. The suggested guidelines for safety zones are essentially a composite of the criteria found at that time in plans adopted by Airport Land Use Commissions throughout the state. Establishment of up to five separate zones is proposed:

- **Inner Safety Zone** - This zone normally either coincides with the runway protection zone (clear zone) or is a rectangular area encompassing it. The shape of the zone should be modified to reflect close-in arrival and departure path turns. No structures and few, if any, people (a maximum of 10 per acre at any one time) should be permitted.
- **Outer Safety Zone** - An extension of the inner safety zone, this zone should consist of either the FAR Part 77 approach zone or an equivalent rectangular area, modified as necessary to follow major flight tracks. The outer end of the zone should be located at the following distance from the runway primary surface, depending upon the type of aircraft utilizing the runway:

Single-engine general aviation aircraft	2,000 feet
Twin-engine general aviation aircraft	3,500 feet
Business and commercial jets and all precision instrument runways	5,000 feet

Recommended development criteria include:

- For uses in structures, no more than 25 people per acre at any time and no more than 150 people in any one building.
- For uses not in structures, no more than 50 people per acre at any time.
- Open areas, large enough and properly shaped and oriented to accommodate a forced, but controlled aircraft landing, should comprise 50% of the total zone. Streets and parking areas are to be considered open areas for the purposes of this computation.
- **Emergency Touchdown Zone** - This recommended zone consists of a 500-foot wide strip running the length of both the inner and outer safety zone. It should be free of all obstructions so as to allow for the emergency landing of aircraft.
- **Traffic Pattern/Overflight Zone** - Encompassing the common flight tracks to and from an airport, the limits of this zone can generally be defined by the FAR Part 77 horizontal surface. Large assemblages of people should be excluded and the lot coverage for commercial uses should not exceed 40% to 50%.
- **Extended Runway Centerline** - Applicable only to precision and nonprecision instrument runways, this zone is comprised of a 1,000-foot wide corridor extending 10,000 feet from the runway threshold. Uses involving large concentrations of people should be discouraged in this area.

Other Agencies

Oregon Aeronautics Division

A set of airport compatibility guidelines, similar in concept to those recommended by the California Division of Aeronautics, has been developed by the Oregon Aeronautics Division for use in that state. Two safety-related zones are proposed:

- **Clear Zone** - This area should be minimally used by people and be free of any construction or obstacle. Its dimensions are as provided in federal standards.
- **Approach Safety Zone** - The edges of this zone follow those of the FAR Part 77 approach surface. Its length should typically be 2,500 to 5,000 feet depending upon the airport type and local desires. At extremely busy airports with precision instrument approaches, a length greater than 5,000 feet may be appropriate. Uses in this zone should not attract large groups of people. Residential uses should be discouraged. Hospitals, rest homes, and other such uses should be excluded. Offices, service businesses, and some retail activities are conditionally acceptable.

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Noise Characteristics

INTRODUCTION

Noise is often defined as unwanted sound. A substantial amount of research has been done regarding the effects of noise on people; much of this research has specifically examined aircraft noise impacts. Although most of the latter deals with high-activity, airline airports, the basic concepts can be applied to small, general aviation facilities as well.

This chapter examines the basic characteristics of noise, particularly as it relates to airports. The discussion includes the physical properties of sound, the nature of airport noise, measures of environmental noise, and community reactions to noise. The next chapter addresses the land use planning implications created by airport noise.

PHYSICAL PROPERTIES OF SOUND

Sound is transmitted in the form of pressure waves. These waves are created by particles of air being displaced from and returning to an equilibrium position. As the particles are displaced, they bump into surrounding particles which bump into others and so on. In this manner, sound is transmitted through the atmosphere. Sounds are heard when the pressure waves of displaced air particles strike the eardrum, causing it to vibrate.

Measurement of Sound

There are three principal dimensions to sound waves: amplitude (intensity or loudness), frequency (pitch), and duration.

Intensity - The intensity of sounds which are audible to the ear is commonly measured in "decibels" (abbreviated dB). The decibel scale ranges from 0 to 140, with 0 corresponding to the lowest sound level that the healthy, unimpaired human ear can detect. Unlike linear measures such as distance or weight, sound intensity is measured on a logarithmic scale. Each increase of 10 dB means that the acoustical energy is multiplied by 10, a sound of 70 dB is 10 times as intensive as one of 60 dB. However, the relative "loudness" of sound as perceived by the human ear does not closely match the actual relative amounts of sound energy. For example, while 70 dB is physically 10 times as intensive as 60 dB, listeners tend to judge it as only twice as "loud." A tabulation of approximate decibel levels generated by common indoor and outdoor sound sources is presented in Table 7A.

Frequency - The frequency of a sound, its "highness" or "lowness", depends upon the relative rapidity of the vibrations by which it is produced. In a low-pitched tone, the sound waves are relatively far apart, while in a high-pitched one they are squeezed much closer together. Pitch is measured in cycles per second (also called hertz or hz). Although some "pure tone" sounds contain only one frequency, more often sound is a mixture of different frequencies.

Duration - The third major dimension of sound is the length of time over which it occurs. Many sounds have a distinct beginning and ending; others, such as from aircraft overflights, gradually increase and decrease without a sharp definition of when they start or stop.

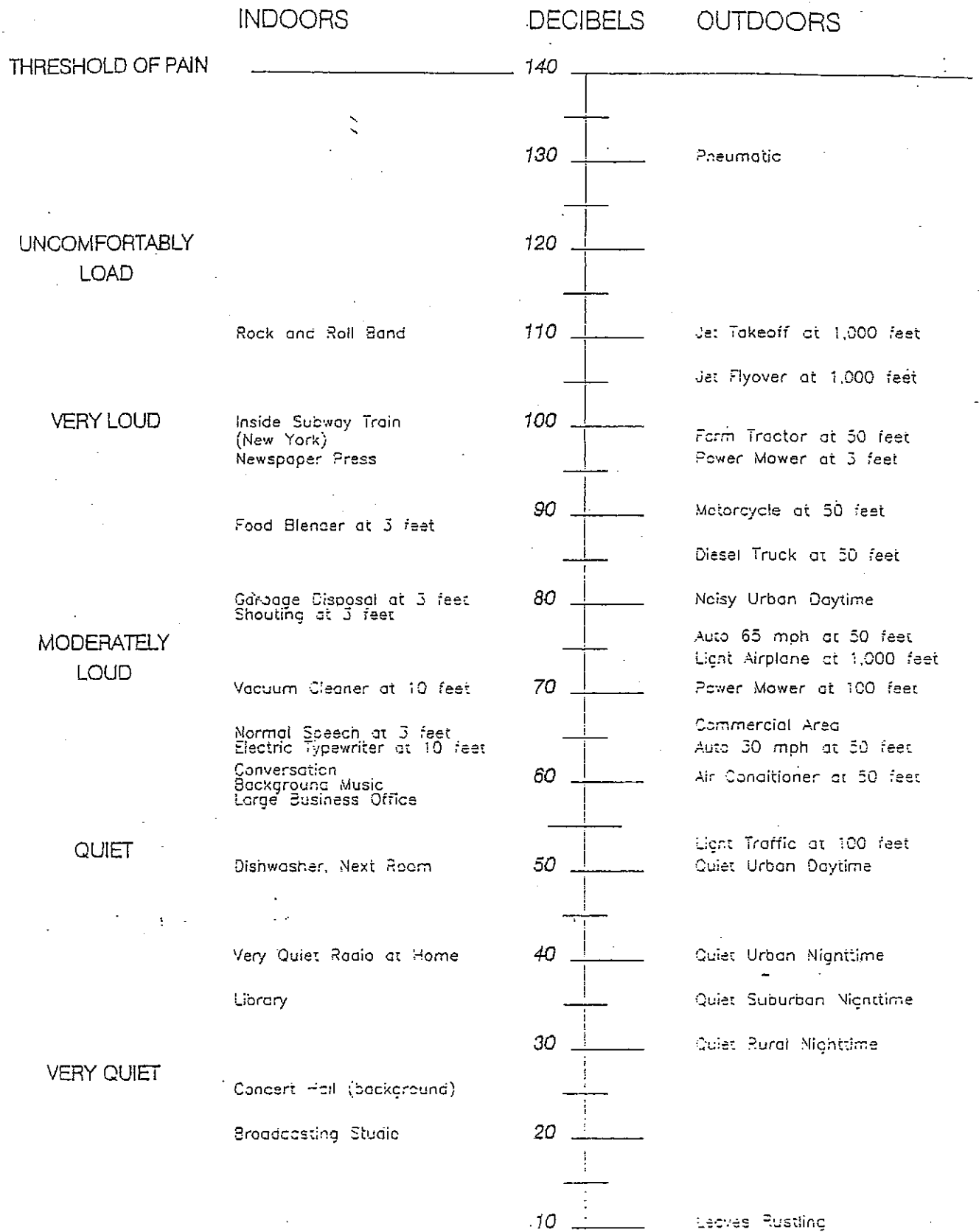
When heard by the human ear, the intensity and frequency of sounds are closely interrelated. Although people can hear sound frequencies as low as 20 hz and as high as 20,000 hz, they do not hear all frequencies in this range equally well. This means that people may assign a different "loudness" to two sounds having identical intensities but widely differing frequencies. Higher frequency sounds tend to seem louder to people than lower frequency sounds. Most environmental sound measurements consequently are weighted to simulate the varying frequency sensitivity of the human ear. The most commonly used weighting is the A-weighted decibel (abbreviated dBA).

Sound Attenuation

Among the basic characteristics of sound which are of particular interest in the discussion of aircraft-generated sounds is its attenuation or reduction over distance. Part of the reduction occurs because the sound energy is spread over a geometrically increasing area as the distance from the source increases. At sufficient distances from the source, the geometric spreading results in a 6 dB loss per doubling of distance. Additional attenuation results from absorption of the sound by the air and by the ground, structures, and other objects.

Sound propagation through the air is affected by meteorological conditions including air temperature, temperature inversions, humidity, wind speed, and air turbulence. Sounds travelling along a hard ground surface are attenuated by an additional 2.5 dB in 1,000 feet (compared to the attenuation in air alone) and tall grasses or shrubs can double this figure. Structures, terrain, or other barriers can provide significant attenuation for ground-to-ground sounds as well. Ground cover and objects on the ground, however, have little effect on air-to-ground sounds, such as those from aircraft.

The attenuation of sound from the exterior to the interior of a building is fairly consistent among structures of similar construction type. Table 7B indicates the amount of attenuation afforded by common types of building construction.



Noise Characteristics

Approximate Decibel Level of Common Sound Sources

TABLE 7A

airport land use compatibility plan

Table 7B

Noise Reduction Afforded by Common Building Construction

Construction Type	Typical Occupancy	General Description	Noise Level Reduction (NLR) in dBA
1	Residential, Commercial, Schools	Woodframing. Exterior stucco or wood sheathing. Interior drywall of plaster. Sliding glass windows. Windows partially open.	15-20
2	Same as 1 above	Same as 1 above, but windows closed.	25-30
3	Commercial, Schools	Same as 1 above, but windows are fixed 1/4 inch plate glass.	30-35
4.	Commercial	Steel or concrete framing. Curtain wall or masonry exterior wall. Fixed 1/4 inch plate glass windows.	30-40

Notes:

- Construction methods assume no special noise control provisions.
- The NLR range depends upon the openness of the windows, the degree of seal, and the window area involved.

Source:

Paul S. Veneklasen & Associates (1973), "Noise Insulation Problems in Buildings".

EFFECTS OF NOISE ON PEOPLE

Types of Effects

Noise, especially aircraft noise, affects people and their activities in varied and complex ways. Three principal types of effects can be identified: physiological, behavioral, and subjective.

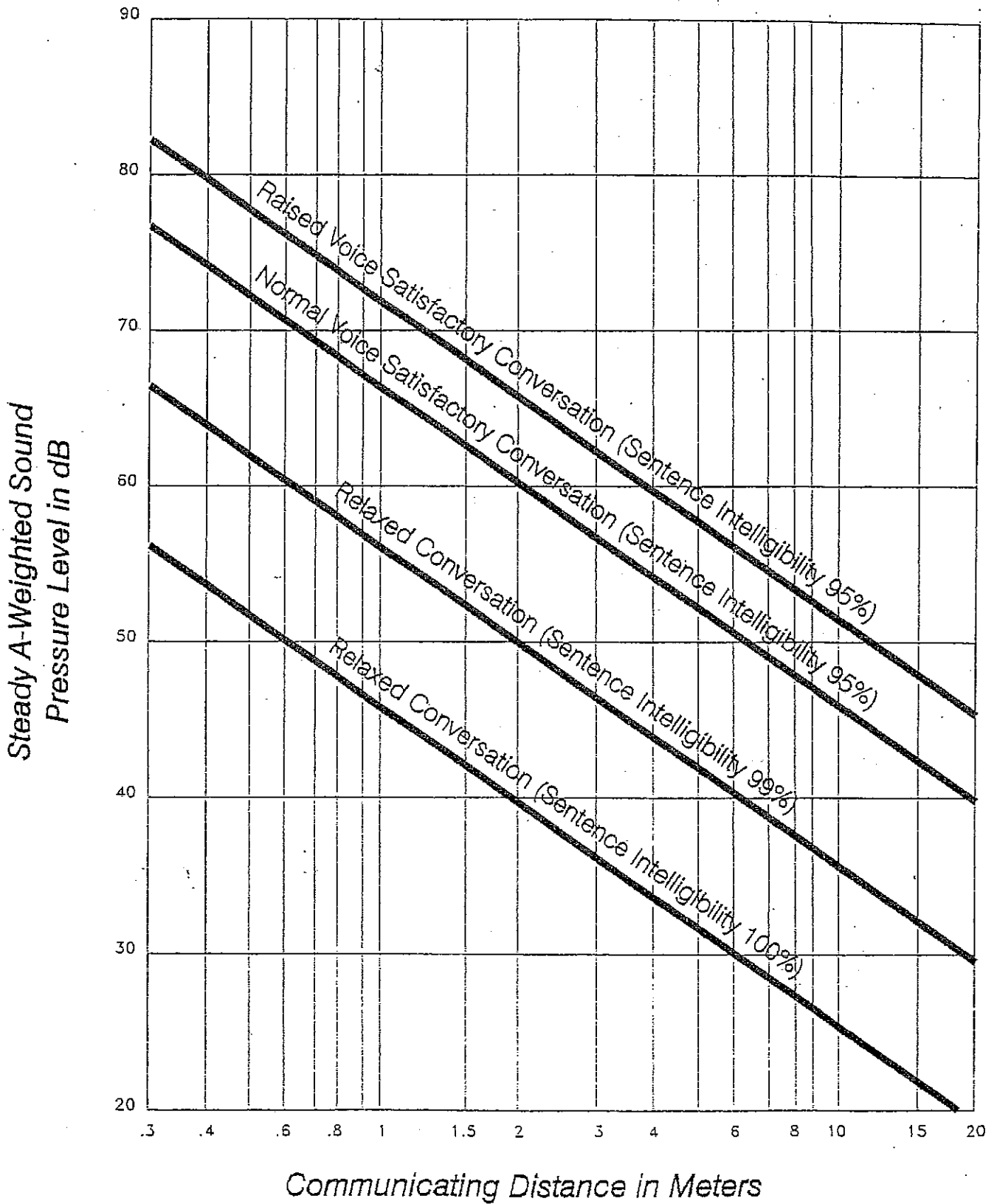
- *Physiological effects* can be either temporary or permanent. Among the temporary effects are startle reactions and the effects of sustained sleep interference. Hearing loss is the most obvious permanent effect of noise. Research indicates that off-airport aircraft noise, even from the loudest aircraft, is generally not severe enough to produce permanent or even sustained (after the noise ceases) physiological effects.
- *Behavioral effects* are usually measured in terms of interference with human activities. Speech interference and interference with the enjoyment of radio or television are the most often cited effects. Interference with concentration on mental activities and disruption of sleep are two others. Most of the readily identifiable aircraft noise effects fall into this category. Specific parameters of these effects are described below.
- *Subjective effects* are by their very nature unique to each individual and, therefore, difficult to quantify. Subjective effects of noise are commonly described in terms of "annoyance" or other similar terms. Some of the characteristics of annoyance effects are discussed in the next section.

Parameters of Human Reactions to Noise

Speech Communication

Scientific research has found that the maximum continuous sound level that will permit relaxed conversation with 100% intelligibility throughout a typical residential living room (talker/listener separation greater than approximately 3.5 feet) is 45 dBA ($L_{eq} = 45$ dBA). A 95% intelligibility, considered to be "satisfactory conversation", can be obtained with a steady sound level of up to 64 dBA.

Outdoors, because of the absence of reflecting walls to provide the reverberation found indoors, the sound level of speech as it reaches the ear generally continues to decrease with increasing distance between the talker and listener. In a steady background noise there



Noise Characteristics

Maximum Distances Outdoors Over Which Conversation is Considered to be Satisfactorily Intelligible in Steady Noise

FIGURE 7A

airport land use compatibility plan

comes a point, as the talker and listener increase their separation, where the decreasing speech signal is masked by the noise. This relationship is shown in Figure 7A.

Almost all fluctuating sound levels found in the everyday environment will, if averaged over a long time period, have less impact on speech intelligibility than a steady sound which has the same Equivalent Sound Level (L_{eq}) value. This occurs because most of the time the background noise level is less than the Equivalent Sound Level (because of the logarithmic base of sound intensity measurement, a loud sound need have only a relatively short duration to raise the L_{eq} substantially).

Sleep Disturbance

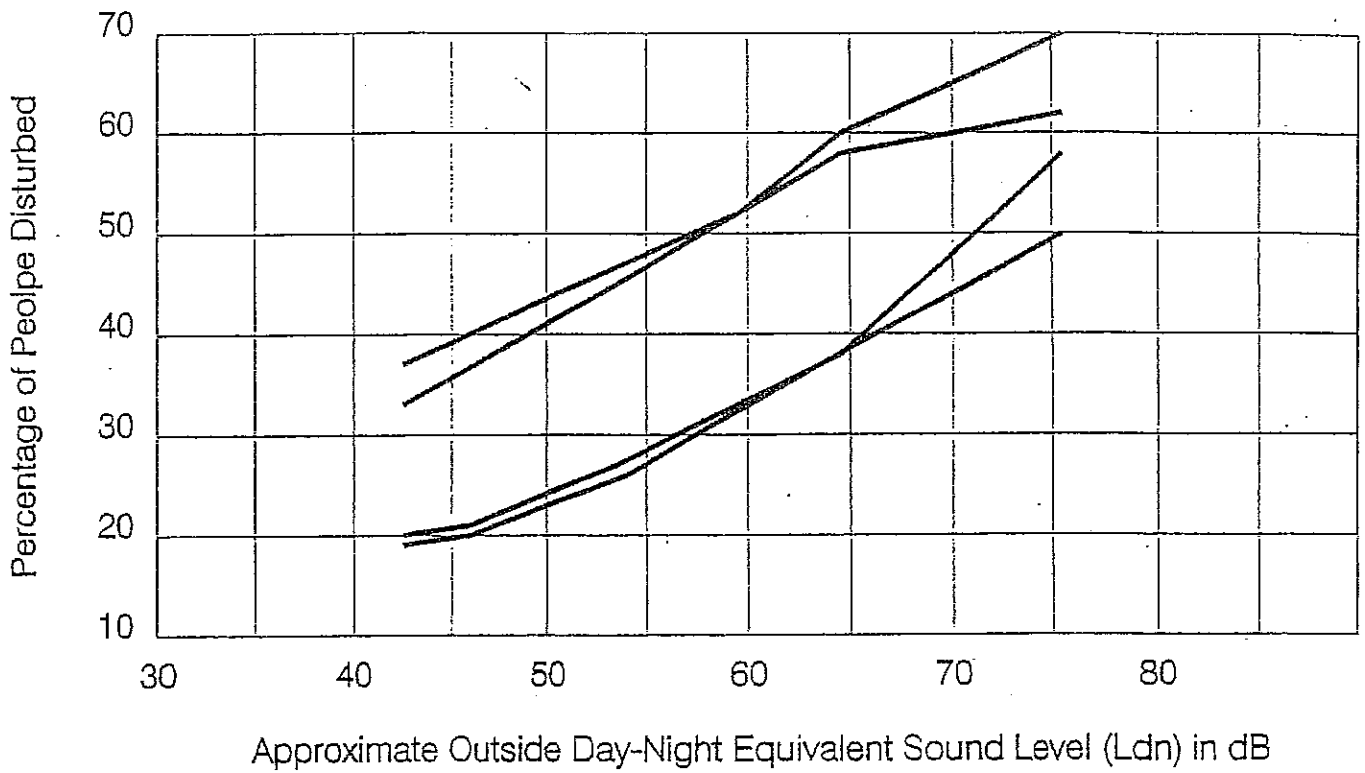
The extent to which environmental noise affects human sleep patterns varies greatly from individual to individual as well as from one time to another for any particular individual. Whether an individual is aroused by a noise depends upon the individual's sleep state, the loudness or suddenness of the noise, the information value of the noise, and other factors. Also, most people adapt over time to increased levels of noise during sleep.

Studies conducted of people living near airports and other noisy environments have found that sleep disturbance can occur at noise levels as low as 35 dBA. At noise levels above 45 dBA, sleep disturbance (although not necessarily awakening) becomes relatively common. Figure 7B illustrates the relationships between noise levels and sleep disturbance for aircraft noise near a busy airline airport.

An important point to recognize here is the distinction between individual noise events and ambient noise levels. When background noise levels are low, a single noise having a maximum intensity of 45 dBA may cause many people to awaken, particularly if they have not become accustomed to such noises. On the other hand, a relatively constant noise of about the same level, may well cause less of a sleep disturbance in the majority of people.

Overflight Annoyance Factors

As noted above, the extent to which people are annoyed by noise is largely a subjective reaction, one that varies widely from individual to individual. Consequently, it is difficult to relate the occurrence of annoyance reactions to any specific noise levels. Anecdotal information from airports which document the location of noise complaints suggests that people's perceptions of noise are shaped by their personal sensitivity, their perception of the importance/appropriateness of the event causing the noise, and their general expectations about noise.



KEY

- 1 = Startles
- 2 = Keeps from going to sleep
- 3 = Wakes up
- 4 = Disturbs Rest or Relaxation

Source: EPA - 1974, p. D-11

Noise Characteristics

Percentage of People Disturbed by Aircraft Noise for Reasons Concerned with Rest and Sleep

FIGURE 7B

airport land use compatibility plan

One explanation of annoyance effects, at least with regard to airports, is that they result from a combination of noise and safety concerns, with fear being an element of the equation. Although people generally do not fear aircraft noise itself, they may be fearful of an aircraft crashing onto their property, and it is the noise that mostly creates their awareness of the aircraft presence. The occurrence of annoyance impacts thus appears to be influenced by several factors related to the individuals affected, their attitudes toward aviation including their feelings regarding the importance of the particular activity, their understanding of how aircraft fly, and their knowledge of when and how often overflights occur, as well as by the actual noise levels and the altitude of the aircraft.

NATURE OF AIRPORT NOISE IMPACTS

Noise is often perceived to be the most significant of the adverse impacts associated with airport activity. To better understand airport noise impacts, it is important to recognize the variables involved with regard to different types of aircraft, the location where the noise occurs, and other factors such as pilot techniques.

Types of Aircraft

The noise emitted by different types of aircraft has distinctly different properties. Although there are also differences among specific makes and models of aircraft within each broad group, these distinctions are generally less pronounced.

Jet Airplanes

Both the character and the intensity of jet airplane noise has changed over time as new engine technologies have been developed and introduced into the airline and business jet aircraft fleets. The older, pure-jet engines produce noise that is both very loud and at the high end of the frequency spectrum. Newer generation, fan-jet engines, in which a substantial volume of the air entering the engine bypasses the combustion chamber, create noise that is comparatively lower both in intensity and frequency. The extent to which future technology can continue to reduce jet-engine noise is uncertain. Most of the overall noise level improvements at airports having jet activity are expected to result from the retirement of the older, louder jet aircraft.

Propeller Airplanes

The dominant noise from most propeller airplanes, whether they be driven by piston or turbojet engines, is from the propeller itself. Propeller airplane noise varies depending upon the number of engines, the rotational speed of the propellers, the number of blades on each propeller, and the pitch of the blades, as well as, to some extent, the type of engine.

Compared to jets, the majority of propeller airplanes emit significantly less noise when measured at equal distances from the aircraft. The size of the aircraft is a major factor in this distinction, however, most propeller airplanes flying today are substantially smaller and lighter than jets airplanes are. For aircraft of similar weight, the noise levels of aircraft that are propeller driven and those that have new-technology, fan-jet engines are not vastly different. Another factor affecting the relative noise levels generated by the two aircraft types is the takeoff climb profile. Because jets climb much more rapidly than typical propeller airplanes, the noise levels measured on the ground diminish rapidly with increased distance from the runway. Consequently, at points sufficiently far from the runway end, the higher altitude attained by jets may make them effectively quieter than propeller airplanes.

Helicopters

Helicopter noise has a character all its own. Although a portion of the noise emanates from the engines themselves, the uniqueness of helicopter noise is mostly due to the modulation of sound created by the relatively slow-turning main rotor. This sound modulation is referred to as *blade slap*. Blade slap is most pronounced during low-speed descents and high-speed cruise. To a listener on the ground, it is most audible as the aircraft approaches. Helicopters are also notable for creating vibration or rattle in structures.

Noise Location

Aircraft operating on or near an airport, generate noise both while in the air and on the ground.

Airborne Operations

The most extensive noise impacts are those created while the aircraft are in flight. These impacts are most concentrated near the runway ends, particularly the ends predominantly used for takeoffs, and secondarily along the common flight tracks. An important factor to comprehend in evaluating airport noise impacts is the wide variation in actual flight paths flown by the aircraft using an airport. As described in Chapter 5, even though airport traffic patterns may be standardized, they are not precisely located "highways in the sky."

Ground Operations

Aircraft ground operations create noise at several locations on an airport:

- **On the Runway** - Significant noise levels are generated behind an aircraft as full engine thrust is produced during acceleration to takeoff. On landing, power settings on most aircraft are low and the noise is minimal. The one significant exception is when jet aircraft use reverse thrust to decelerate after landing. This action can produce high noise levels in front and to the sides of the aircraft.
- **At Runway Holding Bays** - Pre-flight engine run-ups by piston aircraft are usually conducted at holding bays or other locations near the ends of runways. In nearby areas, the resulting noise levels frequently are greater than for takeoffs and landings.

- **Fixed Base Operations Areas** - Maintenance testing of aircraft engines requires the use of high power settings and resulting noise levels. This activity may occur in or near fixed base operations maintenance hangars or sometimes at other locations on an airport.
- **Other Operations Areas** - Aircraft use low power settings when taxiing between parking locations and a runway. For most aircraft, the resulting noise levels are minimal and not a factor off the airport property.

Other Variables

The noise levels experienced on the ground as an aircraft flies over are primarily dependent upon the inherent loudness of the aircraft, the aircraft's altitude, and the horizontal distance between the measuring site and the aircraft flight track. Other variables are also important, however:

- **Pilot Technique** - An important variable in aircraft noise is the pilot. Depending upon the techniques that the pilot employs, the same aircraft can generate significantly different noise levels. Conditions which produce some of the greatest noise variations include: the angle of climb while on takeoff (also affected by air temperature); the pitch setting on variable pitch propeller airplanes, especially at high takeoff power settings; power adjustments during takeoff by jet aircraft; and the airspeed and descent rate relationships that determine the extent of helicopter blade slap during landing operations. Pilot awareness of the aircraft configurations that create abnormally high noise levels can be a significant factor in helping to reduce airport noise impacts.
- **Air Temperature** - On hot days, aircraft cannot climb as rapidly as when temperatures are cooler. Takeoff noise impacts consequently are stretched out over a greater distance from the runway end.
- **Sound Wave Reflections** - The presence of nearby structures or steep terrain can cause sound wave reflections which may increase noise levels. Certain meteorological conditions, particularly a solid, low cloud cover, also can reflect sound back to the ground, resulting in higher noise levels.

MEASURING ENVIRONMENTAL NOISE

Measurement of sound is a relatively straight-forward and objective process. Environmental noise, however, is comprised of a multitude of varying sounds having different intensities, frequencies, and durations, and stemming from different sources. Moreover, to be useful, measures of environmental noise must take into account the ways in which noise affects people.

Types of Noise Metrics

Some assessment of the effects of noise on people can be made relative to a specific decibel value. Noise in the everyday environment, however, fluctuates considerably from loud one moment to quiet the next. Historically, federal and state agencies have sought an acceptable means of expressing average noise levels. The averaging can be with respect to a single event or a number of events over a specified time period.

Single-Event Metrics

The average for an individual event, such as an aircraft overflight, is often computed in terms of the Sound Exposure Level (SEL) or the Single Event Noise Exposure Level (SENEL). (The latter term is used in California, the former is adopted by the U.S. Environmental Protection Agency and the Federal Aviation Administration). SEL and SENEL values are identical. SEL and SENEL measure the A-weighted sound level integrated over the entire noise event above a threshold level and normalized to a referenced duration of one second. Hence, they give the level of a continuous one-second sound which contains the same amount of energy as the complete noise event.

Note that, while the SEL and SENEL are measured in terms of the A-weighted sound level scale, they are generally not equal to the maximum A-level occurring during the noise event. Aircraft noise events last more than one second; therefore, SEL/SENEL values are higher than the maximum A-level for the same events.

Composite Noise Metrics

In order to provide a single measure of continuous or multiple noise events over an extended period of time, various composite or average noise level metrics or descriptors have been devised.

A standard measure of sound level averaged over a longer time is the Equivalent Sound Level (abbreviated L_{eq}). L_{eq} is an objective measure of sound in that it is a function solely of a mathematical relationship between decibels and time.

As noted above, much of the human response to noise is subjective, however. Human sensitivity to noise varies considerably depending upon the circumstances in which the noise occurs. Probably most important among these variations is that people tend to be more sensitive to nighttime noises than they are to ones occurring in the day. Some explanation for this is that, in most communities, exterior background noises generally drop at night from daytime levels. Also, the activity in most households decreases at night, lowering the

internally generated noise levels. Noise events consequently become more intrusive at night because a noise of a given intensity will normally extend farther above the nighttime background noise level than above the daytime background level.

To account for this change in sensitivity, a weighting or penalty is often assigned to nighttime noise levels. The amount of weight and the time period over which it is applied differs depending upon the noise assessment method used (appropriate values can be approximately determined by research, but selection of a specific value is inherently somewhat subjective). Mostly, a 10 dBA weight is used, i.e., nighttime noise events are assumed to be 10 dBA louder than they actually are. This figure corresponds to the drop in background noise level which studies have found takes place between daytime and nighttime in a typical community.

The time-weighted noise metric adopted by the Environmental Protection Agency and the Federal Aviation Administration is the *Day-Night Average Sound Level* (L_{dn}). It applies a nighttime penalty of 10 dBA to noise events occurring between 10 p.m. and 7 a.m. A similar metric, the one used in California, is the *Community Noise Equivalent Level* (CNEL). In addition to the nighttime penalty, the CNEL methodology applies an evening weighting of 5 dBA to noise events occurring between 7 p.m. and 10 p.m. Because the L_{dn} and CNEL equations are logarithmic, a 10 dBA penalty on a single event is identical to counting the same event ten times and a 5 dBA penalty is equivalent to counting the event three times. To facilitate the calculations, the equivalent operations method is used.

Calculations of L_{dn} or CNEL noise contours for an airport are normally done with a computer program. The Federal Aviation Administration's Integrated Noise Model (INM) is the program used in most cases. The program considers such factors as:

- The sound level transmitted by individual operations of each type of aircraft using the airport.
- The number of operations by each aircraft type.
- The time of day when the operations occur.
- Runway utilization and aircraft flight track geometry.
- The takeoff and landing profiles of each aircraft type.

Community Reactions to Noise

In the same manner that composite noise metrics are used to represent the overall noise impacts of an airport, the effects of noise must be examined not just in terms of the physiological, behavioral, and subjective effects on individuals, but also with respect to the reactions of the community as a whole.

There are two basic approaches that can be taken in evaluating community reactions to noise. One is in terms of direct actions taken (complaints, law suits, etc.). The other is through the responses to social surveys. The former approach is valuable in that it focuses on individual airports. Social surveys, on the other hand, help in determining whether the reactions of a particular community are typical of other communities having similar levels of noise exposure. Some general findings regarding community reactions to noise include the following:

- Reactions to noise vary from community to community even when the extent of the impact is similar. Among the community characteristics which have an apparent influence on the reactions are: normal background noise levels in the community; previous experience with noise; the role and significance of the airport in the community; climate and the extent of outdoor living; and socioeconomic factors.
- The majority of available data on community reactions involves typical urban residential communities. Table 7C was developed by the Environmental Protection Agency to provide corrections for the circumstances of a specific community; the corrections result in a "normalized" L_{dn} for intruding noise. Taking these corrections into account, it has typically been found that:
 - No community reaction to an intruding noise can be expected when the normalized L_{dn} of identifiable intruding noise is within 5 dBA of the L_{dn} which exists in the absence of that noise;
 - Widespread complaints may be expected when the noise exceeds the background by 5 dBA; and
 - Vigorous community reaction can be expected when the excess approaches 20 dBA.

In a typical community, about 10% of the population is so sensitive to noise that they object to any noise not of their own making. On the other hand, about 25% of the population seems to be practically imperturbable: they do not complain even in very severe noise exposures. Noise abatement efforts which focus on the middle two-thirds of the population are therefore generally most effective.

- Some studies have concluded that airport noise adversely affects property values in the airport vicinity. The extent of this impact differs from community to community and is difficult to ascertain because of the many other variables in community characteristics that are involved. All of the generally available data concerns airline airports. The extent to which noise at typical general aviation airports influences nearby property values is not known.

Limitations of Composite Noise Metrics

Composite noise metrics such as L_{dn} and CNEL have been in use since the 1970's and other similar metrics were in existence earlier. Most of the research conducted in development of these metrics and the land use standards associated with them was done near busy, urban airports and highways. The application of these metrics to lower-volume transportation noise sources, such as most general aviation airports, has long produced some inconsistencies between the measured noise level and community reactions. Among the apparent shortcomings of composite noise metrics with regard to general aviation airports are:

- General aviation flight track locations vary widely. Determining their location is difficult and the noise impact calculation computer program is limited in the number of tracks that can reasonably be modeled. By contrast, at airline airports, instrument approach and departure procedures limit the variety of flight track locations and locational data is often available from computerized flight control records.
- Occasional very loud individual noise events, especially those occurring at night, often generate the majority of noise complaints, but they may have little effect on the noise contours.
- Seasonal variations in aircraft activity levels are not reflected. This can be particularly significant at many airports because the highest activity levels typically occur in the summer when outdoor residential living and open windows in dwellings are most common.
- Noise contours seldom reflect the impacts of noise events which occur frequently, but which have relatively low decibel levels. Traffic pattern overflight noise is the prime example.
- Because of the many variables and assumptions associated with their computation, composite noise contours are usually considered to have an accuracy of approximately ± 3 dBA. Noise contour locations are often inappropriately used to precisely determine the acceptability or unacceptability of a particular land use at a specific site without appreciation of the fuzziness of the noise contour location.

Toward the end of the 1980's, several events, again arising from airline aircraft activity, have focused attention on the limitations of composite noise contours. These events have included:

- Creation of new air traffic routes by the Federal Aviation Administration as part of the Expanded East Coast Plan in February 1987.
- A Notice Of Proposed Rulemaking issued by the FAA in March 1987 to set en route noise rules for propfan engines.
- Announcement by the U.S. Forest Service that it is considering using a measure of noise detectability to determine public response to en route aircraft noise in wilderness areas.

Because of these events, there has been mounting political pressure as well as increased interest among acoustics specialists to replace or supplement $L_{dn}/CNEL$ with some measure of single-event noise. The subject is continuing to be studied by the FAA, other governmental agencies, and technical groups. As of mid-1990, no single-event noise measure has been formally proposed by the FAA.

Noise Compatibility Policy Issues

ESTABLISHED REGULATIONS AND POLICIES

The discussion in the preceding chapter provides a theoretical foundation for the development of airport/land use noise compatibility policies. Other factors to consider are the established regulations and policies adopted by various Federal and State agencies.

Laws and statutes enacted by the U.S. Congress and the California State Legislature typically set general requirements and the authority for administrative adoption of more detailed regulations and policies. With respect to airports, most of the administrative actions are taken by the Federal Aviation Administration and the California Division of Aeronautics. These laws and regulations establish the basis for local development of airport plans, analyses of airport impacts; and enactment of compatibility policies. Brief descriptions of selected laws, regulations, and policies having particular significance to noise issues are provided in the paragraphs which follow.

Federal

Laws

Airport Improvement Program Act of 1982, as amended - This act establishes the federal requirements for funding of airport planning and airport development. An Airport and Airway Trust Fund is created to pay for these programs and operation of the federal aviation system. The general types of projects eligible for federal funding are indicated. Additionally, the Act directs the preparation of a National Plan of Integrated Airport Systems (NPIAS) which lists the location of airports in the national system of airports and the recommended development of each.

Among the conditions for Airport Improvement Program funding of an airport project are two requirements involving airport/land use compatibility. The airport sponsor (owner) must assure the Federal Aviation Administration that it will:

"Adequately clear and protect the aerial approaches to the airport by removing, lowering, relocating, marking, lighting or otherwise mitigating existing airport hazards and by preventing the establishment or creation of future airport hazards;" and

"Take appropriate action, including the adoption of zoning laws, to the extent reasonable, to restrict the use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations, including landing and takeoff of aircraft."

U.S. Department of Transportation Noise Abatement Policy - This policy, adopted in 1976, sets forth the noise abatement authorities and responsibilities of the Federal Government, airport proprietors, state and local governments, the air carriers, air travelers and shippers, and airport area residents and prospective residents. The basic thrust of the policy is that the FAA's role is primarily one of regulating noise at its source (the aircraft) plus supporting local efforts to develop airport noise abatement plans. The FAA will give high priority in the allocation of Airport Improvement Program funds to projects designed to ensure compatible use of land near airports; but it is the role of state and local governments and airport proprietors to undertake the land use and operational actions necessary to promote capability.

Federal policy on aviation noise, particularly with regard to airline aircraft and airports, has been a hotly debated topic in recent years. The government is being pushed from many directions to issue a new national noise policy, but, as of late 1990, has not yet done so.

Aviation Safety and Noise Abatement Act of 1979 - Further weight was given to the FAA's supporting role in noise compatibility planning by congressional enactment of this legislation. Among the stated purposes of this act is "to provide assistance to airport operators to prepare and carry out noise compatibility programs." The law establishes funding for noise compatibility planning and sets the requirements by which airport operators can apply for funding. The law does not require any airport to develop a noise compatibility program.

Regulations and Guidelines

- **Federal Aviation Regulations, Part 150** - As a means of implementing the Aviation Safety and Noise Abatement Act, the Federal Aviation Administration adopted these regulations establishing Airport Noise Compatibility Planning Programs. "This part prescribes the procedures, standards, and methodology governing the development, submission, and review of airport noise exposure maps and airport noise compatibility programs, including the process for evaluating and approving or disapproving these programs." It also prescribes a system for measuring airport noise impacts and presents guidelines for identifying incompatible land uses.

The noise exposure maps are to be depicted in terms of Yearly Day-Night Average Sound Level (L_{dn}) contours around the airport. All land uses are considered compatible with noise levels of less than 65 L_{dn} unless the local jurisdictions can document the appropriateness of a lower standard. At higher noise exposures, selected land uses are also deemed acceptable, depending upon the nature of the use and the degree of structural noise attenuation provided. In setting the various compatibility guidelines, however, the regulations state that the designations "do not constitute a Federal determination that any use of land covered by the [noise compatibility] program is acceptable or unacceptable under Federal, State, or local law. The responsibility for determining the acceptable and permissible land uses remains with the local authorities. FAA determinations under Part 150 are not intended to substitute federally determined land uses for those determined to be appropriate by local authorities in response to locally determined needs and values in achieving compatible land uses."

Federal Aviation Regulations, Part 36 - This part of the Federal Aviation Regulations specifies the noise standards that individual types of aircraft are required to meet as part of their airworthiness certification. It includes noise level standards for certification of new types of propeller-driven, small airplanes, as well as for transport category, large airplanes. As originally adopted in 1960, FAR Part 36 only prescribed noise standards for issuance of new aircraft type certificates. Subsequent amendments extended the standards to certain newly produced aircraft of older type designs. Other amendments have at various times extended the required compliance dates.

Although aircraft meeting the latest Part 36 standards are noticeably quieter than many of the older aircraft still flying, the regulations make no determination that the newer aircraft are acceptably quiet for operation at any given airport.

Environmental Protection Agency "Levels Document" - One of the more fundamental set of guidelines on noise impacts was published by the EPA in 1974.

Entitled *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*, it is better known as the "Levels Document." The document does not constitute EPA regulations or standards. Rather, it is intended to "provide state and local governments as well as the federal government and the private sector with an informational point of departure for the purposes of decision-making". Using the Yearly Day-Night Average Sound Level (L_{dn}) as a measure of noise acceptability, the document states that "undue interference with activity and annoyance" will not occur if outdoor noise levels in residential areas are below 55 L_{dn} and indoor levels are below 45 L_{dn} .

State of California

State Aeronautics Act - Chapter 4, Article 3, Section 21669 of the California Public Utilities Code requires the State Division of Aeronautics to adopt noise standards applicable to all airports operating under a state permit.

California Airport Noise Standards - The standards promulgated in accordance with the State Aeronautics Act are set forth in California Code of Regulations, Title 21, Sections 5000 et seq. The most recent revisions to the regulations became effective on March 22, 1990.

"The regulations are designed to cause the airport proprietor, aircraft operator, local governments, pilots, and the [Division of Aeronautics] to work cooperatively to diminish noise problems. The regulations accomplish these ends by controlling and reducing the noise impact area in communities in the vicinity of airports."

The regulations state that:

"The standard for the acceptable level of aircraft noise for persons living in the vicinity of airports is hereby established to be a community noise equivalent level of 65 decibels. This standard forms the basis for the following limitation. No airport proprietor of a noise problem airport shall operate an airport with a noise impact area based on the standard of 65 dB CNEL unless the operator has applied for or received a variance as prescribed in ..." the regulations.

The revised regulations define the types of land uses which are deemed *incompatible* with the above standard. The original regulations listed the uses that are considered *compatible*. Four types of land uses are defined by the current regulations as incompatible:

- Residences of all types, except those that are airport owned.
- Public and private schools.
- Hospitals and convalescent homes.
- Churches, synagogues, temples, and other places of worship.

In each case, these land uses are regarded as compatible if: (1) an aviation easement has been obtained; (2) the structure has been acoustically insulated to ensure that the interior CNEL due to aircraft noise is 45 dB or less in all habitable rooms; or (3) with respect to residential land uses, the airport proprietor has made a "genuine effort" to obtain an easement or provide acoustical treatment.

When originally adopted, the State Noise Standards also included single-event noise limits. The single-event standards, however, were challenged in federal court and subsequently struck down in *Air Transportation Association v. Crotti* as being a preemption of federal authority.

California Noise Insulation Standards - These standards, spelled out in the California Code of Regulations, Title 24, Part II, Appendix Chapter 35, are applicable to new hotels, motels, apartment houses, and dwellings other than detached single-family dwellings. They state that "interior community noise equivalent levels (CNEL) with windows closed, attributable to exterior sources shall not exceed an annual CNEL of 45 dBA in any habitable room." Furthermore, "residential structures to be located within an annual CNEL contour of 60 require an acoustical analysis showing that the structure has been designed to limit intruding noise to the prescribed allowable levels. CNEL's shall be as determined by local jurisdiction in accordance with its local general plan."

California Noise Planning in Land Use Act - California Government Code, Division 1, Section 65302, requires that a noise element be included as part of local general plans. Airports are among the noise sources specifically to be analyzed. Noise contours, expressed in terms of either CNEL or L_{dn} , are to be shown down to 60 dB.

POLICY ISSUES

The development of noise compatibility standards and policies can be considered in terms of several individual issues. Some of these issues involve choices which each airport land use commission must make, taking into account the needs of the county's communities.

Basis for Noise Impact Assessment

Aircraft Activity Level

One of the choices to be made in development of noise contours for an airport is what aircraft activity level to use as the basis for the computations.

State statutes regarding comprehensive land use plans for airports specify that the plans should have at least a 20-year outlook. A 20-year activity forecast is usually included in airport master plans; also, forecasts with a similar time frame are available from the California Division of Aeronautics. A 20-year forecast is thus the most commonly used basis for noise contour calculations.

As a reflection of the nationwide decrease in general aviation activity during the 1980's, most forecasts developed during the latter part of the decade have projected very little growth over a 20-year period. Airports, though, presumably have a life span of more than 20 years and it is impossible to anticipate what activity levels might ultimately occur. The danger in using recent 20-year forecasts to determine airport/land use noise compatibility, therefore, is that the forecasts might underestimate the eventual noise impacts.

One alternative is to base an airport's noise impact contours on the operational capacity of the airport runway system. This approach may be reasonable at very busy airports, but at many others it would result in exaggerated noise contours that, in all likelihood, will never be achieved. The option followed in the *Airport/Land Use Policy Plan for Imperial County Airports* represents a compromise between these two choices.

It takes available forecasts (from master plans or the state airport system plan) and adds a flat 50% to the total operations. The resulting activity level is for an indefinite point in time that probably will be well beyond 20 years unless a prolonged up-turn in general aviation activity occurs.

Changes in Average Aircraft Noise Levels

As future types of aircraft become operational, the noise impacts of individual aircraft operations may change. Future noise contours consequently may not represent actual noise impacts even if the activity forecasts may happen to be correct. At airline airports, the noise reduction technology of the aircraft recently or soon to be introduced into the airline fleet is such that, even with increased activity, the future contours often are projected to be smaller than the present ones. However, except for business jets, future general aviation aircraft are not expected to become enough quieter to compensate for forecast activity increases. Noise impact areas for general aviation airports consequently will expand over time. For compatibility planning purposes, the worst-case noise impact is normally used regardless of when it would occur.

Acceptable Overall Noise Levels

As suggested by the background discussion in the preceding chapter, there are no absolute measures for establishing which land uses and noise exposures are or are not compatible with each other. The best that can be hoped for is that compatibility criteria will reflect what is "acceptable" to the average person in the communities involved. Moreover, it must be remembered that what may be considered an *acceptable* degree of compatibility probably is not the most *desirable* degree of compatibility.

Residential Areas

Noise compatibility standards typically place primary emphasis on residential areas. Residential development is not only one of the most noise-sensitive land uses, it usually covers the greatest proportion of urban land. Several factors contribute to this sensitivity:

- Normal residential construction usually provides less sound attenuation than typical commercial construction and windows are more likely to be open;
- Outdoor activity is a significant aspect of residential land use; and
- People are particularly sensitive to noise at night when they are trying to sleep.

There are three basic choices as to where to set the limit for acceptable residential noise exposure. The choices and the rationale for each are listed below:

CNEL = 65 dBA

Established by state law as the maximum acceptable for residential and other incompatible land uses.

CNEL = 60 dBA

The contour within which California Noise Insulation Standards require an acoustical analysis of proposed residential structures, other than detached single-family dwellings.

Suggested by the California Department of Health as the maximum "normally acceptable" noise exposure for residential areas.

Individual noise events will occasionally cause significant interference with residential land use activities, particularly outdoor activities, in quiet suburban/rural communities.

CNEL = 55 dBA

Identified by the U.S. Environmental Protection Agency as the level below which "undue interference with activity and annoyance" will not occur.

Individual noise events will seldom significantly interfere with residential land use activities; commonly occurring noise events will not cause disruption under most circumstances.

Other Land Uses

Data on acceptable noise exposure for other noise-sensitive land uses is not as extensive as for residential uses. Some guidelines exist in various U.S. Department of Housing and Urban Development, California Department of Health, and other agency documents. In general, once a criterion has been set for residential uses, the criteria for other land uses can be established by considering their degree of structural sound attenuation, outdoor activity, etc. relative to residential uses.

The extent to which land uses types are grouped or separated into categories for the purpose of compatibility evaluation is a question of ease of use. Three possible means of categorizing are by: (1) Standard Land Use Codes; (2) local zoning districts or land use plan classifications; or (3) uses having similar degrees of noise sensitivity.

Additional Noise Impact Issues

Single-Event Limits

As noted in the previous chapter, there is increasing interest at the national level regarding establishment of some form of single-event noise descriptor to supplement the composite measure provided by the Day-Night Average Sound Level (L_{dn}). In California, the removal of statewide single-event noise standards from the state regulations has not prevented many airport proprietors from successfully implementing single-event standards for aircraft operating at their airports. These single-event standards have been based upon either the noise levels published by the FAA in accordance with FAR Part 36 or actual measured noise levels recorded at the individual airport.

Airport land use commissions cannot set limits for the noise generated by individual aircraft overflights. So doing would be regarded as a direct regulation of airport operations. Nonetheless, airport land use commissions can consider single-event noise levels as a factor in evaluating land use compatibility.

A basic difficulty in development of single-event noise level standards applicable to land use compatibility assessment is the lack of useful data.

The data resulting from FAR Part 36 is of value only in distinguishing the relative loudness of different types of aircraft. The actual points established by the regulations for measurement of noise levels are too far from the runway to be of much significance in land use planning, especially at general aviation airports.

- Recording of actual aircraft overflight noise levels is mostly done as a routine matter only at airline airports and very busy, urban general aviation facilities. Data for smaller general aviation airports is rarely available unless a specialized study has been conducted for a particular purpose.

- The only other readily available source of data relating aircraft types to the single-event noise levels at various locations on the ground is the data base for the Federal Aviation Administration's Integrated Noise Model. This data base expresses single-event noise in terms of Sound Exposure Level (SEL) which cannot be directly correlated with maximum noise levels.

Until such time as definitive single-event noise level guidelines evolve at the national level, there is little strong grounds on which airport land use commissions can establish single-event noise level compatibility standards.

Interior Noise Level Criteria

The California Noise Insulation Standards, cited previously, set a 45-dBA CNEL as the maximum acceptable interior noise level for residential uses (other than detached single-family dwellings). Although guidelines for other uses exist, there are no other federal, state, or local interior noise level regulations.

Problems arise with developing interior standards for other building uses because some are used only occasionally and others (such as concert halls) are especially sensitive to peak noises. The issue then is whether an average noise exposure measure (e.g., CNEL or L_{dn}) is the most appropriate basis for compatibility standards. Some airport land use commissions have adopted peak noise level criteria for intermittent noises. However, application of these criteria poses questions in defining intermittent noise and in translating projected CNEL values into peak noise levels.

Other Aircraft Noise Sources

Noise contours calculated with the FAA's Integrated Noise Model only take into account airplane takeoffs and landings. Other sources of aircraft noise are not included even though they may be significant in certain circumstances.

- Engine Run-Up Noise** - Many people perceive the noise from engine run-ups while aircraft are on the ground to be more annoying than the noise from overflights, even if the sounds have equal loudness. Part of the reason for this greater annoyance is that run-up noise is thought to be less necessary and more under the control of the

16.	Nurseries for Children (Day -Care)	50
17.	Offices	100
18.	School Shops and Vocational Rooms	50
19.	Stores - Retail Sales Rooms	
	Basement	20
	Ground Floor	30
	Upper Floors	50
20.	Warehouses	500
21.	All Others	100

Examples:

- A. The proposal is for a 60,000-square-foot two-story office building on 4 gross acres (including adjacent roads). The local parking ordinance requires one parking space for every 250 square feet of commercial space. Assuming that the use would generate one person per vehicle, the following calculations would derive the number of people per acre.

Steps:

- 1) $60,000 \text{ sq. ft.} \div 1 \text{ vehicle per } 250 \text{ sq. ft.} = 240 \text{ vehicles}$
- 2) $240 \text{ vehicles} \times 1.0 \text{ people per vehicle} = 240 \text{ people expected at any one time.}$
- 3) $240 \text{ people} \div 4 \text{ acres} = 60 \text{ people per acre.}$

Under this example, the use would be estimated to generate 60 people per acre. In zones with limits of 100 people-per-acre, the use would be considered compatible assuming all other conditions were met.

- B. The proposal is for a 12,000-square-foot store on a 63,000-square-foot parcel. Using the maximum occupancy table from the Uniform Building Code (Exhibit C1) and applying the assumption that the building is occupied at 50 percent of maximum nets results in the following calculations:

Steps:

- 1) $63,000 \text{ sq. ft.} \div 43,560 \text{ sq. ft. (in an acre)} = 1.45 \text{ acre.}$
- 2) $12,000 \text{ sq. ft.} \div 30 \text{ sq. ft./occupant} = 400 \text{ (max. building occupancy).}$
- 3) $400 \text{ max. bldg. occup.} \times 50\% = 200 \text{ people expected at any one time.}$
- 4) $200 \text{ people} \div 1.45 \text{ acre} = 138 \text{ people per acre.}$

Under this example, 138 people per acre would represent a reasonable estimate. In zones with limitations of 100 people-per-acre or less, the use would be considered incompatible.

- C. The proposal is for a 3,000-square-foot office on a 16,500-square-foot parcel. Again using the table in Exhibit C1 but assuming the actual occupancy level is 50% of the maximum indicated by the UBC code provides the following result:

Steps:

- 1) $16,500 \text{ sq. ft.} \div 43,560 \text{ sq. ft. (acre)} = 0.38 \text{ acre.}$
- 2) $3,000 \text{ sq. ft.} \div 100 \text{ sq. ft./occupant} = 30 \text{ (max. building occupancy).}$

- 3) 30 people maximum building occupancy x 50% (actual occupancy) = 15 people in the building at any one time.
- 4) 15 people ÷ 0.38 acres = 39 people per acre.

Under this example, the use would be estimated to generate 39 people per acre. In zones with occupancy limits of 100, the use would be considered compatible assuming all other conditions were met.

Appendix D

Compatibility Guidelines for Specific Land Uses

The compatibility evaluations listed below for specific types of land uses can be used by local jurisdictions as guidelines in implementation of the general compatibility criteria listed in Table 2A. These evaluations are not regarded as adopted policies or criteria of the Imperial County Airport Land Use Commission. In case of any conflicts between these evaluations of specific land uses and the policies and criteria in Chapter 2 of this document, the contents of Chapter 2 shall prevail.

Land Use Compatibility Zones

<i>Agricultural Uses</i>	<u>A</u>	<u>B1/B2</u>	<u>C</u>	<u>D</u>
Truck and Specialty Crops	0	+	+	+
Field Crops	0	+	+	+
Pasture and Rangeland	0	+	+	+
Orchard and Vineyards	-	+	+	+
Dry Farm and Grain	0	+	+	+
Tree Farms, Landscape Nurseries and Greenhouses	-	0	+	+
Fish Farms	-	0	+	+
Feed Lots and Stockyards	-	0	+	+
Poultry Farms	-	0	+	+
Dairy Farms	-	0	+	+
<i>Natural Uses</i>				
Fish and Game Preserves	0	0	0	0
Land Preserves and Open Space	0	+	+	+
Flood and Geological Hazard Areas	0	+	+	+
Waterways: Rivers, Creeks, Canals, Wetlands, Bays, Lakes	0	0	0	+

-	Incompatible
0	Potentially compatible with restrictions
+	Compatible

Land Use Compatibility Zones

	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
Residential and Institutional				
Rural Residential - 10 acres or more	-	0	+	+
Low Density Residential - 2 to 10 acre lots	-	0/+	+	+
Single Family Residential - lots under 2 acres	-	-	0	+
Multi Family Residential	-	-	0	+
Mobile Home Parks	-	-	0	+
Schools, Colleges and Universities	-	-	-	+
Day Care Centers	-	-	0	+
Hospitals and Residential Care Facilities	-	-	-	+
Recreational				
Golf Course	0	+	+	+
Parks - low intensity; no group activities	0	+	+	+
Playgrounds and Picnic Areas	-	0	+	+
Athletic Fields	-	0	+	+
Riding Stables	-	0	+	+
Marinas and Water Recreation	-	0	+	+
Health Clubs and Spas	-	-	0	+
Tennis Courts	-	0	+	+
Swimming Pools	-	0	0	+
Fairgrounds and Race Tracks	-	-	-	+
Resorts and Group Camps-	-	-	0	+
Industrial				
Research and Development Laboratories	-	0	+	+
Warehouses and Distribution Facilities	-	0	+	+
Manufacturing and Assembly	-	0	0	+
Cooperage and Bottling Plants	-	0	+	+
Printing, Publishing and Allied Services	-	0	+	+
Chemical, Rubber and Plastic Products	-	-	0	+
Food Processing	-	-	+	0

- Incompatible
 0 Potentially compatible with restrictions
 + Compatible

Land Use Compatibility Zones

	<u>A</u>	<u>B1/B2</u>	<u>C</u>	<u>D</u>
Commercial Uses				
Large Shopping Malls (500,000+ sq.ft.)	-	-	0	+
Retail Stores (one story)	-	0	0	+
Retail Stores (two story)	-	-	0	+
Restaurants and Drinking Establishments (no take out)	-	0	0	+
Food Take-Outs	-	-	0	+
Auto and Marine Services	-	0	+	+
Building Materials, Hardware and Heavy Equipment	-	0	+	+
Office Buildings (one story)	-	0	+	+
Multiple-story Retail, Office, and Financial	-	-	0	+
Banks and Financial Institutions	-	0	+	+
Repair Services	-	0	+	+
Gas Stations	-	0	+	+
Government Services/Public Buildings	-	0	+	+
Motels (one story)	-	0	0	+
Hotels and Motels (two story)	-	-	0	+
Theaters, Auditoriums, and Assembly Halls	-	-	0	+
Outdoor Theaters	-	-	0	+
Memorial Parks/Cemeteries	-	+	+	+
Truck Terminals	-	+	+	+
Transportation, Communications, and Utilities				
Automobile Parking	0	+	+	+
Highway & Street Right-of-ways	0	+	+	+
Railroad and Public Transit Facilities	0	+	+	+
Taxi, Bus & Train Terminals	-	0	+	+
Reservoirs	-	0	0	+
Power Lines	-	0	0	+
Water Treatment Facilities	-	0	+	+
Sewage Treatment and Disposal Facilities	-	0	0	+
Electrical Substations	-	0	0	+
Power Plants	-	-	0	+
Sanitary Landfills	-	-	-	0

- Incompatible
0 Potentially compatible with restrictions
+ Compatible

Sample Easement and Deed Notice Documents

The Imperial County *Airport Land Use Compatibility Plan* requires the dedication of avigation or overflight easements or use of deed notices in selected areas around each of the airports in the county. The specific applications are as noted in the Compatibility Criteria matrix, Table 2A.

Examples of four types of documents are presented on the following pages.

Exhibit E1 - Avigation Easement

Exhibit E2 - Overflight Easement

Exhibit E3 - Deed Notice

Exhibit E4 - Avigation Easement and Release

Exhibit E1

Typical Avigation Easement

This indenture made this ____ day of _____, 19 __, between _____ hereinafter referred to as Grantor, and the [Insert County or City name], a political subdivision in the State of California, hereinafter referred to as Grantee.

The Grantor, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, does hereby grant to the Grantee, its successors and assigns, a perpetual and assignable easement over the following described parcel of land in which the Grantor holds a fee simple estate. The property which is subject to this easement is depicted as _____ on "Exhibit A" attached and is more particularly described as follows:

[Insert legal description of real property]

The easement applies to the Airspace above an imaginary plane over the real property. The plane is described as follows:

The imaginary plane above the hereinbefore described real property, as such plane is defined by Part 77 of the Federal Aviation Regulations, and consists of a plane [describe approach, transition, or horizontal surface]; the elevation of said plane being based upon the _____ Airport official runway end elevation of ____ feet Above Mean Sea Level (AMSL), as determined by [Insert name and Date of Survey or Airport Layout Plan that determines the elevation] the approximate dimensions of which said plane are described and shown on Exhibit A attached hereto and incorporated herein by reference.

The aforesaid easement and right-of-way includes, but is not limited to:

- (1) For the use and benefit of the public, the easement and continuing right to fly, or cause or permit the flight by any and all persons, or any aircraft, of any and all kinds now or hereafter known, in, through, across, or about any portion of the Airspace hereinabove described; and
- (2) The easement and right to cause or create, or permit or allow to be caused or created within all space above the existing surface of the hereinabove described real property and any and all Airspace laterally adjacent to said real property, such noise, vibration, currents and other effects of air, illumination and fuel consumption as may be inherent in, or may arise or occur from or during the operation of aircraft of any and all kinds, now or hereafter known or used, for navigation of or flight in air; and

- (3) A continuing right to clear and keep clear from the Airspace any portions of buildings, structures, or improvements of any kinds, and of trees or other objects, including the right to remove or demolish those portions of such buildings, structures, improvements, trees, or other things which extend into or above said Airspace, and the right to cut to the ground level and remove, any trees which extend into or above the Airspace; and
- (4) The right to mark and light, or cause or require to be marked or lighted, as obstructions to air navigation, any and all buildings, structures, or other improvements, and trees or other objects, which extend into or above the Airspace; and
- (5) The right of ingress to, passage within, and egress from the hereinabove described real property, for the purposes described in subparagraphs (3) and (4) above at reasonable times and after reasonable notice.

For and behalf of itself, its successors and assigns, the Grantor hereby covenants with the [Insert County or City name], for the direct benefit of the real property constituting the _____ Airport hereinafter described, that neither the Grantor, nor its successors in interest or assigns will construct, install, erect, place or grow in or upon the hereinabove described real property, nor will they permit to allow, any building structure, improvement, tree or other object which extends into or above the Airspace, or which constitutes an obstruction to air navigation, or which obstructs or interferes with the use of the easement and rights-of-way herein granted.

The easements and rights-of-way herein granted shall be deemed both appurtenant to and for the direct benefit of that real property which constitutes the _____ Airport, in the [Insert County or City name], State of California; and shall further be deemed in gross, being conveyed to the Grantee for the benefit of the Grantee and any and all members of the general public who may use said easement or right-of-way, in landing at, taking off from or operating such aircraft in or about the _____ Airport, or in otherwise flying through said Airspace.

This grant of easement shall not operate to deprive the Grantor, its successors or assigns, of any rights which may from time to time have against any air carrier or private operator for negligent or unlawful operation of aircraft.

These covenants and agreements run with the land and are binding upon the heirs, administrators, executors, successors and assigns of the Grantor, and, for the purpose of this instrument, the real property firstly hereinabove described is the servient tenement and said _____ Airport is the dominant tenement.

DATED: _____

STATE OF } ss

COUNTY OF }

On _____, before me, the undersigned, a Notary Public in and for said County and State, personally appeared _____, and _____ known to me to be the persons whose names are subscribed to the within instrument and acknowledged that they executed the same.

WITNESS my hand and official seal.

Notary Public

Exhibit E2

Typical Overflight Easement

GRANTOR hereby grants to the _____ in _____, its successors or assigns, as owners of the [Name of Airport], California, an overflight easement for the following purposes and granting the following rights:

- (1) For the use and benefit of the public, and to the extent and in the manner consistent with safe operating procedures as provided under applicable governmental regulations, the right to make flights, and the noise inherent thereto, in airspace over the property described in Exhibit A (attached) in connection with landings, takeoffs, and general operation of the [Name of Airport].
- (2) The right to regulate or prohibit the release into the air of any substance which would impair the visibility or otherwise interfere with the operations of aircraft such as, but not limited to, steam, dust, and smoke.
- (3) The right to regulate or prohibit light emissions, either direct or indirect (reflective), which might interfere with pilot vision.
- (4) The right to prohibit electrical emissions which would interfere with aircraft communication systems or aircraft navigational equipment.

This easement shall be effective from this date and run with the land until such time as the [Name of Airport] is no longer used as an airport.

The real property subject to this overflight easement is described as follows:

See Attachment "A"

DATED: _____ GRANTOR: _____

By: _____

Exhibit E3

Sample Deed Notice

The following statement should be included on the deed for the subject property and recorded in the County. This statement should also be included on any parcel map or final map for subdivision approval.

This property is in the area subject to overflights by aircraft using _____ airport, and as a result, residents may experience inconvenience, annoyance or discomfort arising from the noise of such operations. State law (Public Utilities Code Section 21670 et. seq.) establishes the importance of public use airports to protection of the public interest of the people of the State of California. Residents of property near a public use airport should therefore be prepared to accept such inconvenience, annoyance or discomfort from normal aircraft operations. Any subsequent deed conveying parcels or lots shall contain a statement in substantially this form.

EXHIBIT E4

AVIGATION EASEMENT AND RELEASE

_____, (hereinafter referred to as "Grantor", hereby grants to the County of Imperial, State of California, (hereinafter referred to as "Grantee), a perpetual easement on the following terms:

1. Description: The easement shall be an easement on, over, across, and upon all that certain real property situated in the unincorporated area of the County of Imperial, State of California, described in Exhibit "A" attached hereto and by this reference incorporated herein, and all the air space above said real property.

2. Benefit: The easement shall be appurtenant to and for the benefit of all of the real property comprising the _____, Airport ("Airport") and such other additional property or interest therein as shall be subsequently acquired or designated from time to time by Grantee or its successors as constituting a part of the Airport.

3. Use and Purpose: The easement shall be used for the existence on, over, upon, and within the described easement of all noise, vibration, air currents, natural or artificial illumination, and such matter, emissions, activities, or other events that may occur or result directly or indirectly from the operations of the Airport, now and in the future, including, but in no way limited to, ground and flight operations of aircraft at, over, on, or about the Airport. The easement shall also be used for the passage and flight of aircraft; provided, however, this easement shall not affect such rights for the passage and flight of aircraft as such rights existed prior to the date of easement and as are now or may be provided or permitted by law.

4. Restrictions on Use of Land: Grantor will not use nor permit any use of the land above described in Exhibit "A", or any of the air space above it at any height whatever, for any purpose which will interfere with the use, operation, maintenance, and further development of the airport, and, in addition, will not use nor permit any use of such land and of any structures thereon for purposes which will create or result in a hazard of flight, such as, but not limited to, those which will (a) produce electrical interference with radio or other electronic communications, (b) make it difficult for pilots to distinguish between airport lights and other lights, (c) project glare into the eyes of pilots, (d) impair visibility in the vicinity of the Airport, or (e) otherwise endanger the landing, takeoff, and maneuvering of aircraft, or in any manner whatever adversely affect the accuracy of any devices or apparatus used in the operation of, or to promote, safe landings and takeoffs from the Airport.

Grantee shall, after thirty (30) days written notice to Grantor, have the right to come on the property herein described and correct the proper use, with right of passage over the land described in Exhibit "A" for those purposes.

5. Liability: All of such uses shall be without any liability of Grantee or of any other person or entitled to the benefits of this easement to Grantor, Grantor's heirs, assigns, or successors in interest to all or any part of the property or any interest therein, or to any other person or entity using or located on or in the area subject to the easement for damage to property or physical or emotional injury to persons, animals, or any other living thing the diminution in value of any personal or real property, discomfort or inconvenience of any type or kind to any person or thing, or interference with television, radio, or other types or kinds of electrical reception transmissions, or activities in the easement; and Grantor, for itself and on behalf of the Grantor's heirs, assigns, or successors in interest to all or any part of the property, or any interest therein and each person or entity using or located on or in the area subject to this easement, hereby releases and discharges Grantee and all persons and entities to the benefits of the easement for all claims, demands, actions, and causes of action of all types or kinds, known or unknown, existing or which might be created hereafter by statute or case decision arising out of any of the foregoing described injuries or damages resulting from the use of this easement by Grantee and any person or entity to the benefits of this easement.

6. Covenants Run With the Land: All rights, easements, releases, benefits, and estates granted hereunder shall be covenants running with the land described in Exhibit "A" hereof, of which land Grantor will be the servient tenement, and Grantee and the beneficiaries of such rights, easements, releases, benefits, and estates shall be the dominant tenement.

7. Scope: This agreement and conveyance shall bind the parties hereto, their heirs, administrators, executors, successors, and assigns, and each and every one of them as though specifically named herein, and is joined in by Grantee by the acceptance and recording thereof.

IN WITNESS WHEREOF, Grantor has caused this instrument to be executed this _____ day of _____, 199.

'GRANTOR'

Name of Grantor

By: _____
Its Authorized Agent

sm/ALUCDOCS.

Appendix F
Glossary

ABOVE GROUND LEVEL (AGL): An elevation datum given in feet above ground level.

AIRPORT TRAFFIC CONTROL TOWER (ATCT): A terminal facility that uses air/ground communications, visual signaling, and other devices to provide ATC services to aircraft operating in the vicinity of an airport or on the movement area. (AIM)

AIRCRAFT ACCIDENT: An occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked; and in which any person suffers death or serious injury as a result of being in or upon the aircraft or by direct contact with the aircraft or anything attached thereto, or in which the aircraft receives substantial damage. (NTSB)

AIRCRAFT OPERATION: The airborne movement of aircraft in controlled or non-controlled airport terminal areas and about given en route fixes or at other points where counts can be made. There are two types of operations- local and itinerant. An operation is counted for each landing and each departure, such that a touch-and-go flight is counted as two operations. (FAA Stats)

AIRCRAFT PARKING LINE LIMIT (APL): A line established by the airport authorities beyond which no part of a parked aircraft should protrude. (Airport Design AC)

AIRPORT: An area of land or water that is used or intended to be used for the landing and taking off of aircraft, and includes its buildings and facilities, if any. (FAR 1)

AIRPORT ELEVATION: The highest point of an airport's usable runways, measured in feet above mean sea level. (AIM)

AIRPORT LAYOUT PLAN (ALP): A scale drawing of existing and proposed airport facilities, their location on the airport, and the pertinent clearance and dimensional information required to demonstrate conformance with applicable standards.

AIRPORT REFERENCE CODE (ARC): A coding system used to relate airport design criteria to the operational and physical characteristics of the airplanes intended to operate at the airport. (Airport Design AC)

AIRPORT LAND USE COMMISSION (ALUC): A commission established under provisions of California Public Utilities Code, Sections 12670 et seq., in each county within which a public-use airport is located for the purpose of ensuring the orderly expansion of airports and the adoption of land use measures that minimize the public's exposure to excessive airport noise and safety hazards. (Chapter 4, Article 3.5 of State Aeronautics Act)

AMBIENT NOISE LEVEL: Background noise level, the normal or existing level of environmental noise at a given location.

APPROACH LIGHT SYSTEM (ALS): An airport lighting system which provides visual guidance enabling a pilot to align the aircraft with the extended runway centerline during a final approach to landing. Among the specific types of systems are:

- LDIN - Sequenced Flashing Lead-in Lights.
- ODALS - Omnidirectional Approach Light System, a combination of LDIN and REILS.
- SSALR - Simplified Short Approach Light System with Sequenced Flashing Lights. (AIM)

APPROACH SPEED: The recommended speed contained in aircraft manuals used by pilots when making an approach to landing. This speed will vary for different segments of an approach as well as for aircraft weight and configuration. (AIM)

AVIGATION EASEMENT: A type of easement that includes the following rights or restrictions: (1) the right of overflight above the property at any altitude above a surface specified in the easement. (2) A right to subject the property to noise, vibrations, fumes, dust, emissions associated with airport activities. (3) Prohibits the erection or growth of any object, tree or structure that would penetrate the defined airspace. (4) A right of entry to the property, with proper notice to the owner for the purpose of removing, marking, or lighting any structure or other object that may constitute a hazard or obstruction. (5) Prohibits certain land use characteristics that may create flight hazards, including electrical interference, glare, misleading light sources, smoke, steam, dust or other visual impairments and uses which may attract large flocks of birds.

BASED AIRCRAFT: Aircraft stationed at an airport on a long-term basis.

CEILING: Height above the earth's surface to the lowest layer of clouds or obscuring phenomena. (AIM)

CIRCLING APPROACH/CIRCLE-TO-LAND MANEUVER: A maneuver initiated by the pilot to align the aircraft with a runway for landing when a straight-in landing from an instrument approach is not possible or not desirable. (AIM)

COMMERCIAL OPERATOR: A person who, for compensation or hire, engages in the carriage by aircraft in air commerce of persons or property, other than as an air carrier. (FAR 1)

COMMUNITY NOISE EQUIVALENT LEVEL (CNEL): The noise measure adopted by the State of California for evaluating airport noise. It represents the composite noise levels of aircraft operations during an average annual 24-hour day. CNEL is measured in A-weighted decibels (dBA) and evening and nighttime operations are weighted to reflect a community's greater sensitivity to noise during these hours and to account for quieter ambient levels.

COMMUTER AIR CARRIER: An air taxi operator which performs at least five round trips per week between two or more points and publishes flight schedules which specify the times, days of the week and places between which such flights are performed. (FAA Census)

CONTROL ZONE: Controlled airspace surrounding one or more airports, normally a circular area. Having a radius of five statute miles plus extensions to include instrument arrival and departure paths. Most control zones surround airports with air traffic control towers and are in effect only for the hours the tower is operational.

CONTROLLED AIRSPACE: Any of several types of airspace within which some or all aircraft may be subject to air traffic control. (FAR 1)

DAY-NIGHT AVERAGE SOUND LEVEL (Ldn): The noise descriptor adopted by the U.S. Environmental Protection Agency for measurement of environmental noise. It represents the average daytime noise level during a 24-hour day, measured in decibels and adjusted to account for the lower tolerance of people to noise during nighttime periods.

DECIBELS, A-WEIGHTED (dBA): A measure of sound level, adjusted to account for the perception range of the human ear.

DEED NOTICE: A deed notice is a formal statement which is added to the legal description of the deed for a property and on any subdivision map which states that the property is subject to aircraft overflights. Deed notices are used as a form of buyer notification as a means of ensuring that those who are particularly sensitive to aircraft overflights can avoid moving to the affected areas. (Refer to overflight easement.)

DISPLACED THRESHOLD: A landing threshold that is located at a point on the runway other than the designated beginning of the runway. (See Threshold) (AIM)

FEDERAL AVIATION REGULATIONS (FAR): Regulations issued by the FAA to regulate air commerce; issued as separate "Parts", e.g., Part 77.

FAR PART 77: The part of the Federal Aviation Regulations which deals with objects affecting navigable airspace.

FAR PART 77 SURFACES: Imaginary surfaces established with relation to each runway of an airport. There are five types of surfaces: (1) primary; (2) approach; (3) transitional; (4) horizontal; and (5) conical.

FEDERAL AVIATION ADMINISTRATION (FAA): The United States government agency which is responsible for insuring the safe and efficient use of the nation's airspace.

FIXED BASE OPERATOR (FBO): A business operating at an airport that provides aircraft services to the general public, including but not limited to sale of fuel and oil; aircraft sales, rental, maintenance, and repair; parking and tiedown or storage of aircraft; flight training; air taxi/charter operations; and specialty services, such as instrument and avionics maintenance, painting, overhaul, aerial application, aerial photography, aerial hoists, or pipeline patrol.

GENERAL AVIATION: That portion of civil aviation which encompasses all facets of aviation except air carriers. (FAA Stats)

GLIDE SLOPE: An electronic signal radiated by a component of an ILS to provide descent path guidance to approaching aircraft.

HELIPAD: A small, designated area, usually with a prepared surface, on a heliport, airport, landing/takeoff area, apron/ramp, or movement area used for takeoff, landing, or parking of helicopters. (AIM)

INSTRUMENT APPROACH PROCEDURE: A series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing or to a point from which a landing may be made visually. It is prescribed and approved for a specific airport by competent authority. Refer to nonprecision and precision approach procedures. (AIM)

INSTRUMENT FLIGHT RULES (IFR): Rules governing the procedures for conducting instrument flight. Generally, IFR applies when meteorological conditions with a ceiling below 1,000 feet and visibility less than 3 miles prevail. (AIM)

INSTRUMENT LANDING SYSTEM (ILS): A precision instrument approach system which normally consists of the following electronic components and visual aids: (1) Localizer; (2) Glide Slope; (3) Outer Marker; (4) Middle Marker; (5) Approach Lights. (AIM)

INSTRUMENT OPERATION: An aircraft operation in accordance with an IFR flight plan or an operation where IFR separation between aircraft is provided by a terminal control facility. (FAA ATA)

INSTRUMENT RUNWAY: A runway equipped with electronic and visual navigation aids for which a precision or nonprecision approach procedure having straight-in landing minimums has been approved. (AIM)

ITINERANT OPERATION: An arrival or departure performed by an aircraft from or to a point beyond the local airport area.

LARGE AIRCRAFT: An aircraft of more than 12,500 pounds maximum certificated takeoff weight. (FAR 1)

LOCALIZER (LOC): The component of an ILS which provides course guidance to the runway. (AIM)

LOCALIZER TYPE DIRECTIONAL AID (LDA): A NAVAID used for nonprecision instrument approaches with utility and accuracy comparable to a localizer but which is not a part of a complete ILS and is not aligned with the runway. (AIM)

LOCAL OPERATION: An arrival or departure performed by an aircraft: (1) operating in the traffic pattern, (2) known to be departing or arriving from flight in local practice areas, or (3) executing practice instrument approaches at the airport. (FAA ATA)

MEAN SEA LEVEL (MSL): An elevation datum given in feet above mean sea level.

MICROWAVE LANDING SYSTEM (MLS): A precision instrument approach system providing a function similar to an ILS, but operating in the microwave spectrum. It normally consists of three components: azimuth station, elevation station, and precision distance measuring equipment.

MINIMUM DESCENT ALTITUDE (MDA): The lowest altitude, expressed in feet above mean sea level, to which descent is authorized on final approach or during circle-to-land maneuvering in execution of a standard instrument approach procedure where no electronic glide slope is provided. (FAR 1)

MISSED APPROACH: A maneuver conducted by a pilot when an instrument approach cannot be completed to a landing. (AIM)

NAVIGATIONAL AID/NAVAID: Any visual or electronic device airborne or on the surface which provides point-to-point guidance information or position data to aircraft in flight. (AIM)

NOISE CONTOURS: Lines drawn about a noise source indicating constant energy levels of noise exposure. CNEL and Ldn are the measures used to describe community exposure to noise.

NONPRECISION APPROACH PROCEDURE: A standard instrument approach procedure in which no electronic glide slope is provided. (FAR 1)

NONPRECISION INSTRUMENT RUNWAY: A runway with an instrument approach procedure utilizing air navigation facilities, with only horizontal guidance, or area-type navigation equipment for which a straight-in nonprecision instrument approach procedure has been approved or planned, and no precision approach facility or procedure is planned. (Airport Design AC)

OBJECT FREE AREA (OFA): A two-dimensional ground area surrounding runways, taxiways, and taxilanes which is clear of objects except for objects whose location is fixed by function. (Airport Design AC)

OBSTRUCTION: Any object of natural growth, terrain, or permanent or temporary construction or alteration, including equipment or materials used therein the height of which exceeds the obstruction standards of subpart C of FAR Part 77 "Objects Affecting Navigable Airspace".

OBSTACLE FREE ZONE (OFZ): The airspace defined by the runway OFZ and, as appropriate, the inner-approach OFZ and the inner-transitional OFZ, which is clear of object penetrations other than frangible NAVAIDs.

OBSTRUCTION: An object, including a mobile object, which penetrates an imaginary surface described in FAR Part 77.

OUTER MARKER: A marker beacon at or near the glide slope intercept position of an ILS approach. (AIM)

OVERFLIGHT EASEMENT: An easement which describes the right to overfly the property above a specified surface and includes the right to subject the property to noise, vibrations, fumes and emissions. An overflight easement is used primarily as a form of buyer notification.

OVERFLIGHT ZONE: The area(s) where aircraft are maneuvering to enter or leave the traffic pattern, typically defined by the FAR Part 77 horizontal surface.

OVERLAY ZONING: Establishes development standards in areas of special concern over an above the standards applicable to basic underlying zoning districts.

PLANNING BOUNDARY: The area designated by the ALUC surrounding each airport pursuant to Section 21675 (c) of the Public Utilities Code in which the ALUC plan applies.

PRECISION APPROACH PATH INDICATOR (PAPI): An airport landing aid similar to a VASI, but which has light units installed in a single row rather than two rows.

PRECISION APPROACH PROCEDURE: A standard instrument approach procedure in which an electronic glide slope is provided. (FAR 1)

PRECISION INSTRUMENT RUNWAY: A runway with an instrument approach procedure utilizing an instrument landing system (ILS), microwave landing system (MLS), or precision approach radar (PAR). (Airport Design AC)

PUBLIC USE AIRPORT: Publicly or privately owned airport that offers the use of its facilities to the public without prior notice or special invitation or clearance, and that has been issued a California Airport Permit by the Division of Aeronautics of the California Department of Transportation. For purposes of the ALUC plan, the

State Division of Aeronautics has interpreted "public use" to include special-use airports in which commercial operators offer service to the public.

REFERRAL AREA: The area around an airport defined by the planning boundary adopted by the ALUC within which certain land use proposals are to be referred to the ALUC for review.

RUNWAY EDGE LIGHTS: Lights used to define the lateral limits of a runway. Specific types include:

- HIRL - High-Intensity Runway Lights.
- MIRL - Medium-Intensity Runway Lights.

RUNWAY END IDENTIFIER LIGHTS (REIL): Two synchronized flashing lights, one on each side of the runway threshold, which provide a pilot with a rapid and positive visual identification of the approach end of a particular runway. (AIM)

RUNWAY PROTECTION ZONE (RPZ): An area (formerly the clear zone) used to enhance the safety of aircraft operations. It is at ground level beyond the runway end. (Airport Design AC)

RUNWAY SAFETY AREA (RSA): A defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway. (Airport Design AC)

SAFETY ZONE(S): For the purposes of this Plan, a safety zone is an area near an airport in which land use restrictions are established to protect the safety of the public from potential aircraft accidents.

SINGLE-EVENT NOISE: As used in this report, it refers to the noise from an individual aircraft operation or overflight.

SINGLE EVENT NOISE EXPOSURE LEVEL (SENEL) OR (SEL): The A-weighted sound level of a single noise event, such as an aircraft overflight, measured over the time interval for which the sound exceeds a threshold level and normalized to a reference duration of one second. SENEL and SEL values are identical: SENEL is used in California, SEL is adopted by the EPA and FAA.

The SENEL or SEL expresses the level of a continuous one-second signal that contains the same amount of energy as the entire noise event. This value is not equal to the maximum A-level occurring during the noise event. Aircraft noise events last more than one second. SENEL/SEL values will be higher than the maximum A-level for the same events.

SMALL AIRCRAFT: An aircraft of 12,500 pounds or less maximum certificated takeoff weight.

(FAR 1)

STANDARD INSTRUMENT DEPARTURE (SID): A preplanned instrument flight rules (IFR) air traffic control departure procedure printed for pilot use in graphic and/or textual form. SID's provide transition from the terminal to the appropriate en route structure. (AIM)

STANDARD TERMINAL ARRIVAL ROUTE (STAR): A preplanned instrument flight rule (IFR) air traffic control arrival route published for pilot use in graphic and/or textual form. STARs provide transition from the en route structure to an outer fix or an instrument approach fix/arrival waypoint in the terminal area. (AIM)

STOPWAY: An area beyond the takeoff runway, no less wide than the runway and centered upon the extended centerline of the runway, able to support the airplane during an aborted takeoff, without causing structural damage to the airplane, and designated by the airport authorities for use in decelerating the airplane during an aborted takeoff. (FAR 1)

STRAIGHT-IN INSTRUMENT APPROACH: An instrument approach wherein final approach is begun without first having executed a procedure turn; it is not necessarily completed with a straight-in landing or made to straight-in landing weather minimums. (AIM)

TAXILANE: The portion of the aircraft parking area used for access between taxiways, aircraft parking positions, hangars, storage facilities, etc. (Airport Design AC)

TAXIWAY: A defined path, from one part of an airport to another, selected or prepared for the taxiing of aircraft. (Airport Design AC)

TERMINAL INSTRUMENT PROCEDURES (TERPS): Procedures for instrument approach and departure of aircraft to and from civil and military airports. There are four types of terminal instrument procedures: precision approach, nonprecision approach, circling, and departure.

TERMINAL RADAR SERVICE AREA (TRSA): Airspace surrounding designated airports wherein ATC provides radar vectoring, sequencing, and separation on a full-time basis for all IFR and participating VFR aircraft. (AIM)

THRESHOLD: The beginning of that portion of the runway usable for landing. (AIM) (Also see Displaced Threshold)

TOUCH-AND-GO: A practice maneuver consisting of a landing and a takeoff performed in one continuous movement. A touch-and-go is defined as two operations.

TRAFFIC PATTERN: The traffic flow that is prescribed for aircraft landing at, taxiing on, or taking off from an airport. The components of a typical traffic pattern are upwind leg, crosswind leg, downwind leg, base leg, and final approach. (AIM)

TRANSIENT AIRCRAFT: Aircraft not based at the airport.

UNICOM (Aeronautical Advisory Station): A nongovernment air/ground radio communication facility which may provide airport information at certain airports. (AIM)

UTILITY AIRPORT: An airport designed, constructed, and maintained to serve airplanes having approach speeds less than 121 knots. (Airport Design AC)

VISUAL APPROACH: An approach where the pilot must use visual reference to the runway for landing under VFR conditions.

VISUAL APPROACH SLOPE INDICATOR (VASI): An airport landing aid which provides a pilot with visual descent (approach slope) guidance while on approach to landing. Also see PAPI.

VISUAL FLIGHT RULES (VFR): Rules that govern the procedures for conducting flight under visual conditions. VFR applies when meteorological conditions are equal to or greater than the specified minimum- generally, a 1,000-foot ceiling and 3-mile visibility.

VISUAL GLIDE SLOPE INDICATOR (VGSI): A generic term for the group of airport visual landing aids which includes Visual Approach Slope Indicators (VASI), Precision Approach Path Indicators (PAPI), and Pulsed Light Approach Slope Indicators (PLASI). When FAA funding pays for this equipment, whichever type received the lowest bid price will be installed unless the airport owner wishes to pay the difference for a more expensive unit.

VISUAL RUNWAY: A runway intended solely for the operation of aircraft using visual approach procedures, with no straight-in instrument approach procedure

and no instrument designation indicated on an FAA-approved airport layout plan.
(Airport Design AC)

WIND SHEER: A condition typified by rapid changes in wind velocity and duration with altitude.

REFERENCES

FAR 1: Federal Aviation Regulations Part 1, Definitions and Abbreviations.
(1974)

AIM: Airman's Information Manual, Pilot/Controller Glossary. (1988)

Airport Design AC: Federal Aviation Administration. Airport Design.
Advisory Circular 150/5300-13. (1989)

FAA ATA: Federal Aviation Administration. Air Traffic Activity. (1986)

FAA Census: Federal Aviation Administration. Census of U.S. Civil Aircraft.
(1986)

FAA Stats: Federal Aviation Administration. Statistical Handbook of
Aviation. (1984)

NTSB: National Transportation Safety Board.

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DISTRIBUTION LISTING:

- Air Resources Board
- Brawley Elementary School District
- Brawley Municipal Airport (Airport Manager)
- Brawley Union High School
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- California Energy Commission
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- El Centro Public Library

- Calexico Public Library
- Brawley Public Library
- Imperial Public Library
- Jimmy Doyle
- Phil Haas

RC/sm/ALUCD1ST.

aircraft operator. For land uses near the end of a runway, run-up noise can be louder and more prolonged than overflight noise. This is especially true when a runway is used predominantly in one direction. The runway end which is used for landings, when aircraft are typically the quietest, is also the end at which pre-flight engine run-ups are normally conducted.

In terms of potential airport land use commission policies, run-up noise is similar to single-event noise. ALUC's do not have the authority to regulate the noise at its source, but can consider it in land use compatibility evaluation.

Helicopter Noise - Because of their separate flight tracks, different operating characteristics, and typically low activity volumes, helicopter operations are usually not included in noise contour calculations. A simulation of helicopter noise can be included in Integrated Noise Model calculations. More accurate modelling of helicopter noise impacts requires use of the separate FAA Helicopter Noise Model (HNM) with the impacts then being manually added to the airplane impacts calculated with INM.

Agricultural Aircraft Noise - In agricultural locations, such as Imperial County, a significant portion of aircraft noise impacts is often produced by agricultural aircraft. This noise differs from that of other aircraft and is difficult to accurately portray in airport noise contours.

- For one, specialized agricultural aircraft are not included in the INM data base and thus must be represented by other aircraft.
- A more important distinction is that these aircraft seldom climb to normal traffic pattern altitudes and they often make turns at low altitudes close to the runway. Unless numerous flight tracks are modelled, the calculated noise contours tend to maintain a constant width along the flight tracks and never reach a closure point.
- Thirdly, because of the low flight altitudes and typically loud noise emissions of agricultural aircraft, noise impacts may be greater in the vicinity of fields that require frequent spraying than they are around low-activity airports. Although these impacts cannot be modelled, they can be considered in land use planning for agricultural areas.

Implementation Strategies for Local Jurisdictions

INTRODUCTION

The Airport Land Use Commission policies set forth in this *Airport Land Use Compatibility Plan* contain performance-type standards intended to prevent occurrence of future new conflicts between airport operations and surrounding land uses. Implementation of these criteria requires action by the local jurisdictions that have control over the airport-vicinity land use. This process is comparable to that established by the California Environmental Quality Act, the state has adopted a set of guidelines that must then be implemented by the specific procedures and other actions adopted by each local government.

The following strategies are divided into two categories: (1) those that can or must be taken by the local land use jurisdictions; and (2) actions that are available to a local jurisdiction when it is also the owner of the airport creating the impacts.

LOCAL JURISDICTION ACTIONS

Land Use Designations

The most fundamental means of assuring compatibility between an airport and surrounding land uses is by the designation of appropriate land uses in local general plans, specific plans, and zoning ordinances. California state aeronautics law requires local jurisdictions to make their general plans and specific plans consistent with the county airport land use commission plan or otherwise to override the commission.

Although long-term maintenance of airport/land use compatibility is difficult and often impossible without designation of compatible land uses, this form of land use control also has significant limitations. To overcome these limitations, other forms of land use

controls are normally essential as part of a complete airport/land use compatibility implementation strategy.

- **Ease of Change** - Nothing permanently locks in a land use designation. When pressured by landowners to allow less restricted development, future local legislative bodies can change the established designations, by overriding the ALUC, if necessary. Such changes especially can occur if the land changes jurisdiction (e.g., as a result of annexation).
- **Restrictiveness** - Land use designations are limited in the degree of restrictiveness that they can contain. If they are deemed to eliminate all reasonable economic use of private property, they can be considered an unfair taking and result in inverse condemnation. (For additional discussion of inverse condemnation, see Chapter 7). Especially in areas near ends of runways, the restrictions may need to be more severe than can be accomplished by this means alone.
- **Lack of Retroactiveness** - Designating an area for a different use than the one already existing may encourage change over the long run, but it does not directly eliminate existing incompatible uses. Other devices, such as fee simple acquisition, may be necessary to bring about the changes.
- **Nonaviation Orientation** - Standard land use plan and zoning designations are developed for community-wide planning purposes. Seldom do they have an aviation orientation or address the specific issues of compatibility with aviation activities (i.e., noise and safety).

Airport Combining Zones

One way of overcoming the lack of aviation orientation of basic land use designations is adoption of an overlay or combining zone. A combining zone supplements local land use designations by adding specific noise and, often more importantly, safety criteria (e.g., maximum number of people on the site, site design and open space criteria, height restrictions, etc.) applicable to future development in the airport vicinity. Geographically, the combining zone should extend at least a mile from the runway ends and encompass lands regularly overflowed by aircraft at or below traffic pattern altitudes.

An airport combining zone has several important benefits. Most importantly, it permits the continued utilization of the majority of the design and use guidelines contained in the existing zones. At the same time, it provides a mechanism for implementation of restrictions and conditions that may apply to only a few types of land uses within a given land use category or zoning district. This avoids the need for a large number of discrete zoning districts. It also enables local jurisdictions to use the performance standards provided in the *Airport Land Use Compatibility Plan* directly, rather than through redefinition of existing zoning district descriptions.

Combining Zone Components

Requirements defined in a combining zone ordinance could include:

- **Noise Insulation Standards** - In highly noise-impacted areas, the ordinance could be used to assure compliance with state statutes regarding interior noise levels. The ordinance could specify the construction techniques necessary to meet the requirements.
- **Height Limitations** - Restrictions on the height of buildings, antennas, trees, and other objects near airports, as defined by Federal Aviation Regulations (FAR) Part 77, Subpart C, and regulated by California aeronautics law, can be implemented as part of a combining zone. Although Part 77 surfaces are complex, three-dimensional shapes even at airports with only one runway, the general flatness of the land around airports in Imperial County limits the significance. Except within Compatibility Zone A, and to a minor extent Zone B, only objects exceeding 35 feet in height would have a potential to penetrate the Part 77 surfaces.
- **FAA Notification Requirements** - Combining zones also can be used to assure that project developers are informed about the need for compliance with the notification requirements of FAR Part 77. Subpart B of the regulations require that the proponent of any project which exceeds a specified set of height criteria submit a "Notice of Proposed Construction or Alteration" (Form 7460-1) to the Federal Aviation Administration prior to commencement of construction. The height criteria associated with this notification requirement are lower than those spelled out in Part 77, Subpart C, which define airspace obstructions. The purpose of the notification is to determine if the proposed construction would constitute a potential hazard or obstruction to flight. Notification is not required for proposed structures that would be shielded by existing structures or by natural terrain of equal or greater height, where it is obvious that the proposal would not adversely affect air safety.

- **Maximum Densities** - The principal noise and safety compatibility standards in the *Airport Land Use Compatibility Plan* are expressed in terms of dwelling units per acre for residential uses and people per acre for other land uses. These standards can either be included as is in a compatibility zone or used to modify the underlying land use designations. For residential land uses, the correlation between the compatibility criteria and land use designations is direct. For other land uses, the implications of the density limitations are not as clear. One step that can be taken by local governments is establish a matrix indicating whether specific types of land uses are or are not compatible with each of the four compatibility zones. To be useful, the land use categories will need to be more detailed than typically provided by general plan or zoning ordinance land use designations. Appendix D herein provides a sample compatibility matrix for over 70 types of land uses.
- **Open Space Requirements** - *Airport Land Use Compatibility Plan* criteria regarding airport-vicinity open space suitable for emergency aircraft landings can be implemented by a combining zone. These criteria are most effectively carried out by planning at the general or specific plan level, but may also need to be addressed in terms of the development restrictions on large parcels.

Avigation Easements

Avigation easements are another type of land use control measure available to local jurisdictions. These easements have historically been used to establish height limitations, prevent other flight hazards, and permit noise impacts. More recently, they have been employed as a form of buyer awareness, the recording of an easement with the title to a property ensures that prospective buyers of the property are informed about the airport impacts.

Methods of Acquisition

As with all easements, an avigation easement applies only to the specific property to which it is attached and it is binding on all subsequent owners of the property. Avigation easements can be obtained either by purchase or by required dedication.

- **Purchase** - Acquisition of avigation easements for some monetary amount is usually done by the airport proprietor, which may or may not be the same as the local land use jurisdiction. In most instances, the purchase of avigation easements is limited to property within runway protection zones (previously called clear zones) or elsewhere very close to the airport boundaries where some significant degree of restriction or impact is involved.

- **Dedication** - Required dedication of aviation easements is sometimes set as a condition for local jurisdiction approval of a proposed land use development, especially a residential development, in the vicinity of an airport. Generally, when aviation easements are obtained in this manner, they are primarily intended to serve as a comprehensive and stringent form of buyer awareness measure, the rights conveyed by the easement dedication are seldom more restrictive than the conditions and rights established in other legal forms (e.g., airport-vicinity height-limit zoning ordinances, Federal Aviation Regulations, etc.).
- Approved authorization for the Planning Director, acting as Secretary to the Airport Land Use Commission, to accept aviation easements, overflight easement and such other easements of records of (sic) instrument needing to be accepted by County on behalf of the Airport, owned by the County, if and when so directed by the Airport Land Use Commission. (Board Minute Order, #21, 5/11/93).

Property Rights Conveyed

A standard aviation easement conveys the following property rights from the owner of the property to the holder of the easement:

- **Overflight** - A right-of-way for free and unobstructed passage of aircraft through the airspace over the property at any altitude above a surface specified in the easement (set in accordance with Federal Aviation Regulations Part 77 and/or criteria for terminal instrument approaches).
- **Impacts** - A right to subject the property to noise, vibration, fumes, dust, and fuel particle emissions associated with normal airport activity.
- **Height Limits** - A right to prohibit the construction or growth of any structure, tree, or other object that would enter the acquired airspace.
- **Access and Abatement** - A right-of-entry onto the property, with appropriate advance notice, for the purpose of removing, marking, or lighting any structure or other object that enters the acquired airspace.
- **Other Restrictions** - A right to prohibit electrical interference, glare, misleading light sources, visual impairments, and other hazards to aircraft from being created on the property.

Easements which convey only certain ones of these rights are common. An easement containing only the first two rights is usually referred to as an *overflight* or *noise*

easement. The latter three rights are often collectively called a *height-limit* or *airspace* easement. Overflight easements are useful in locations sufficiently distant from an airport that height limits and other restrictions are not a concern. Height-limit easements have most frequently been obtained by purchase on properties close to an airport where restrictions on the height of objects are necessary. Because height-limit easements do not include the overflight easement rights, there is little apparent advantage to obtaining them rather than a complete avigation easement.

Buyer Awareness Measures

Buyer awareness is an umbrella category for types of airport/land use compatibility measures whose objective is to ensure that prospective buyers of property in the vicinity of an airport are made aware of the airport's existence and the impacts that the airport activity has on surrounding land uses. Avigation easements are the most definitive form of buyer awareness measure. Buyer awareness, though, can also be successfully implemented through other types of programs. Two primary methods are deed notices and real estate disclosure statements.

Deed Notices

Deed notices are statements, attached to the deed to a property, disclosing that the property is subject to routine overflights and associated noise and other impacts by aircraft operating at a nearby airport. An ideal application of deed notices is as a condition of approval for development of residential land uses in airport-vicinity locations where neither noise nor safety are significant factors, but frequent aircraft overflights may be annoying to some people. In addition to being recorded with the deed to a property, the notices shall be included "on its face" and on parcel maps and final maps.

Deed notices are similar to avigation or other aviation-related easements in that they become part of the title to a property and thus are a permanent form of buyer awareness. The distinguishing difference between deed notices and avigation easements is that deed notices only serve as a disclosure of potential overflights, whereas avigation easements convey an identified set of property rights. In locations where height limitations or other land use restrictions are unnecessary, deed notices have the advantage of being less cumbersome to define. Also, they give less appearance of having a negative affect on the value of the property.

An example of a deed notice is included in Appendix E.

Real Estate Disclosure Statements

A more comprehensive form of buyer awareness program is to require that information about an airport's influence area be disclosed to prospective buyers of all airport-adjacent properties prior to the transfer of title. The advantage of this type of program is that it applies to previously existing land uses as well as to new development.

This type of buyer awareness program can be implemented through adoption of a local ordinance requiring real estate disclosure upon the transfer of title or it can be established in conjunction with the adoption of an airport combining zone. Notification describing the zone and discussing its significance could be formally sent to all local real estate brokers and title companies. Having received this information, the brokers would be obligated by state law to pass it along to prospective buyers.

At a minimum, the area covered by a real estate disclosure program should include the airport influence area as established in the *Airport Land Use Compatibility Plan*. The boundary also could be defined to coincide with the boundaries of an airport combining zone.

AIRPORT PROPRIETOR ACTIONS

By law, an airport land use commission cannot establish policies governing the operation of any airport. Nonetheless, in developing its policies, the commission must take into account adopted airport master plans and thus, by extension, should consider actions taken by the airport proprietor to limit the airport's impacts. When a local land use jurisdiction is also the owner of the airport creating the impacts, the jurisdiction gains significant additional capabilities with regard to assuring airport/land use compatibility. Sometimes, the jurisdiction can use airport/land use compatibility actions such as those described below in addition to or in lieu of restrictions on land use development.

Acquisition of Fee Simple Title

Outright airport-owner purchase of fee simple title to a property is the most direct means of land use control. It provides positive assurance of long-term land use compatibility and is the only type of action that enables existing incompatible uses to be removed.

Federal Aviation Administration Funding

Acquisition of property for approach protection purposes is eligible for federal grants under the Federal Aviation Administration Airport Improvement Program. FAA guidelines state that:

"...land interest is eligible which is necessary to restrict the use of land in the approach and the transitional zones (the dimensions as cited in the applicable Advisory Circulars) to activities and purposes compatible with normal airport operations as well as to meet current and anticipated development at the airport."
(FAA Order 5100.38A)

Airport sponsors are encouraged "to acquire the minimum property interest necessary to ensure safe aeronautical use." Except when required for noise compatibility, normally only the portion of approach zone property within 5,000 feet of the runway end is grant eligible.

Limitations

Weighing against the benefits of fee simple acquisition are several important drawbacks:

- **Cost** - Fee simple acquisition is usually the most expensive land use compatibility measure. Also, although some 90% of acquisition costs are eligible for FAA grants under current legislation, the FAA participates in acquisition of parcels only within the limited area indicated above. Most airport operators cannot afford to purchase property without assistance from the FAA.
- **Disruptiveness** - The need to relocate residents and businesses occupying the property to be acquired is disruptive both to the individuals directly involved and to the neighborhood as a whole. Compliance with state and federal relocation laws is required (assistance in finding replacement property must be provided and moving costs must be paid).
- **Tax Implications** - Government acquisition of real property removes it from the tax rolls unless it is leased out for compatible development.
- **Owner Opposition** - Landowners may be unwilling to sell their property voluntarily. Although the property can still be acquired by eminent domain, the condemnation process can be time consuming and costly (both financially and socially).

Acquisition of Approach Protection Easements

As with easements in general, approach protection easements are a form of less-than-fee interest in real property. The key distinction between approach protection easements and the standard aviation easements discussed earlier is that approach protection easements establish specific controls on the underlying use of the land; aviation easements do not. Certain development rights that normally are associated with land ownership would be acquired (e.g., rights to develop high-density residential facilities). The landowner would have all other rights associated with land ownership including the right to sell the property. The easement would, however, be attached to the property title and therefore be binding on subsequent owners. In concept, approach protection easements are very similar to conservation easements which have been employed in several states as a means of agricultural land preservation.

There are two means by which approach protection easements can be acquired. One is through direct purchase. This method is suitable where the existing land uses are compatible with airport activities, but where prevention of future incompatible uses is of such importance that other, less absolute control measures (e.g., zoning) are deemed inadequate. The second method is by retention of the easement when reselling property previously acquired in fee. This approach is necessary when the existing land uses are not compatible with airport activities. In either case, several specific issues must be addressed in the acquisition process:

- **Lack of Precedence** - A difficulty associated with use of approach protection easements as an airport/land use compatibility measure is that there is little previous experience with them. More experience exists with the conservation easements employed as a means of agricultural land preservation, but these most often are obtained through donation rather than purchase. Several airports, however, are currently in the process of obtaining approach protection easements. Their experience will be invaluable elsewhere.
- **Determining Cost of Acquisition** - One of the problems with acquisition of approach protection easements is determining their fair cost, especially when they are purchased directly. In theory, the cost of an approach protection easement should be the difference between a property's market value without the easement and its remaining value with the easement restrictions attached. The market values would be based upon the concept of "highest and best use" and would be determined by appraisal. The problem that arises, however, is the lack of comparable transactions upon which to base appraisals of the easement-restricted property. Some negotiation undoubtedly would come into play regarding what uses

reasonably could still occur on the property and what the property's "fair" value for such purposes should be.

- **Maximum Acceptable Cost** - If the cost of acquiring an approach protection easement is determined to represent a significant percentage of the fee simple value (30-50% as a maximum), it becomes preferable to purchase the property in fee and resell it with the easement attached. The value of the easement would be easier to determine under such circumstances. Although appraisals would still need to be obtained, the actual sale price of the property would be established by the open market.
- **Description of Restrictions** - An approach protection easement is a negative easement in that it restricts the underlying rights to use of the land. However, the easement agreement can be written either to prohibit specified uses or to permit only those uses listed. The latter is more certain to prevent development of incompatible uses, although it may also eliminate unanticipated uses that would be compatible. Regardless of the approach, the agreement must be carefully worded to prevent future disputes.
- **Transfer of Development Rights** - An extension of the approach protection easement concept is to allow the development rights acquired and removed from one parcel to be sold or transferred to another parcel where development would be acceptable. The latter parcel would then be allowed to be developed to a higher degree than would otherwise be permitted by the underlying zoning. Implementation of development rights transfer would require approval by the local jurisdiction and coordination with other community land use planning criteria.

Airport Operational Restrictions and Facility Modifications

All of the airport/land use compatibility implementation strategies discussed previously in this chapter involve some form of control on land use. The other approach to minimizing compatibility conflicts is to reduce the impacts created by aircraft operating at an airport. This can be done by adoption of restrictions on the way aircraft are permitted to operate at the airport and/or by construction of physical facilities to mitigate operational impacts.

At most airports where operational restrictions or facility modifications have been implemented, the objective has been to reduce the airport's noise impacts. Enhancement of safety can, however, also be an important goal. The following list represents only a few of the numerous actions that can be beneficial at general aviation airports. The choice of which ones to implement depends upon the nature and extent of the impacts and the characteristics of the land uses being affected.

- **Preferential Runway** - When winds are blowing at more than about 5 knots, the wind direction dictates which runway is used at an airport. During calm or near calm conditions any runway can be used. The purpose of a preferential runway policy is to establish which runway should be used under these circumstances. Since aircraft takeoffs typically create more noise than do landings, overall noise impacts can sometimes be reduced by directing these operations over lands whose uses are the least affected by noise.
- **Traffic Pattern Location and Altitudes** - As described in Chapter 5, standard left-hand traffic pattern turns result in a pattern on each side of a runway. Often, high terrain or airspace conflicts necessitate limitation of the pattern to a single side of the runway. The length or width of the pattern sometimes is limited for similar reasons. Such restrictions also can be established for noise abatement purposes. For example, to place the pattern over open land and avoid overflight of urban areas. Increasing the altitude of the traffic pattern is another change that can have noise reduction benefits. Implementation of these actions, it must be noted, requires coordination with the Federal Aviation Administration.
- **Single-Event Noise Level Limits** - Overall airport noise levels can potentially be reduced by restricting or prohibiting operation of the noisiest aircraft. This technique is most effective when a few specific types of aircraft are far noisier than others operating at the airport. Maximum noise level criteria can be based upon published data, such as Federal Aviation Regulations Part 36, or, at severely impacted airports, upon actual monitoring of individual events.
- **Aircraft Weight Limit** - Most airports have an operational weight limit set to reflect the pavement strength or other physical limitations of the airport. Aircraft weight limit restrictions also can be established as a means of reducing the potential severity of off-airport accidents. Additionally, because heavier aircraft tend to be louder than lighter ones, an aircraft weight limit can serve as a form of single-event noise level limit.
- **Nighttime Restrictions** - Any of the above restrictions can be fixed to be more stringent during nighttime hours than during the daytime. The concept is that airport impacts, particularly from noise, are more disturbing during the night than in the daytime.
- **Run-up Locations** - Normal practice is for aircraft to conduct run-ups at a designated location adjacent to the point they taxi onto the runway. If such a location produces excessive noise impacts upon adjacent property, it is often reasonable to move the run-up area to another convenient spot. Alternatively, a

sound barrier (such as an earthen berm) can sometimes be constructed between the run-up area and the impacted land uses.

- **Other Facility Modifications** - At some airports, other physical changes to the runway configuration can hold prospects for reducing noise and/or safety impacts. Such facility modifications might include displacing or relocating a runway landing threshold or construction of a new runway to take traffic off a runway that produces more significant impacts.
- **Override Process** - Various sections of the Airport Land Use Commission statutes provide for local agencies to override ALUC decisions on land use matters and airport master plans. The override process involves three mandatory steps:
 - (1) The holding of a public hearing;
 - (2) The making of specific findings that the action proposed is consistent with the purposes of the ALUC statute; and,
 - (3) The City or County may override the Commission's determination of inconsistency by a 2/3 vote of its governing body.

The necessity for adequate findings to accompany a local agency's overriding of an ALUC was affirmed in a 1992 court case, *California Aviation Council v. City of Ceres*. In this case the court found that the Ceres city council had merely referred to the ALUC statutes and then concluded that the proposed land uses minimized public exposure to excessive noise and safety hazards in the airport area. The findings did not document the critical links between the proposal, the finding, and the facts. (Chapter 5, 5-15, *State ALUC Handbook*, December 1993).

- **Airport Owner's Immunity**

With respect to a publicly owned airport that a public agency does not operate, if the public agency pursuant to Section 21676 or 21676.5 overrides a commission's action or recommendation, the operator of the airport shall be immune from liability for damages to property or personal injury caused by or resulting directly or indirectly from the public agency's decision to override the commission's action or recommendation.

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General Plan Consistency Review

Imperial County Jurisdictions

INTRODUCTION

As part of the previous study which revises the 1982 Airport Land Use Plan, the general plans, zoning ordinances, and other applicable plans and policies of the jurisdictions near each of the airports in the county were reviewed. The intent of this review was to identify clear or potential inconsistencies between the Airport Land Use Compatibility Plan policies, especially those listed in the Compatibility Criteria matrix (Table 2A) - and the land uses planned for the airports' environs. The results of this review are outlined below.

The review was based upon the documents indicated. In most cases the documents are adopted by the local jurisdiction. At the time the Airport Land Use Compatibility Plan was being drafted, several communities had general plans or elements thereof under preparation. The County currently is preparing an update of the 1993 General Plan Land Use Ordinance, and the listing includes the latest updates of local city general plans.

COUNTY-WIDE

County of Imperial

Documents Reviewed

- General Plan (November 1993)
- Zoning Ordinance

Inconsistencies Noted

- The General Plan addresses airport compatibility but is not sufficiently detailed to determine land use compatibility.

The Amended Noise Plan allows residential densities of up to 29 dwelling units per acre in CNEL 60-65 dBA range. Noise levels of up to CNEL 70 dBA are allowed for residential uses having densities of up to 2 dwelling units per acre in A-1 Light Agricultural Zone and 7 dwelling units per acre in R-1 Residential Agricultural Zone.

- No open land requirements for "A", "B", and "C" Zones.
- No aviation easement dedication requirements for "A", "B", and "C" Zones.

BRAWLEY MUNICIPAL AIRPORT

City of Brawley

Documents Reviewed

- **General Plan, Land Use and Circulation Map (April 1995)**
- **Public Safety/Noise Element (April 1995).**
- General Plan requires a deed notice in "D" Zone and aviation easements in the "B" Zones.

Inconsistencies Noted

- No intensity restrictions for industrial uses in "A", "B", and "C" Zones.
- No open land requirements for "A", "B" and "C" Zones.
- No indicated restrictions on open space/park use proposed for "A" Zone at east end of runway.
- Up to 9 dwelling units per acre allowed in "B1" and "B2" Zones west of runway. Residential development allowed within CNEL 60-65 dBA range.
- No restrictions on school sites and other critical uses in "B" and "C" Zones.
- Aviation easement dedication not established as adopted policy for "A" and "B" Zones.

- Height limits not adopted.

County of Imperial

Documents Reviewed

- Brawley Area Zoning Map (1995).

Inconsistencies Noted

- Labor camps permitted in "A" and "B" Zones at east end of runway (County Zone A-2).
- No intensity limitations for manufacturing uses in "C" Zone north of airport.
- No open land requirements for "A", "B", and "C" Zones.

CALEXICO INTERNATIONAL AIRPORT

City of Calexico

Documents Reviewed

- General Plan, Land Use Element (1992)

Inconsistencies Noted

- Residential densities greater than 4 dwelling units per acre may be allowable in "C" Zone north of airport.
- No limitations or intensities for commercial and manufacturing uses in "B" and "C" Zones east of airport.
- No open land requirements for "A", "B", and "C" Zones.
- No aviation easement dedication requirements for "A", "B", and "C" Zones.

County of Imperial

Documents Reviewed

- Current Land Use Plan, Calexico Planning Unit (April 1982).
- Calexico Area Zoning Plan, (March 1990).

Inconsistencies Noted

- Labor camps permitted in "A" and "B" Zones at west end of runway (County Zone A-2).

CALIPATRIA MUNICIPAL AIRPORT

City of Calipatria

Documents Reviewed

- Zoning Ordinance, (1992).
- Airport Approaches Zoning Ordinance, (1992).

No Inconsistencies Noted

County of Imperial

Documents Reviewed

- County Zoning Map 6 (1992).

Inconsistencies Noted

- A-1 Light Agricultural Zone allow up to 2 dwelling units per acre in "A" and "B" Zones at west end of runway.

HOLTVILLE AIRPORT

County of Imperial

Documents Reviewed

- County-wide plans.

Inconsistencies Noted

- None.

IMPERIAL COUNTY AIRPORT

City of Imperial

Documents Reviewed

- Amended General Plan, (May 1993)
- Zoning Map

Inconsistencies Noted

- Residential uses permitted in part of "A" Zone at north end of runway.
- Residential densities of up to 1 dwelling unit per acre allowed in "B1" Zone.
- No intensity limitations in city commercial and industrial zoning districts.
- No open land requirements for "A", "B" and "C" Zones.
- No aviation easement dedication requirements for "A", "B" and "C" Zones.

City of El Centro

Documents Reviewed

- General Plan, (June 1988).
- Zoning Ordinance and Map, (April 1989).

Inconsistencies Noted

- Residential densities greater than 0.5 dwelling units per acre allowed in "B2" Zone southeast of airport.
- No aviation easement dedication requirements for "B2" and "C" Zones.
- Airport height limit zoning not established.

County of Imperial

Documents Reviewed

- El Centro Area Zoning Map, (March 1990).
- Imperial Area Zoning Map, (March 1989).

Inconsistencies Noted

- County A-1 zone allows residential density of up to 2 dwelling units in "A", "B" and "C" Zones west and northwest of airport.
- No intensity limitations on manufacturing zone (M-2) encompassed by "B2" Zone southeast of airport.
- No open land requirements for "A", "B", and "C" Zones.

SALTON SEA AIRPORT

Documents Reviewed

- Salton City Area Zoning Map, (March 15, 1989).

Inconsistencies Noted

- Up to 7 dwelling units per acre allowed in residential area encompassed by "B" and "C" Zones adjacent to airport.

NAVAL AIR FACILITY EL CENTRO

Documents Reviewed

- Seeley and Imperial West Area Zoning Maps

Inconsistencies Noted

- Labor camps permitted in "A" and "B" Zones (County Zone A-2).
- Residential densities of up to 2 dwelling units per acre allowed in County A-1 zoning district along Evan Hewes Highway encompassed by "B" Zone.
- "C" Zone encompasses community of Seeley where County R-1 zone allows densities of up to 7 dwelling units per acre.

STATE OF CALIFORNIA AERONAUTICS LAW
STATE AERONAUTICS ACT

Public Utilities Code
Chapter 4, Article 3.5

AIRPORT LAND USE COMMISSION

Creation; Membership; Selection

21670. (a) The Legislature hereby finds and declares that:

(1) It is in the public interest to provide for the orderly development of each public use airport in this state and the area surrounding these airports so as to promote the overall goals and objectives of the California airport noise standards adopted pursuant to Section 21669 and to prevent the creation of new noise and safety problems.

(2) It is the purpose of this article to protect public health, safety, and welfare by ensuring the orderly expansion of airports and the adoption of land use measures that minimize the public's exposure to excessive noise and safety hazards within areas around public airports to the extent that these areas are not already devoted to incompatible uses.

(b) In order to achieve the purposes of this article, every county in which there is located an airport which is served by a scheduled airline shall establish an airport land use commission. Every county, in which there is located an airport which is not served by a scheduled airline, but is operated for the benefit of the general public, shall establish an airport land use commission, except that the board of supervisors for the county may, after consultation with the appropriate airport operators and affected local entities and after a public hearing, adopt a resolution finding that there are no noise, public safety, or land use issues affecting any airport in the county which require the creation of a commission and declaring the county exempt from that requirement. The board shall, in this event, transmit a copy of the resolution to the Director of Transportation. For purposes of this section, "commission" means an airport land use commission. Each commission shall consist of seven members to be selected as follows:

(1) Two representing the cities in the county, appointed by a city selection committee comprised of the mayors of all the cities within that county, except that if

there are any cities contiguous or adjacent to the qualifying airport, at least one representative shall be appointed therefrom. If there are no cities within a county, the number of representatives provided for by subdivisions (b) and (c) shall, each be increased by one.

(2) Two representing the county, appointed by the board of supervisors.

(3) Two having expertise in aviation, appointed by a selection committee comprised of the managers of all the public airports within that county.

(4) One representing the general public, appointed by the other six members of the commission.

(c) Public officers, whether elected or appointed, may be appointed and serve as members of the commission during their terms of public office.

(d) Each member shall promptly appoint a single proxy to represent the member in commission affairs and to vote on all matters when the member is not in attendance. The proxy shall be designated in a signed written instrument which shall be kept on file at the commission offices, and the proxy shall serve at the pleasure of the appointing member. A vacancy in the office of proxy shall be filled promptly by appointment of a new proxy.

(e) A person having an "expertise in aviation": means a person who, by way of education, training, business, experience, vocation, or avocation has acquired and possesses particular knowledge of, and familiarity with, the function, operation, and role of airports, or is an elected official of a local agency which owns or operates an airport.

Action by Designated Body Instead of Commission

21670.1 (a) Notwithstanding any provisions of this article, if the board of supervisors and the city selection committee of mayors in any county each makes a determination by a majority vote that proper land use planning can be accomplished through the actions of an appropriate designated body, then such body shall assume the planning responsibilities of an airport land use commission as provided for in this article, and a commission need not be formed in that county.

(b) A body designated pursuant to subdivision (a) which does not include among its membership at least two members having an expertise in aviation, as defined in subdivision (e) of Section 21670, shall, when acting in the capacity of an airport land use commission, be augmented so that the body, as augmented, will have at least two members having that expertise. The commission shall be constituted pursuant to this section on and after March 1, 1988.

(c)(1) Notwithstanding subdivisions (a) and (b), and subdivision (b) of Section 21670, if the Board of Supervisors of a County and each affected city in that county each makes a determination that proper land use planning pursuant to this article can be accomplished pursuant to this subdivision, then a commission need not be formed in that county.

(2) If the Board of Supervisors of a county and each affected city makes a determination that proper land use planning may be accomplished and a commission is not formed pursuant to paragraph (1) of this subdivision, that county and the appropriate affected cities having jurisdiction over an airport, subject to the review and approval by the Division of Aeronautics of the department, shall do all of the following:

(A) Adopt processes for the preparation, adoption, and amendment of the comprehensive airport land use plan for each airport that is served by a scheduled airline or operated for the benefit of the general public.

(B) Adopt processes for the notification of the general public, landowners, interested groups, and other public agencies regarding the preparation, adoption, and amendment of the comprehensive airport land use plans.

(C) Adopt processes for the mediation of disputes arising from the preparation, adoption, and amendment of the comprehensive airport land use plans.

(D) Adopt processes for the amendment of general and specific plans to be consistent with the comprehensive airport land use plans.

(E) Designate the agency that shall be responsible of the preparation, adoption, and amendment of each comprehensive airport land use plan.

(3) The Division of Aeronautics of the department shall review the processes adopted pursuant to paragraph (2), and shall approve the processes if the division determines that the processes are consistent with the procedure required by this article and will do all of the following:

(A) Result in the preparation, adoption, and implementation of plans within a reasonable amount of time.

(B) Rely on the height, use, noise, safety, and density criteria that are compatible with airport operations, as established by this article, and referred to as the Airport Land Use Planning Handbook, published by the division, and any applicable federal aviation regulations, including, but not limited to Part 77 (commencing with Section 77.1) of Title 14 of the Code of Federal Regulations.

(C) Provide adequate opportunities for notice to, review of, and comment by the general public, landowners, interested groups, and other public agencies.

(4) If the county does not comply with the requirements of paragraph (3) within 120 days, then the plan and amendments shall not be considered adopted pursuant to this article and a commission shall be established within 90 days of the determination of noncompliance by the division and a plan shall be adopted pursuant to this article within 90 days of the establishment of the commission.

(d) A commission need not be formed in a county that has contracted for the preparation of comprehensive airport land use plans with the Division of Aeronautics under the California Aids to Airport Program (Title 21 (commencing with Section 4050) of the California Code of Regulations), Project Ker-VAR 90-1, and that submits all of the following information to the Division of Aeronautics for review and

comment that the county and the cities affected by the airports within the county, as defined by the plans:

(1) Agree to adopt and implement the comprehensive airport plans that have been developed under contract.

(2) Incorporated by the height, use, noise, safety and density criteria that are compatible with airport operations as established by this article, and referred to as the Airport Land Use Planning Handbook, published by the division, and any applicable federal aviation regulations, including, but not limited to, Part 77 (commencing with Section 77.1) of Title 14 of the Code of Federal Regulations as part of the general and specific plans for the county and for each affected city.

(3) If the county does not comply with this subdivision on or before May 1, 1995, then a commission shall be established in accordance with this article.

(e) (1) A commission need not be formed in a county if all of the following conditions are met:

(A) The county has only one public use airport that is owned by a city.

(B)(i) The county and the affected city adopt the elements in paragraph (2) of subdivision (d), as part of their general and specific plans for the county and the affected city.

(ii) The general and specific plans shall be submitted, upon adoption, to the Division of Aeronautics. If the county and the affected city do not submit the elements specified in paragraph (2) of subdivision (d), on or before May 1, 1996, then a commission shall be established in accordance with this article.

Applicability to Counties Having Over 4 Million Population

21670.2. (a) Sections 21670 and 21670.1 do not apply to counties of more than 4 million population. In such counties, the county regional planning commission has the responsibility of coordinating the airport planning of public agencies within the county. In instances where impasses result relative to this planning, an appeal may be made to the county regional planning commission by any public agency involved. The action taken by the county regional planning commission on such an appeal may be overruled by a four-fifths vote of the governing body of a public agency whose planning led to the appeal.

(b) By January 1, 1992, the county regional planning commission shall adopt the comprehensive land use plans required pursuant to Section 21675.

Airports Owned by a City, District, or County; Appointment of Certain Members by Cities and Counties

21671. In any county where there is an airport operated for the general public which is owned by a city or district in another county or by another county, one of the representatives provided by paragraph (1) of subdivision (a) of Section 21670 shall be appointed by the city selection committee of mayors of the cities of the county in which the owner of that airport is located, and one of the representatives provided by paragraph (2) subdivision (a) of Section 21670 shall be appointed by the board of supervisors of the county in which the owner of that airport is located.

Term of Office; Removal of Members; Vacancies; Compensation; Staff Assistance; Meetings

21671.5 (a) Except for the terms of office of the members of the first commission, the term of office for each member shall be four years and until the appointment and qualification of his or her successor. The members of the first commission shall classify themselves by lot so that the term of office of one member is one year, of two members is two years, of two members is three years, and of two members if four years. The body which originally appointed a member whose term has expired shall appoint his or her successor for a full term of four years. Any member may be removed at any time and without cause by the body appointing him or her. The expiration date of the term of office of each member shall be the first Monday in May in the year in which his or her term is to expire. Any vacancy in the membership of the commission shall be filled for the unexpired term by appointment by the body which originally appointed the member whose office has become vacant. The chairperson of the commission shall be selected by the members thereof.

(b) Compensation, if any, shall be determined by the board of supervisors.

(c) Staff assistance, including the mailing of notices and the keeping of minutes, and necessary quarters, equipment, and supplies shall be provided by the county. The usual and necessary expenses of the commission shall be a county charge.

(d) Notwithstanding any other provisions of this article, the commission shall not employ any personnel either as employees or independent contractors without the prior approval of the board of supervisors.

(e) The commission shall meet at the call of the commission chairperson or at the request of the majority of the commission members. A majority of the commission members shall constitute a quorum for the transaction of business. No

action shall be taken by the commission except by the recorded vote of a majority of the full membership.

(f) The commission may establish a schedule of fees for reviewing and processing proposals and for providing copies of land use plans, as required by subdivision (d) of Section 21675. Those fees shall be charged to the proponents of actions, regulations, or permits, shall not exceed the estimated reasonable cost of providing the service, and shall be imposed pursuant to Chapter 13 (commencing with Section 54990) of Part 1 of Division 2 of Title 5 of the Government Code. After June 30, 1991, a commission which has not adopted the comprehensive land use plan required by Section 21675 shall not charge fees pursuant to this subdivision until the commission adopts the plan.

Rules and Regulations

21672. Each commission shall adopt rules and regulations with respect to the temporary disqualification of its members from participating in the review or adoption of a proposal because of conflict of interest and with respect to appointment of substitute members in such cases.

Initiation of Proceedings for Creation by Owner of Airport

21673. In any county not having a commission or a body designated to carry out the responsibilities of a commission, any owner of a public airport may initiate proceedings for the creation of a commission by presenting a request to the board of supervisors that a commission be created and showing the need therefor to the satisfaction of the board of supervisors.

Powers and Duties

21674. The commission has the following powers and duties, subject to the limitations upon its jurisdiction set forth in Section 21676:

(a) To assist local agencies in ensuring compatible land uses in the vicinity of all new airports and in the vicinity of existing airports to the extent that the land in the vicinity of those airports is not already devoted to incompatible uses.

(b) To coordinate planning at the state, regional, and local levels so as to provide for the orderly development of air transportation, while at the same time protecting the public health, safety, and welfare.

(c) To prepare and adopt an airport land use plan pursuant to Section 21675.

(d) To review the plans, regulations, and other actions of local agencies and airport operators pursuant to Section 21676.

(e) The powers of the commission shall in no way be construed to give the commission jurisdiction over the operation of any airport.

(f) In order to carry out its responsibilities, the commission may adopt rules and regulations consistent with this article.

Staff Training and Development

21674.5 (a) The Department of Transportation shall develop and implement a program or programs to assist in the training and development of the staff or airport land use commissions, after consulting with airport land use commissions, cities, counties, and other appropriate public entities.

(b) The training and development program or programs are intended to assist the staff of airport land use commissions in addressing high priority needs, and may include, but need not be limited to, the following:

(1) The establishment of a process for the development and adoption of comprehensive land use plans.

(2) The development of criteria for determining airport land use planning boundaries.

(3) The identification of essential elements which should be included in the comprehensive plans.

(4) Appropriate criteria and procedures for reviewing proposed developments and determining whether proposed developments are compatible with the airport use.

(5) Any other organizational, operational, procedural, or technical responsibilities and functions which the department determines to be appropriate to provide the commission staff and for which it determines there is a need for staff training and development.

(c) The department may provide training and development programs for airport land commission staff pursuant to this section by any means it deems appropriate. Those programs may be presented in any of the following ways:

(1) By offering formal courses or training programs.

(2) By sponsoring or assisting in the organization and sponsorship of conferences, seminars, or other similar events.

(3) By producing and making available written information.

(4) Any other feasible method of providing information and assisting in the training and development of airport land use commission staff.

Comprehensive airport land use plan; adoption or amendment; use of Airport Land Use Planning Handbook

21674.7.. An airport land use commission that formulates, adopts or amends a comprehensive airport land use plan shall be guided by information prepared and updated pursuant to Section 21674.5 and referred to as the Airport Land Use Planning

Handbook published by the Division of Aeronautics of the Department of Transportation.

Land Use Plan

21675. (a) Each commission shall formulate a comprehensive land use plan that will provide for the orderly growth of each public airport and the area surrounding the airport within the jurisdiction of the commission, and will safeguard the general welfare of the inhabitants within the vicinity of the airport and the public in general. The commission plan shall include and shall be based on a long-range master plan or an airport layout plan, as determined by the Division of Aeronautics of the Department of Transportation, that reflects the anticipated growth of the airport during at least the next 20 years. In formulating a land use plan, the commission may develop height restrictions on buildings, specify use of land, and determine building standards, including soundproofing adjacent to airports, within the planning area. The comprehensive land use plan shall be reviewed as often as necessary in order to accomplish its purposes, but shall not be amended more than once in any calendar year.

(b) The commission may include, within its plan formulated pursuant to subdivision (a), the area within the jurisdiction of the commission surrounding any federal military airport for all the purpose specified in subdivision (a). This subdivision does not give the commission any jurisdiction or authority over the territory or operations of any military airport.

(c) The planning boundaries shall be established by the commission after hearing and consultation with the involved agencies.

(d) The commission shall submit to the Division of Aeronautics of the department one copy of the plan and each amendment to the plan.

(e) If a comprehensive land use plan does not include the matters required to be included pursuant to this article, the Division of Aeronautics of the department shall notify the commission responsible for the plan.

Date of Adoption; Review of Actions; Approval or Disapproval

21675.1 (a) By June 30, 1991, each commission shall adopt the comprehensive land use plan required pursuant to Section 21675.

(b) Until a commission adopts a comprehensive land use plan, a city or county shall first submit all actions, regulations, and permits within the vicinity of a public airport to the commission for review and approval. Before the commission approves or disapproves any actions, regulations, or permits, the commission shall give the public notice in the same manner as the city or county is required to give for those actions, regulations, or permits. As used in this section, "vicinity" means land which will be included or reasonably could be included within the plan. If the commission has not

designated a study area for the plan, then "vicinity" means land within two miles of the boundary of a public airport.

(c) The commission may approve an action, regulation, or permit if it finds, based on substantial evidence in the record, all of the following:

(1) The commission is making substantial progress toward the completion of the plan.

(2) There is a reasonable probability that the action, regulation, or permit will be consistent with the plan being prepared by the commission.

(3) There is little or no probability of substantial detriment to or interference with the future adopted plan if the action, regulation, or permit is ultimately inconsistent with the plan.

(d) If the commission disapproves an action, regulation, or permit, the commission shall notify the city or county. The city or county may overrule the commission, by a two-thirds vote of its governing body, if it makes specific findings that the proposed action, regulation, or permit is consistent with the purposes of this article, as stated in Section 21670.

(e) If a city or county overrules the commission pursuant to subdivision (d), that action shall not relieve the city or county from further compliance with this article after the commission adopts the plan.

(f) If a city or county overrules the commission pursuant to subdivision (d) with respect to a publicly owned airport that the city or county does not operate, the operator of the airport shall be immune from liability for damages to property or personal injury from the city's or county's decision to proceed with the action, regulation, or permit.

(g) A commission may adopt rules and regulations which exempt any ministerial permit for single-family dwellings from the requirements of subdivision (b) if it makes the findings required pursuant to subdivision (c) for the proposed rules and regulations, except that the rules and regulations may not exempt either of the following:

(1) More than two single-family dwellings by the same applicant within a subdivision prior to June 30, 1991.

(2) Single-family dwellings in a subdivision where 25 percent or more of the parcels are undeveloped.

Failure to Approve or Disapprove

21675.2 (a) If a commission fails to act to approve or disapprove any actions, regulations, or permits within 60 days of receiving the request pursuant to Section 21675.1, the applicant or his or her representative may file an action pursuant to Section 1094.5 of the Code of Civil Procedure to compel the commission to act, and the court shall give the proceedings preference over all other actions or proceedings, except previously filed pending matters of the same character.

(b) The action, regulation, or permit shall be deemed approved only if the public notice required by this subdivision has occurred. If the applicant has provided seven days advance notice to the commission of the intent to provide public notice pursuant to this subdivision, then, not earlier than the date of the expiration the time limit established by Section 21675.1, an applicant may provide the required public notice. If the applicant chooses to provide public notice, that notice shall include a description of the proposed action, regulation, or permit substantially similar to the descriptions which are commonly used in public notices by the commission, the name and address of the commission, and a statement that the action, regulation, or permit shall be deemed approved if the commission has not acted within 60 days. If the applicant has provided the public notice specified in this subdivision, the time limit for action by the commission shall be extended to 60 days after the public notice is provided. If the applicant provides notice pursuant to this section, the commission shall refund to the applicant any fees which were collected for providing notice and which were not used for that purpose.

(c) Failure of an applicant to submit complete or adequate information pursuant to Sections 65943 to 65946, inclusive, of the Government Code, may constitute grounds for disapproval of actions, regulations, or permits.

(d) Nothing in this section diminishes the commission's legal responsibility to provide, where applicable, public notice and hearing before acting on an action, regulation, or permit.

Review of Local General Plans

21676. (a) Each local agency whose general plan includes areas covered by an airport land use commission plan shall, by July 1, 1983, submit a copy of its plan or specific plans to the airport land use commission. The commission shall determine by August 31, 1983, whether the plan or plans are consistent or inconsistent with the commission's plan. If the plan or plans are inconsistent with the commission's plan, the local agency shall be notified and that local agency shall have another hearing to reconsider its plans. The local agency may overrule the commission after such a hearing by a two-thirds vote of its governing body if it makes specific findings that the proposed action is consistent with the purposes of this article stated in Section 21670.

(b) Prior to the amendment of a general plan or specific plan, or the addition or approval of a zoning ordinance or building regulation within the planning boundary established by the airport land use commission pursuant to Section 21675, the local agency shall first refer the proposed action to the commission. If the commission determines that the proposed action is inconsistent with the commission's plan, the referring agency shall be notified. The local agency may, after a public hearing, overrule the commission by a two-thirds vote of its governing body if it makes specific findings that the proposed action is consistent with the purposes of this article stated in Section 21670.

(c) Each public agency owning any airport within the boundaries of an airport land use commission plan shall, prior to modification of its airport master plan, refer such proposed change to the airport land use commission. If the commission determines that the proposed action is inconsistent with the commission's plan, the referring agency shall be notified. The public agency may, after a public hearing, overrule the commission by a two-thirds vote of its governing body if it makes specific findings that the proposed action is consistent with the purposes of this article stated in Section 21670.

(d) Each commission determination pursuant to subdivision (b) or (c) shall be made within 60 days from the date of referral of the proposed action. If a commission fails to make the determination within that period, the proposed action shall be deemed consistent with the commission's plan.

Review of Local Plans

21676.5. (a) If the commission finds that a local agency has not revised its general plan or specific plan or overruled the commission by a two-thirds vote of its governing body after making specific findings that the proposed action is consistent with the purposes of this article as stated in Section 21670, the commission may require the local agency submit all subsequent actions, regulations, and permits to the commission for review until its general plan or specific plan is revised or the specific findings are made. If, in the determination of the commission, an action, regulation, or permit of the local agency is inconsistent with the commission plan, the local agency shall be notified and that local agency shall hold a hearing to reconsider its plan. The local agency may overrule the commission after hearing by a two-thirds vote of its governing body if it makes specific findings that the proposed action is consistent with the purposes of this article as stated in Section 21670.

(b) Whenever the local agency has revised its general plan or specific plan or has overruled the commission pursuant to subdivision (a), the proposed action of the local agency shall not be subject to further commission review, unless the commission and the local agency agree that the individual projects shall be reviewed by the commission.

Marin County Override Provisions

21677. Notwithstanding Section 21676, any public agency in the County of Marin may overrule the Marin County Airport Land Use Commission by a majority vote of its governing body.

Airport Owner's Immunity

21678. With respect to a publicly owned airport that a public agency does not operate, if the public agency pursuant to Section 21676 or 21676.5 overrides a commission's action or recommendation, the operator of the airport shall be immune from liability for damages to property or personal injury caused by or resulting directly or indirectly from the public agency's decision to override the commission's action or recommendation.

Court Review

21679. (a) In any county in which there is no airport land use commission or other body designated to assume the responsibilities of an airport land use commission, or in which the commission or other designated body has not adopted an airport land use plan, an interested party may initiate proceedings in a court of competent jurisdiction to postpone the effective date of a zoning change, a zoning variance, the issuance of a permit, or the adoption of a regulation by a local agency, which directly affects the use of land one mile of the boundary of a public airport within the county.

(b) The court may issue an injunction which postpones the effective date of the zoning change, zoning variance, permit, or regulation until the governing body of the local agency which took the action does one of the following:

(1) In the case of an action which is a legislative act, adopts a resolution declaring that the proposed action is consistent with the purposes of this article stated in Section 21670.

(2) In the case of an action which is not a legislative act, adopts a resolution declaring that the proposed action is consistent with the purposes of this article stated in Section 21670.

(3) Rescinds the action.

(4) Amends its action to make it consistent with the purposes of this article stated in Section 21670, and complies with either paragraph (1) or (2) of this subdivision, whichever is applicable.

(c) The court shall not issue an injunction pursuant to subdivision (b) if the local agency which took the action demonstrates that the general plan and any applicable specific plan of the agency accomplishes the purposes of an airport land use plan as provided in Section 21675.

(d) An action brought pursuant to subdivision (a) shall be commenced within 30 days of the decision or within the appropriate time periods set by Section 21167 of the Public Resources Code, whichever is longer.

(e) If the governing body of the local agency adopts a resolution pursuant to subdivision (b) with respect to a publicly owned airport that the local agency does not operate, the operator of the airport shall be immune from liability for damages to property or personal injury from the local agency's decision to proceed with the zoning change, zoning variance, permit, or regulation.

(f) As used in this section, "interested party" means any owner of land within two miles of the boundary of the airport or any organization with a demonstrated interest in airport safety and efficiency.

Action to Postpone Effective Date of Zoning Change, Etc.

21679.5 (a) Until June 30, 1991, no action pursuant to Section 21679 to postpone the effective date of a zoning change, a zoning variance, the issuance of a permit, or the adoption of a regulation by a local agency, directly affecting the use of land within one mile of the boundary of a public airport, shall be commenced in any county in which the commission or other designated body has not adopted an airport land use plan, but is making substantial progress toward the completion of the plan.

(b) If a commission has been prevented from adopting the comprehensive land use plan by June 30, 1991, or if the adopted plan could not become effective, because of a lawsuit involving the adoption of the plan, the June 30, 1991 date in subdivision (a) shall be extended by the period of time during which the lawsuit was pending in a court of competent jurisdiction.

(c) Any action pursuant to Section 21679 commenced prior to January 1, 1990, in a county in which the commission or other designated body has not adopted an airport land use plan, but is making substantial progress toward the completion of the plan, which has not proceeded to final judgment, shall be held in abeyance until June 30, 1991. If the commission or other designated body does not adopt an airport land use plan on or before June 30, 1991, the plaintiff or plaintiffs may proceed with the action.

(d) An action to postpone the effective date of a zoning change, a zoning variance, the issuance of a permit, or the adoption of a regulation by a local agency, directly affecting the use of land within one mile of the boundary of a public airport for which an airport land use plan has not been adopted by June 30, 1991, shall be commenced within 30 days of June 30, 1991, or within 30 days of the decision by the

local agency, or within the appropriate time periods set by Section 21167 of the Public Resources Code, whichever date is later.

Appendix B
Federal Aviation Administration
Runway Approach Protection Standards

Federal Aviation Regulations
Part 77

Subpart A - General

§77.1 Scope.

This Part-

- (a) Establishes standards for determining obstructions in navigable airspace;
- (b) Sets forth the requirements for notice to the administrator of certain proposed construction or alteration;
- (c) Provides for aeronautical studies of obstructions to air navigation, to determine their effect on the safe and efficient use of airspace;
- (d) Provides for public hearings on the hazardous effect of proposed construction or alteration on air navigation; and
- (e) Provides for establishing antenna farm areas.

§77.2 Definition of terms.

For the purpose of this Part:

"Airport available for public use" means an airport that is open to the general public with or without a prior request to use the airport.

"A seaplane base" is considered to be an airport only if its sea lanes are outlined by visual markers.

"Non-precision instrument runway" means a runway having an existing instrument approach procedure utilizing air navigation facilities with only horizontal guidance, or area type navigation equipment, for which a straight-in non-precision instrument approach procedure has been approved, or planned, and for which no precision approach facilities are planned, or indicated on an FAA planning document or military service military airport planning document.

"Precision instrument runway" means a runway having an existing instrument approach procedure utilizing an Instrument Landing System (ILS), or a Precision Approach Radar (PAR). It also means a runway for which a precision approach system is planned and is so indicated by an FAA approved airport layout plan; a military service approved military airport layout plan; any other FAA planning document, or military service military airport planning document.

"Utility runway" means a runway that is constructed for and intended to be used by propeller driven aircraft of 12,500 pounds maximum gross weight and less.

"Visual runway" means a runway intended solely for the operation of aircraft using visual approach procedures, with no straight-in instrument approach procedure and no instrument designation indicated on an FAA approved airport layout plan, a military service approved military airport layout plan, or by any planning document submitted to the FAA by competent authority.

§77.3 Standards.

(a) The standards established in this Part for determining obstructions to air navigation are used by the Administrator in-

(1) Administering the Federal-aid Airport Program and the Surplus Airport Program;

(2) Transferring property of the United States under Section 16 of the Federal Airport Act;

(3) Developing technical standards and guidance in the design and construction of airports; and

(4) Imposing requirements for public notice of the construction or alteration of any structure where notice will promote air safety.

(b) The standards used by the Administrator in the establishment of flight procedures and aircraft operational limitations are not set forth in this Part but are contained in other publications of the Administrator.

§77.5 Kinds of objects affected.

This Part applies to-

(a) Any object of natural growth, terrain, or permanent or temporary construction or alteration, including equipment or materials used therein, and apparatus of a permanent or temporary character; and

(b) Alteration of any permanent or temporary existing structure by a change in its height (including appurtenances), or lateral dimensions, including equipment or materials used therein.

Subpart B - Notice of Construction or Alteration

§77.11 Scope.

(a) This subpart requires each person proposing any kind of construction or alteration described in §77.13(a) of this chapter to give adequate notice to the Administrator. It specifies the locations and dimensions of the construction or alteration for which notice is required and prescribes the form and manner of the notice. It also requires supplemental notices 48 hours before the start and upon the completion of certain construction or alteration that was the subject of a notice under §77.13(a).

(b) Notices received under this subpart provide a basis for -

(1) Evaluating the effect of the construction or alteration on operational procedures and proposed operational procedures;

(2) Determinations of the possible hazardous effect of the proposed construction or alteration on air navigation;

(3) Recommendations for identifying the construction or alteration in accordance with the current Federal Aviation Administration Advisory Circular AC 70/7460-1 entitled "Obstruction Marking and Lighting," which is available without charge from the Department of Transportation, Distribution Unit, TAD 484.3, Washington, D.C. 20590;

- (4) Determining other appropriate measures to be applied for continued safety of air navigation; and
- (5) Charting and other notification to airmen of the construction or alteration.

§77.13 Construction or alteration requiring notice.

(a) Except as provided in §77.15, each sponsor who proposes any of the following construction or alteration shall notify the Administrator in the form and manner prescribed in §77.17:

(1) Any construction or alteration of more than 200 feet in height above the ground level at its site.

(2) Any construction or alteration of greater height than an imaginary surface extending outward and upward at one of the following slopes:

(i) 100 to 1 for a horizontal distance of 20,000 feet from the nearest point of the nearest runway of each airport specified in subparagraph (5) of this paragraph with at least one runway more than 3,200 feet in actual length, excluding heliports.

(ii) 50 to 1 for a horizontal distance of 10,000 feet from the nearest point of the nearest runway of each airport specified in subparagraph (5) of this paragraph with its longest runway no more than 3,200 feet in actual length, excluding heliports.

(iii) 25 to 1 for a horizontal distance of 5,000 feet from the nearest point of the nearest landing and takeoff area of each heliport specified in subparagraph (5) of this paragraph.

(3) Any highway, railroad, or other traverse way for mobile objects, of a height which, if adjusted upward 17 feet for an Interstate Highway that is part of the National System of Military and Interstate Highways where overcrossings are designed for a minimum of 17 feet vertical distance, 15 feet for any other public roadway, 10 feet or the height of the highest mobile object that would normally traverse the road, whichever is greater, for a private road, 23 feet for a railroad; and for a waterway or any other traverse way not previously mentioned, an amount equal to the height of the highest mobile object that would normally traverse it, would exceed a standard of paragraph (1) or (2) of this section.

(4) When requested by the FAA, any construction or alteration that would be in an instrument approach area (defined in the FAA standards governing instrument approach procedures) and available information indicates it might exceed a standard of Subpart C of this part.

(5) Any construction or alteration on any of the following airports (including heliports):

(i) An airport that is available for public use and is listed in the Airport Directory of the current Airman's Information Manual or in either the Alaska or Pacific Airman's Guide and Chart Supplement.

(ii) An airport under construction, that is the subject of a notice or proposal on file with the Federal Aviation Administration, and, except for

military airports, it is clearly indicated that the airport will be available for public use.

(iii) An airport that is operated by an armed force of the United States.

(b) Each sponsor who proposes construction or alteration that is the subject of a notice under paragraph (a) of this section and is advised by an FAA regional office that a supplemental notice is required shall submit that notice on a prescribed form to be received by the FAA regional office at least 48 hours before the start of the construction or alteration.

(c) Each sponsor who undertakes construction or alteration that is the subject of a notice under paragraph (a) of this section shall, within 5 days after that construction or alteration reaches its greatest height, submit a supplemental notice on a prescribed form to the FAA regional office having jurisdiction over the region involved, if-

(1) The construction or alteration is more than 200 feet above the surface level of its site; or

(2) The FAA regional office advises him that submission of the form is required.

§77.15 Construction or alteration not requiring notice.

No person is required to notify the Administrator for any of the following construction or alteration:

(a) Any object that would be shielded by existing structures of a permanent and substantial character or by natural terrain or topographic features of equal or greater height, and would be located in the congested area of a city, town, or settlement where it is evident beyond all reasonable doubt that the structure so shielded will not adversely affect safety in air navigation.

(b) Any antenna structure of 20 feet or less in height except one that would increase the height of another antenna structure.

(c) Any air navigation facility, airport visual approach or landing aid, aircraft arresting device, or meteorological device, of a type approved by the Administrator, or an appropriate military service on military airports, the location and height of which is fixed by its functional purpose.

(d) Any construction or alteration for which notice is required by any other FAA regulation.

§77.17 Form and time of notice.

(a) Each person who is required to notify the Administrator under §77.13(a) shall send one executed form set (four copies) of FAA Form 7460-1, Notice of Proposed Construction or Alteration, to the [Manager], Air Traffic Division, FAA Regional Office having jurisdiction over the area within which the construction or alteration will be located. Copies of FAA Form 7460-1 may be obtained from the headquarters of the Federal Aviation Administration and the regional offices.

(b) The notice required under §77.13(a)(1) through (4) must be submitted at least 30 days before the earlier of the following dates-

(1) The date the proposed construction or alteration is to begin.

(2) The date an application for a construction permit is to be filed.

However, a notice relating to proposed construction or alteration that is subject to the licensing requirements of the Federal Communications Act may be sent to the FAA at the same time the application for construction is filed with the Federal Communications Commission, or at any time before that filing.

(c) A proposed structure or an alteration to an existing structure that exceeds 2,000 feet in height above the ground will be presumed to be a hazard to air navigation and to result in an inefficient utilization of airspace and the applicant has the burden of overcoming that presumption. Each notice submitted under the pertinent provisions of this Part 77 proposing a structure in excess of 2,000 feet above ground, or an alteration that will make an existing structure exceed that height must contain a detailed showing, directed to meeting this burden. Only in exceptional cases, where the FAA concludes that a clear and compelling showing has been made that it would not result in an inefficient utilization of the airspace and would not result in a hazard to air navigation, will a determination of no hazard be issued.

(d) In the case of an emergency involving essential public services, public health, or public safety that requires immediate construction or alteration, the 30-day requirement in paragraph (b) of this section does not apply and the notice may be sent by telephone, telegraph, or other expeditious means, with an executed FAA Form 7460-1 submitted within five days thereafter. Outside normal business hours, emergency notices by telephone or telegraph may be submitted to the nearest FAA Flight Service Station.

(e) Each person who is required to notify the Administrator by paragraph (b) or (c) of §77.13, or both, shall send an executed copy of FAA Form 117-1, Notice of Progress of Construction or Alteration, to the [Manager], Air Traffic Division, FAA Regional Office having jurisdiction over the area involved.

§77.19 Acknowledgment of notice.

(a) The FAA acknowledges in writing the receipt of each notice submitted under §77.13 (a).

(b) If the construction or alteration proposed in a notice is one for which lighting or marking standards are prescribed in the FAA Advisory Circular AC 70/7460-1 entitled "Obstruction Marking and Lighting", the acknowledgment contains a statement to that effect and information on how the structure should be marked and lighted in accordance with the manual.

(c) The acknowledgment states that an aeronautical study of the proposed construction or alteration has resulted in a determination that the construction or alteration-

(1) Would not exceed any standard of Subpart C and would not be a hazard to air navigation;

(2) Would exceed a standard of Subpart C but would not be a hazard to air navigation; or

(3) Would exceed a standard of Subpart C and further aeronautical study is necessary to determine whether it would be hazard to air navigation, that the sponsor may request within 30 days that further study, and that,

pending completion of any further study, it is presumed the construction or alteration would be a hazard to air navigation.

Subpart C - Obstruction Standards

§77.21 Scope

(a) This subpart establishes standards for determining obstructions to air navigation. It applies to existing and proposed manmade objects, objects of natural growth, and terrain. The standards apply to the use of navigable airspace by aircraft and to existing air navigation facilities, such as an air navigation aid, airport, Federal airway, instrument approach or departure procedure, or approved off-airway route. Additionally, they apply to a planned facility of use, if a proposal therefor is on file with the Federal Aviation Administration or an appropriate military service on the date the notice required by §77.13(a) is filed.

(b) At those airports having defined runways with specially prepared hard surfaces, the primary surface for each such runway extends 200 feet beyond each end of the runway. At those airports having defined strips or pathways that are used regularly for the taking off and landing of aircraft and have been designated by appropriate authority as runways, but do not have specially prepared hard surfaces, each end of the primary surface for each such runway shall coincide with the corresponding end of the runway. At those airports, excluding seaplane bases, having a defined landing and takeoff area with no defined pathways for the landing and taking off of aircraft, a determination shall be made as to which portions of the landing and takeoff pathways. Those pathways so determined shall be considered runways and an appropriate primary surface as defined in §77.25(c) will be considered as being longitudinally centered on each runway so determined, and each end of that primary surface shall coincide with the corresponding end of that runway.

(c) The standards in this subpart apply to the effect of construction or alteration proposals upon an airport if, at the time of filing of the notice is required by §77.13(a), that airport is-

(1) Available for public use and is listed in the Airport Directory of the current Airman's Information Manual or in either the Alaska or Pacific Airman's Guide and Chart Supplement; or,

(2) A planned or proposed airport or an airport under construction, that is the subject of a notice or proposal on file with the Federal Aviation Administration, and, except for military airports, it is clearly indicated that that airport will be available for public use; or,

(3) An airport that is operated by an armed force of the United States.

(d) [Deleted]

§77.23 Standards for determining obstructions.

(a) An existing object, including a mobile object, is, and a future object would be, an obstruction to air navigation if it is of greater height than any of the following heights or surfaces:

(1) A height of 500 feet above ground level at the site of the object.

(2) A height that is 200 feet above ground level or above the established airport elevation, whichever is higher, within 3 nautical miles of the established reference point of an airport, excluding heliports, with its longest runway more than 3,200 feet in actual length, and that height increases in the proportion of 100 feet for each additional nautical mile of distance from the airport up to a maximum of 500 feet.

(3) A height within a terminal obstacle clearance area, including an initial approach segment, a departure area, and a circling approach area, which would result in the vertical distance between any point on the object and an established minimum instrument flight altitude within that area or segment to be less than the required obstacle clearance.

(4) A height within an en route obstacle clearance area, including turn and termination areas, of a Federal airway or approved off-airway route, that would increase the minimum obstacle clearance altitude.

(5) The surface of a takeoff and landing area of an airport or any imaginary surface established under §§77.25, 77.28, or 77.29. However, no part of the takeoff or landing area itself will be considered an obstruction.

(b) Except for traverse ways on or near an airport with an operative ground traffic control service, furnished by an air traffic control tower or by the airport management and coordinated with the air traffic control service, the standards of paragraph (a) of this section apply to traverse ways used or to be used for the passage of mobile objects only after the heights of these traverse ways are increased by:

(1) Seventeen feet for an Interstate Highway that is part of the National System of Military and Interstate Highways where overcrossings are designed for a minimum of 17 feet vertical distance.

(2) Fifteen feet for any other public roadway.

(3) Ten feet or the height of the highest mobile object that would normally traverse the road, whichever is greater, for a private road.

(4) Twenty-three feet for a railroad.

(5) For a waterway or any other traverse way not previously mentioned, an amount equal to the height of the highest mobile object that would normally traverse it.

§77.25 Civil airport imaginary surfaces.

The following civil airport imaginary surfaces are established with relation to the airport and to each runway. The size of each such imaginary surface is based on the category of each runway according to the type of approach available or planned for that runway. The slope and dimensions of the approach surface applied to each end of a runway are determined by the most precise approach existing or planned for that runway end.

(a) Horizontal surface - a horizontal plane 150 feet above the established airport elevation, the perimeter of which is constructed by swinging arcs of specified radii from the center of each end of the primary surface of each runway of each

airport and connecting the adjacent arcs by lines tangent to those arcs. The radius of each arc is:

- (1) 5,000 feet for all runways designated as utility or visual;
- (2) 10,000 feet for all other runways.

The radius of the arc specified for each end of a runway will have the same arithmetical value. That value will be the highest determined for either end of the runway. When a 5,000 foot arc is encompassed by tangents connecting two adjacent 10,000 foot arcs, the 5,000 foot arc shall be disregarded on the construction the perimeter of the horizontal surface.

(b) Conical surface - a surface extending outward and upward from the periphery of the horizontal surface at a slope of 20 to 1 for a horizontal distance of 4,000 feet.

(c) Primary surface - a surface longitudinally centered on a runway. When the runway has a specially prepared hard surface, the primary surface extends 200 feet beyond each end of that runway; but when the runway has no specially prepared hard surface, or planned hard surface, the primary surface ends at each end of that runway. The elevation of any point on the primary surface is the same as the elevation of the nearest point on the runway centerline. The width of a primary surface is:

- (1) 250 feet for utility runways having only visual approaches.
- (2) 500 feet for utility runways having non-precision instrument approaches.
- (3) For other than utility runways the width is:
 - (i) 500 feet for visual runways having only visual approaches.
 - (ii) 500 feet for non-precision instrument runways having visibility minimums greater than three-fourths statute mile.
 - (iii) 1,000 feet for a non-precision instrument runway having a non-precision instrument approach with visibility minimums as low as three fourths of a statute mile, and for precision instrument runways.

The width of the primary surface of a runway will be that width prescribed in this section for the most precise approach existing or planned for either end of that runway.

(d) Approach surface- a surface longitudinally centered on the extended runway centerline and extending outward and upward from each end of the primary surface. An approach surface is applied to each end of each runway based upon the type of approach available or planned for that runway end.

(1) The inner edge of the approach surface is the same width as the primary surface and it expands uniformly to a width of:

- (i) 1,250 feet for that end of a utility runway with only visual approaches;
- (ii) 1,500 feet for that end of a runway other than a utility runway with only visual approaches;
- (iii) 2,000 feet for that end of a utility runway with a non-precision instrument approach;

- (iv) 3,500 feet for that end of a non-precision instrument runway other than utility, having visibility minimums greater than three-fourths of a statute mile;
 - (v) 4,000 feet for that end of a non-precision instrument runway, other than utility, have a non-precision instrument approach with visibility minimums as low as three-fourths statute mile; and
 - (vi) 16,000 feet for precision instrument runways.
- (2) The approach surface extends for a horizontal distance of:
- (i) 5,000 feet at a slope of 20 to 1 for all utility and visual runways;
 - (ii) 10,000 feet at a slope of 34 to 1 for all non-precision instrument runways other than utility; and,
 - (iii) 10,000 feet at a slope of 50 to 1 with an additional 40,000 feet at a slope of 40 to 1 for all precision instrument runways.
- (3) The outer width of an approach surface to an end of a runway will be that width prescribed in this subsection for the most precise approach existing or a planned for that runway end.
- (e) *Transitional surface*- These surfaces extend outward and upward at right angles to the runway centerline and the runway centerline extended at a slope of 7 to 1 from the sides of the primary surface and from the sides of the approach surfaces. Transitional surfaces for those portions of the precision approach surface which project through and beyond the limits of the conical surface, extend a distance of 5,000 feet measured horizontally from the edge of the approach surface and at right angles to the runway centerline.

§77.27 [Revoked]

§77.28 Military airport imaginary surfaces.

- (a) *Related to airport reference points.* These surfaces apply to all military airports. For the purposes of this section a military airport is any airport operated by an armed force of the United States.
- (1) *Inner horizontal surface*- A plane is oval in shape at a height of 150 feet above the established airfield elevation. The plane is constructed by scribing an arc with a radius of 7,500 feet about the centerline at the end of each runway and interconnecting these arcs with tangents.
 - (2) *Conical surface*- A surface extending from the periphery of the inner horizontal surface outward and upward at a slope of 20 to 1 for a horizontal distance of 7,000 feet to a height of 500 feet above the established airfield elevation.
 - (3) *Outer horizontal surface*- A plane, located 500 feet above the established airfield elevation, extending outward from the outer periphery of the conical surface for a horizontal distance of 30,000 feet.
- (b) *Related to runways.* These surfaces apply to all military airports.
- (1) *Primary surface*- A surface located on the ground or water longitudinally centered on each runway with the same length as the runway. The width of the primary surface for runways is 2,000 feet. However, at established bases where substantial construction has taken

place in accordance with a previous lateral clearance criteria, the 2,000 foot width may be reduced to the former criteria.

(2) *Clear zone surface*- A surface located on the ground or water at each end of the primary surface, with a length of 1,000 feet and the same width as the primary surface.

(3) *Approach clearance surface*- An inclined plane, symmetrical about the runway centerline extended, beginning 200 feet beyond each end of the primary surface at the centerline elevation of the runway end and extending for 50,000 feet. The slope of the approach clearance surface is 50 to 1 along the runway centerline extended until it reaches an elevation of 500 feet above the established airport elevation. It then continues horizontally at this elevation to a point 50,000 feet from the point of beginning. The width of this surface as the runway end is the same as the primary surface, it flares uniformly, and the width at 50,000 is 16,000 feet.

(4) *Transitional surfaces*- These surfaces connect the primary surfaces, the first 200 feet of the clear zone surfaces, and the approach clearance surfaces to the inner horizontal surface, conical surface, outer horizontal surface or other transitional surfaces. The slope of the transitional surface is 7 to 1 outward and upward at right angles to the runway centerline.

§77.29 Airport imaginary surfaces for heliports.

(a) *Heliport primary surface*. The area of the primary surface coincides in size and shape with the designated takeoff and landing area of a heliport. This surface is a horizontal plane at the elevation of the established heliport elevation.

(b) *Heliport approach surface*. The approach surface begins at each end of the heliport primary surface with the same width as the primary surface, and extends outward and upward for a horizontal distance of 4,000 feet where its width is 500 feet. The slope of the approach surface is 8 to 1 for civil heliports and 10 to 1 for military heliports.

(c) *Heliport transitional surfaces*. These surfaces extend outward and upward from the lateral boundaries of the heliport primary surface and from the approach surfaces at a slope of 2 to 1 for a distance of 250 feet measured horizontally from the centerline of the primary and approach surfaces.

(December 1993, Airport Land Use Planning Hand Book).

**Airport Design Standards
FAA Advisory Circular No. 150/5300-13**

Table 2-4. Approach surface dimensions

Facilities Expected To Serve	Runway End		Approach Surface Dimensions			
	Approach End	Opposite End	Length feet (meters)	Inner Width feet (meters)	Outer Width feet (meters)	Slope run/rise
Only	V	V	5,000	250	1,250	20:1
		NP	5,000 (1,500)	500 (150)	1,250 (375)	20:1
Small		NP 3/4	5,000 (1,500)	1,000 (300)	(1,250) (375)	20:1
	NP	V NP	5,000 (1,500)	500 (150)	2,000 (600)	20:1
Airplanes		NP 3/4 P	5,000 (1,500)	1,000 300	2,000 (600)	20:1
	V	V NP	5,000 (1,500)	500 (150)	1,500 450	20:1
Large		NP 3/4 P	5,000 (1,500)	1,000 (300)	1,500 (450)	20:1
	Airplanes	NP	10,000 (3,000)	500 (150)	3,500 (1,050)	34:1
Large		NP 3/4 P	10,000 (3,000)	1,000 (300)	3,500 (1,050)	34:1
	or	NP 3/4 V NP NP 3/4 P	10,000 (3,000)	1,000 (300)	4,000 (1,200)	34:1
Only	P	V	10,000 (3,000)	1,000 (300)	4,000 (1,200)	50:1
Small		NP NP 3/4	PLUS 40,000 (12,000)	4,000 (1,200)	16,000 (4,800)	40:1
Airplanes		P	40,000 (12,000)	4,000 (1,200)	16,000 (4,800)	40:1

V- Visual approach
 NP- Non-precision instrument approach with visibility minimums more than 3/4 statute mile
 NP 3/4- Non-precision instrument approach with visibility minimums as low as 3/4 statute mile
 P- Precision instrument approach

Table 2-5. Runway protection zone (RPZ) dimensions

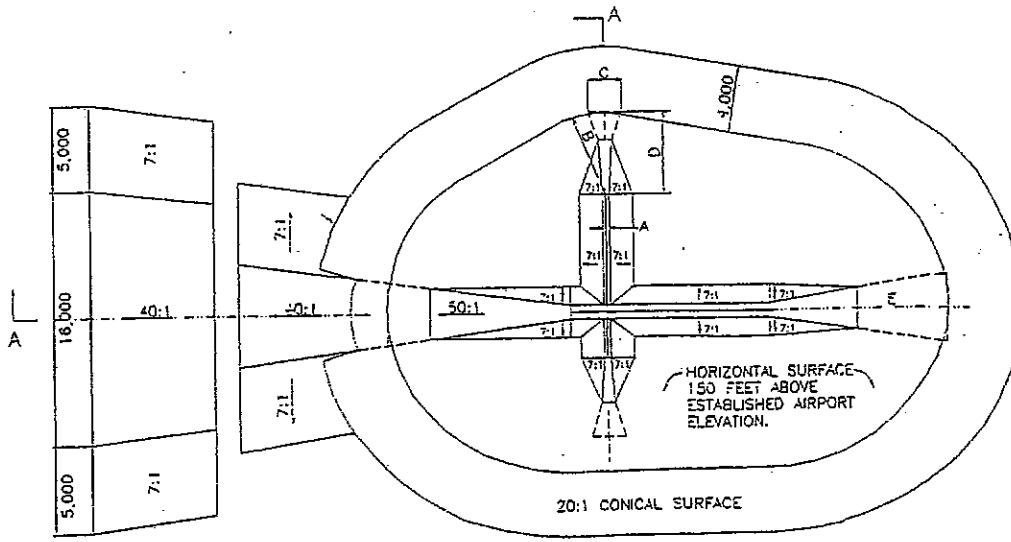
Facilities Expected To Serve	Approach End	Runway End		Dimensions for Approach End		RPZ acres
		Opposite End	Length L feet (meters)	Inner Width W1 feet (meters)	Outer Width W2 feet (meters)	
Only Small Airplanes	V	V	1,000 (300)	250 (75)	450 (135)	8.035
		NP	1,000 (300)	500 (150)	650 (195)	13,200
		NP 3/4 P	1,000 (300)	1,000 (300)	1,050 (315)	23.542
	NP	V	1,000 (300)	500 (150)	800 (240)	14,922
		NP	1,000 (300)	1,000 (300)	1,200 (360)	25.252
		NP 3/4 P	1,000 (300)	1,000 (300)	1,200 (360)	25.252
Large Airplanes	V	V	1,000 (300)	500 (150)	700 (210)	13,770
		NP	1,000 (300)	1,000 (300)	1,100 (330)	24.105
		NP 3/4 P	1,000 (300)	1,000 (300)	1,100 (330)	24.105
Large or Only Small Airplanes	NP	V	1,700 (510)	500 (150)	1,010 (303)	29.465
		NP	1,700 (510)	1,000 (300)	1,425 (427.5)	47,320
		NP 3/4 P	1,700 (510)	1,000 (300)	1,425 (427.5)	47,320
Large or Only Small Airplanes	NP 3/4	V	1,700 (510)	1,000 (300)	1,510 (453)	48.978
		NP	1,700 (510)	1,000 (300)	1,510 (453)	48.978
		NP 3/4 P	1,700 (510)	1,000 (300)	1,510 (453)	48.978
Large or Only Small Airplanes	P	V	2,500 (750)	1,000 (300)	1,750 (525)	78,914
		NP	2,500 (750)	1,000 (300)	1,750 (525)	78,914
		NP 3/4 P	2,500 (750)	1,000 (300)	1,750 (525)	78,914

V- Visual Approach

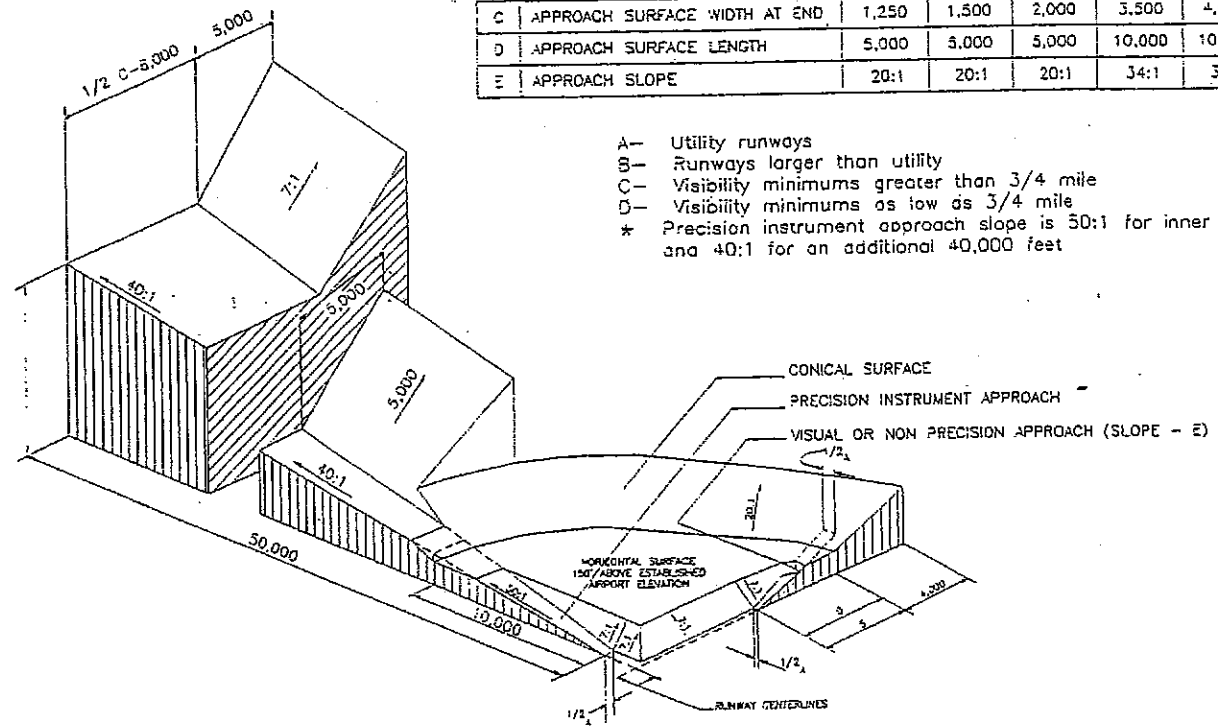
NP- Non-precision instrument approach with visibility minimums more than 3/4 statute mile.

NP 3/4- Non-precision instrument approach with visibility minimums as low as 3/4 statute mile.

P- Precision instrument approach



D I M	I T E M	D I M E N S I O N A L S T A N D A R D S (F E E T)					
		V I S U A L R U N W A Y		N O N - P R E C I S I O N I N S T R U M E N T A P P R O A C H			P R E C I S I O N I N S T R U M E N T R U N W A Y
		A	B	A	B		
					C	D	
A	W I D T H O F P R I M A R Y S U R F A C E A N D A P P R O A C H S U R F A C E , W I D T H A T I N N E R E N D	250	500	500	500	1,000	1,000
B	R A D I U S O F H O R I Z O N T A L S U R F A C E	5,000	5,000	5,000	10,000	10,000	10,000
		V I S U A L A P P R O A C H		N O N - P R E C I S I O N I N S T R U M E N T A P P R O A C H			P R E C I S I O N I N S T R U M E N T A P P R O A C H
		A	B	A	B		
C	A P P R O A C H S U R F A C E W I D T H A T E N D	1,250	1,500	2,000	3,500	4,000	16,000
D	A P P R O A C H S U R F A C E L E N G T H	5,000	5,000	5,000	10,000	10,000	*
E	A P P R O A C H S L O P E	20:1	20:1	20:1	34:1	34:1	*



- A- Utility runways
- B- Runways larger than utility
- C- Visibility minimums greater than 3/4 mile
- D- Visibility minimums as low as 3/4 mile
- * Precision instrument approach slope is 50:1 for inner 10,000 feet and 40:1 for an additional 40,000 feet

ISOMETRIC VIEW OF SECTION A-A
 § 7725 CIVIL AIRPORT MAGINARY SURFACES

FAA Runway Approach Protection Standards
 Objects Affecting Navigable Airspace

Appendix B
FIGURE B-1
 airport land use compatibility plan

Notice of Proposed Construction or Alteration

FAA Form 7460

NOTICE OF PROPOSED CONSTRUCTION OR ALTERATION			Aeronautical Study Number
US Department of Transportation Federal Aviation Administration			
1. Nature of Proposal		2. Complete Description of Structure	
A Type <input type="checkbox"/> New Construction <input type="checkbox"/> Alteration	B Class <input type="checkbox"/> Permanent <input type="checkbox"/> Temporary (Duration _____ months)	C Work Schedule Dates Beginning _____ End _____	A Include effective radiated power and assigned frequency of all existing proposed or modified AM FM or TV broadcast stations utilizing this structure. B Include size and configuration of power transmission towers and their supporting towers in the vicinity of FAA facilities and public airports. C Include information showing site orientation dimensions and construction materials of the proposed structure.
3A. Name and address of individual, company, corporation, etc. proposing the construction or alteration. (Number Street City State and Zip Code) (_____) Area code _____ Telephone Number _____		(if more space is required continue on a separate sheet)	
B Name address and telephone number of proponent's representative if different than 3 above			
4. Location of Structure		5. Height and Elevation (Complete to the nearest foot)	
A Coordinates To nearest second Latitude _____ Longitude _____	B Nearest City or Town and State (1) Distance to 48 _____ Miles (2) Direction to 48 _____	C Name of nearest airport heliport flightport, or seaplane base (1) Distance from structure to nearest point of nearest runway _____ (2) Direction from structure to airport _____	A Elevation of site above mean sea level _____ B Height of Structure including all appurtenances and lighting (if any) above ground or water if so situated _____ C Overall height above mean sea level (A B) _____
C Description of location of site with respect to highways streets airports prominent terrain features existing structures etc. Attach a U.S. Geological Survey quadrangle map or equivalent showing the relationship of construction site to nearest airport(s) (if more space is required continue on a separate sheet of paper and attach to this notice)			
Notice is required by Part 77 of the Federal Aviation Regulations 14 C.F.R. Part 77 pursuant to Section 1101 of the Federal Aviation Act of 1958 as amended 749 U.S.C. 1107. Persons who knowingly and willfully violate the Notice requirements of Part 77 are subject to a fine (criminal penalty) of not more than \$500 for the first offense and not more than \$2,000 for subsequent offenses pursuant to Section 302(a) of the Federal Aviation Act of 1958 as amended 149 U.S.C. 1472(a).			
I HEREBY CERTIFY that all of the above statements made by me are true, complete, and correct to the best of my knowledge. In addition, I agree to obstruction mark and/or light the structure in accordance with established marking & lighting standards if necessary.			
Date	Typed Name/Title of Person Filing Notice	Signature	
FOR FAA USE ONLY		FAA will either return this form or issue a separate acknowledgement.	
The Proposal: <input type="checkbox"/> Does not require a notice to FAA. <input type="checkbox"/> Is not identified as an obstruction under any standard of FAR, Part 77, Subpart C, and would not be a hazard to air navigation. <input type="checkbox"/> Is identified as an obstruction under the standards of FAR, Part 77, Subpart C, but would not be a hazard to air navigation. <input type="checkbox"/> Should be obstruction _____ marked, _____ lighted per FAA Advisory Circular 70/7460-1, Chapter (s) _____ <input type="checkbox"/> Obstruction marking and lighting are not necessary.		Supplemental Notice of Construction FAA Form 7460-2 is required any time the project is abandoned, or <input type="checkbox"/> At least 48 hours before the start of construction. <input type="checkbox"/> Within five days after the construction reaches its greatest height. This determination expires on _____ unless: (a) the construction is subject to the licensing authority of the Federal Communications Commission and an application for a construction permit is made to the FCC on or before the above expiration date. In such case the determination expires on the date prescribed by the FCC for completion of construction, or on the date the FCC denies the application. NOTE: Request for extension of the effective period of this determination must be postmarked or delivered to the issuing office at least 15 days prior to the expiration date. If the structure is subject to the licensing authority of the FCC, a copy of this determination will be sent to that agency.	
Remarks:	Signature		Date

FAA Form

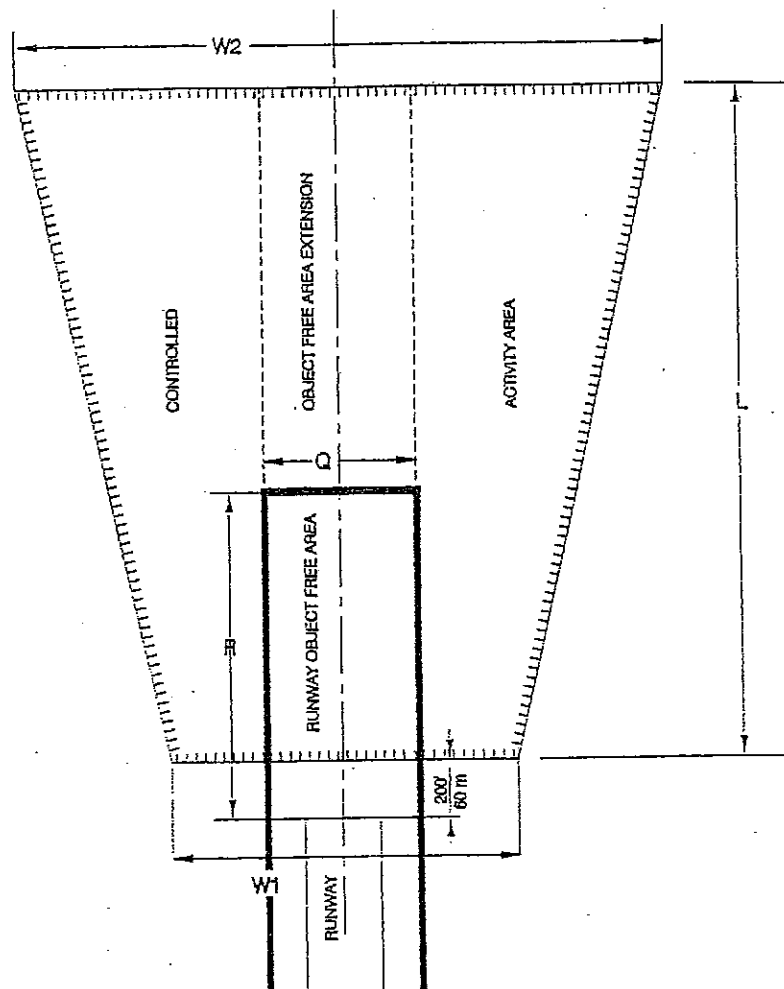
FAA Runway Approach Protection Standards

Notice of Proposed Construction or Alteration

Appendix B

FIGURE B-2

airport land use compatibility plan



NOTE: See Table 2-5 for dimensions $W1$, $W2$, L
 See Tables 3-1 through 3-3 for dimensions R , Q

Appendix C Methods for Determining Concentrations of People

One criterion used in the *Airport Land Use Compatibility Plan* is the maximum number of people per acre that can be present in a given area at any one time. If a proposed use exceeds the maximum density, it will be considered inconsistent with ALUC policies. This appendix provides some guidance on how to make the people-per-acre determination.

The most difficult part of making a people-per-acre determination is estimating the number of people likely to use a particular facility. There are several methods that can be utilized, depending upon the nature of the proposed use:

- **Parking Ordinance** - The number of people present in a given area can be calculated based upon the number of parking spaces provided. Some assumption regarding the number of people per vehicle needs to be developed to calculate the number of people on-site. The number of people per acre can then be calculated by dividing the number of people on-site by the size of the parcel in acres. This approach is appropriate where the use is expected to be dependent upon access by vehicles.
- **Maximum Occupancy** - The Uniform Building Code can be used as a standard for determining the maximum occupancy of certain uses. The chart provided as Exhibit C-1 is taken from the 1976 edition of the UBC (Table 33-A) and indicates the required number of square feet per occupant with changes from 1991 UBC shown. The number of people on the site can be calculated by dividing the total floor area of a proposed use by the minimum square feet per occupant requirement listed in the table. The maximum occupancy can then be divided by the size of the parcel in acres to determine the people per acre.

Surveys of actual occupancy levels conducted by the City of Sacramento have indicated that many retail and office uses are generally occupied at 50% of their maximum occupancy levels, even at the busiest times of day. Therefore, the number of people calculated for office and retail uses should be adjusted (50%) to reflect the actual occupancy levels before making the final people-per-acre determination.

- **Survey of Similar Uses** - Certain uses may require an estimate based upon a survey of similar uses. This approach is more difficult, but is appropriate for uses which, because of the nature of the use, cannot be reasonably estimated based upon parking or square footage.

Exhibit C1

Occupancy Levels

Uniform Building Code

	Minimum Use	Square Feet per Occupant
1.	Aircraft Hangars (no repair)	500
2.	Auction Room	7
3.	Assembly Areas, Concentrated Use (without fixed seats) Auditoriums Bowling Alleys (assembly areas) Churches and Chapels Dance Floors Lodge Rooms Reviewing Stands Stadiums	7
4.	Assembly Areas, Less Concentrated Use Conference Rooms Dining Rooms Drinking Establishments Exhibit Rooms Gymnasiums Lounges Skating Rinks Stages	15
5.	Children's Homes Homes for the Aged	80
6.	Classrooms	20
7.	Dormitories	50
8.	Dwellings	300
9.	Garage, Parking	200
10.	Hospitals and Sanitariums Nursing Homes	80
11.	Hotels and Apartments	200
12.	Kitchen - Commercial	200
13.	Library Reading Room	50
14.	Locker Rooms	50
15.	Mechanical Equipment Room	300

Appendix D

Compatibility Guidelines for Specific Land Uses

The compatibility evaluations listed below for specific types of land uses can be used by local jurisdictions as guidelines in implementation of the general compatibility criteria listed in Table 2A. These evaluations are not regarded as adopted policies or criteria of the Imperial County Airport Land Use Commission. In case of any conflicts between these evaluations of specific land uses and the policies and criteria in Chapter 2 of this document, the contents of Chapter 2 shall prevail.

Land Use Compatibility Zones

<i>Agricultural Uses</i>	A	B1/B2	C	D
Truck and Specialty Crops	0	+	+	+
Field Crops	0	+	+	+
Pasture and Rangeland	0	+	+	+
Orchard and Vineyards	-	+	+	+
Dry Farm and Grain	0	+	+	+
Tree Farms, Landscape Nurseries and Greenhouses	-	0	+	+
Fish Farms	-	0	+	+
Feed Lots and Stockyards	-	0	+	+
Poultry Farms	-	0	+	+
Dairy Farms	-	0	+	+
 <i>Natural Uses</i>				
Fish and Game Preserves	0	0	0	0
Land Preserves and Open Space	0	+	+	+
Flood and Geological Hazard Areas	0	+	+	+
Waterways: Rivers, Creeks, Canals, Wetlands, Bays, Lakes	0	0	0	+

-	Incompatible
0	Potentially compatible with restrictions
+	Compatible

Land Use Compatibility Zones

	<u>A</u>	<u>B1/B2</u>	<u>C</u>	<u>D</u>
Residential and Institutional				
Rural Residential - 10 acres or more	-	0	+	+
Low Density Residential - 2 to 10 acre lots	-	0/+	+	+
Single Family Residential - lots under 2 acres	-	-	0	+
Multi Family Residential	-	-	0	+
Mobile Home Parks	-	-	0	+
Schools, Colleges and Universities	-	-	-	+
Day Care Centers	-	-	0	+
Hospitals and Residential Care Facilities	-	-	-	+
Recreational				
Golf Course	0	+	+	+
Parks - low intensity; no group activities	0	+	+	+
Playgrounds and Picnic Areas	-	0	+	+
Athletic Fields	-	0	+	+
Riding Stables	-	0	+	+
Marinas and Water Recreation	-	0	+	+
Health Clubs and Spas	-	-	0	+
Tennis Courts	-	0	+	+
Swimming Pools	-	0	0	+
Fairgrounds and Race Tracks	-	-	-	+
Resorts and Group Camps-	-	-	0	+
Industrial				
Research and Development Laboratories	-	0	+	+
Warehouses and Distribution Facilities	-	0	+	+
Manufacturing and Assembly	-	0	0	+
Cooperage and Bottling Plants	-	0	+	+
Printing, Publishing and Allied Services	-	0	+	+
Chemical, Rubber and Plastic Products	-	-	0	+
Food Processing	-	-	+	0

-
0
+

Incompatible
Potentially compatible with restrictions
Compatible

Land Use Compatibility Zones

	A	B1/B2	C	D
Commercial Uses				
Large Shopping Malls (500,000+ sq.ft.)	-	-	0	+
Retail Stores (one story)	-	0	0	+
Retail Stores (two story)	-	-	0	+
Restaurants and Drinking Establishments (no take out)	-	0	0	+
Food Take-Outs	-	-	0	+
Auto and Marine Services	-	0	+	+
Building Materials, Hardware and Heavy Equipment	-	0	+	+
Office Buildings (one story)	-	0	+	+
Multiple-story Retail, Office, and Financial	-	-	0	+
Banks and Financial Institutions	-	0	+	+
Repair Services	-	0	+	+
Gas Stations	-	0	+	+
Government Services/Public Buildings	-	0	+	+
Motels (one story)	-	0	0	+
Hotels and Motels (two story)	-	-	0	+
Theaters, Auditoriums, and Assembly Halls	-	-	0	+
Outdoor Theaters	-	-	0	+
Memorial Parks/Cemeteries	-	+	+	+
Truck Terminals	-	+	+	+
Transportation, Communications, and Utilities				
Automobile Parking	0	+	+	+
Highway & Street Right-of-ways	0	+	+	+
Railroad and Public Transit Facilities	0	+	+	+
Taxi, Bus & Train Terminals	-	0	+	+
Reservoirs	-	0	0	+
Power Lines	-	0	0	+
Water Treatment Facilities	-	0	+	+
Sewage Treatment and Disposal Facilities	-	0	0	+
Electrical Substations	-	0	0	+
Power Plants	-	-	0	+
Sanitary Landfills	-	-	-	0

- Incompatible
0 Potentially compatible with restrictions
+ Compatible