Chapter 7
Land Use
Master Plan Update

Nogales International Airport
Santa Cruz County

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CHAPTER 7 LAND USE ANALYSIS

7.1 INTRODUCTION

The purpose of the Nogales International Airport land use analysis is to document the anticipated impacts of airport improvements on the land within the airport boundary, on adjacent properties, and on the community as a whole. Both on-and off-airport land use planning is important.

On-airport land use planning efforts should strive to effectively and efficiently distribute available land to various airport functions to meet future airport development goals and objectives. Off-airport planning should ensure that proper protection of the airport environs is established and maintained by clearly identifying compatible/incompatible land uses.

7.2 ON-AIRPORT LAND USE

The on-airport Land Use Plan for Nogales International Airport adopts general FAA criteria for the use of airport property (FAA Advisory Circular 150/5070-6A, Airport Master Plans):

- Adherence to standards in support of safe aircraft operations.
- Non-interference with line of sight or other restrictions for navigation aids and weather equipment.
- Use of existing facilities, to the extent possible, depending on their location, condition, and obligations with respect to their use.
- Consideration of topography and available infrastructure that might affect development costs.
- Flexibility in accommodating changes in demand and expansion.
- Effective and safe ground circulation for aircraft and vehicles.

In Chapter 8, Airport Plans, Section 8.7 and ALP drawing P9 the Land Use Plan for Nogales International Airport is illustrated. The plan depicts proposed and contingency development land uses similar to the land uses identified earlier in Chapter 5, Alternatives Analysis. There are seven primary categories of on-airport land use plus an eighth category defined as "aviation reserve" which does not reflect any specific proposed development. These land use designations and their associated acreages are presented in Table 7-1. As shown, the land use areas are defined as "proposed development" to accommodate the projected 20-year aviation demand, and "contingent development" to accommodate any unanticipated demand as well as demand beyond 2020.

Table 7-1 On-Airport Land Use Designations and Acreages

Description	Proposed Development (acres)	Contingent Development (acres)
Airfield Operating Area	242	same area
General Aviation (GA)	13	+9
Cargo	2	+57
U.S. Customs/Border Patrol	1	+10
Terminal Area	1	+3
FBO/Flight School	1	+2
Aviation Compatible Industrial Park	14	same area
Aviation Reserve		+24

7.2.1 Airfield Operating Area/Critical Area (Fixed Wing and Rotorcraft)

The highest priority use for airport land is present and future air operations. This category includes runways, taxiways, aprons, navigation aids, and their associated clearances. The boundary of the air operations land use falls inside of the Building Restriction Line (BRL) on both sides of the airfield. For Nogales, BRL is defined by the 7:1 transitional surface off of the 500 foot-wide primary surface of Runway 3-21, the existing and future taxiway object free areas, and the TVOR/DME critical area. The BRL allows buildings to a height of approximately 34 feet on the East Side and 28 feet on the West Side.

The runway protection zones (RPZs) are included in the airfield operating area land use designation. Although the trapezoidal RPZs at the end of each runway should not contain buildings, some ancillary land uses other than air operations are permitted within the RPZ. However, such uses should be outside of all object free areas. Further, the uses should not attract wildlife or interfere with navigational aids. Automobile parking is discouraged, but permitted. Fuel storage, residences, and places of public assembly should not be located in the RPZ. The RPZs at Nogales International Airport are clear with the exception of a roadway easement that crosses Runway 3 end's RPZ and the airport fence line that crosses both Runway 3 and 21 end RPZs. The proposed airport perimeter roadway will be constructed in the RPZ and will require the relocation of the existing roadway easement to the south. The existing roadway belongs to the adjacent property owner.

It is also important to note that although a large portion of this land use area is associated with the TVOR/DME Critical Area, the County recognizes that the FAA plans to decommission this type of navigational equipment in the future as GPS technology is refined and more progressively implemented airport-system wide. Therefore, the County has identified this area

with a secondary/alternative land use designation of aviation reserve so this parcel may be developed as cargo or any other aviation-related function demand dictates in the future.

7.2.2 General Aviation (GA)

For the purpose of the land use analysis, GA includes all of the existing and proposed hangar development that does not belong to the FBO, U.S. Customs/Border Patrol agencies, and cargo/passenger service operators. GA does include both private and corporate GA development. Existing GA hangars are located south of the terminal area on the West Side of the airport. Future GA hangar development and additional based aircraft tiedowns are planned in the same area and to the south. Maintaining this development in a contiguous area and near the terminal area simplifies future taxilane development, utility expansion, and overall management of facilities by separating various airport activities. As shown in Table 7-1, airport property identified for both proposed and contingent GA land use total approximately 22 acres.

7.2.3 Cargo

Cargo area development includes staging areas, warehouses, truck loading docks, and associated auto parking spaces in support of the transport of commercial cargo. All future cargo development through 2020 is proposed on the West Side. Long-term or contingency development of cargo is proposed on the East Side. However, the West Side can accommodate some additional cargo development beyond the demand anticipated through 2020.

7.2.4 U.S. Customs/Border Patrol

The U.S. Customs/Border patrol land use designation is located between the Terminal and FBO/Flight School land uses. This land use is identified for inspection of passengers, aircraft, crewmembers, baggage, and cargo. As shown earlier on Exhibit 5-7 in Chapter 5, land is also reserved on the East Side of the airport for U.S. Customs/ Border Patrol to accommodate the possible long-term relocation of cargo to that area.

7.2.5 Terminal Area

The terminal land use area is generally located near the midpoint of Runway 3-21 on the West Side of the airport. This land use consists of approximately four acres for the existing terminal building, proposed and contingent expansion, terminal area parking, and portion of airport access.

7.2.6 FBO/Flight School

The FBO/Flight School land use area is a separate designation from the terminal area in an effort to specifically identify future expansion needs of the fixed wing and rotorcraft training activity as well as aircraft maintenance, fueling support and administrative expansion plans. The FBO/Flight School land use is defined as a 1-acre area just north of the US Customs/Border patrol land use area with an additional 3-acre parcel for contingent development.

7.2.7 Aviation Compatible Industrial Park

The Aviation-compatible Industrial Park land use designation includes a total of 14 acres. The Industrial Park boundary was previously established by the County in the early 1990's. The Economic Development Administration (EDA) provided the County with a grant to fund infrastructure development such as the utility lines for this site. While this property is identified for aviation-compatible development, the EDA grant assurances also specify other conditions for the use of this property.

7.2.8 Open

The "Aviation Reserve" land use designation is defined for the possible development of any aviation-related facility depending on demand. This property is currently committed for the TVOR/DME critical area. However, the decommissioning of this facility with the progressive implementation of GPS technology will free much of this area for development.

7.3 LAND ACQUISITION AND CONTROL

Nogales International Airport has insufficient control of property adjacent to the airport boundary to effectively protect and develop the airport during the planning period and beyond.

Three parcels on the East Side of the airport have been identified for land acquisition. These parcels are identified on the Airport Property Map in Chapter 8. The southernmost parcel is a small triangular parcel that runs from the AOA land use along the existing airport boundary adjacent to the proposed Contingency Cargo Development Area. The northernmost parcel is also small and fairly triangular in shape and is nearly an island parcel surrounded by airport-owned land. Further, the parcel overlies the proposed eastside parallel taxiway. The largest and most central tract on the East Side contains 28 acres. This parcel contains a plateau surrounded by downward sloping terrain. The acquisition of this parcel will accommodate the contingency/ultimate development on the East Side such as access, auto parking, and additional cargo development.

Further, the airport has insufficient control of the outermost portion of the RPZ off Runway 3 end. Per FAA guidelines, this area should be controlled in fee simple or avigation easement. This parcel is proposed for avigation easement acquisition. There is also a roadway easement for a private property owner adjacent to the airport that runs through the Runway 3 RPZ. It is recommended that this easement be terminated when the perimeter roadway is constructed off the Runway 3 end since the perimeter roadway is proposed to be separated by fencing from the airport.

7.4 OFF-AIRPORT LAND USE

The primary purpose of off-airport land use planning is to ensure that the airport environs are developed in a safe and compatible manner to minimize the impacts of aircraft activity on the surrounding community.

Noise and airspace are the most prevalent off-airport land use concerns. Further, development and activities near the airport should not emit smoke, produce glare, produce electromagnetic interference that could affect radio navigation and approach aids, nor attract wildlife, so that they do not interfere with aviation activity.

According to FAA Order 7400.2C, "When airport design standards are combined with appropriate state and local zoning ordinances, the resultant effect will: assure the lowest possible operational altitudes for aircraft; protect the economic investment in the airport; and promote safety in the areas affected by the airport by assuring, through proper development, land use most beneficial to the community."

Currently, Nogales International Airport's immediate environs are compatible. However, many airports nationwide, both GA and commercial service, have been impacted by airspace penetrations and residential encroachment after once having the same compatible environs as Nogales.

The following three topics in this section address the importance of and straightforward approach to off-airport land use planning as well as the negative impacts associated with its disregard:

- Airspace
- Airport Influence Area
- Noise

7.4.1 Airspace

Airspace protection is important to the safety of pilots as well as people and property on the ground. The airspace drawing in the Airport Layout Plan drawing set (see Chapter 8) indicates the sloped imaginary approach, departure, and transitional surfaces that define the airspace that should remain unobstructed by structures, vegetation, or terrain. Further, consideration of any future development plans adjacent to the airport should include the submittal of an FAA Form 7460-1, Notice of Proposed Construction, to allow the FAA the opportunity to review its potential adverse impact on the airspace surrounding the airport.

In addition to coordinating proposed construction in the vicinity of an airport, it's important to identify existing airspace penetrations. This process should include the proper published notification to all pilots that the airspace obstruction exists and, when feasible, proper obstruction lighting.

As identified in the Approach Plan and Profile drawing for Runway 21, significant rising terrain existing to the north of the airport dictates the location of the displaced threshold on this runway.

7.4.2 Airport Influence Area

The Nogales International Airport is located six miles northeast of the City with the closest residential areas located approximately one mile off of Runway 3 end southwest of the airport. Two other small residential areas as well as a school lie between 1½ and 1¾ miles southwest of

the airport. Although no significant residential development exists around the airport boundary, it is important to protect the airport environs in the long-term.

In August of 1998, Santa Cruz County passed an ordinance that established an airport influence area that the County formally titled an "Airport District Overlay Zone" or ADOZ. The ordinance states that the "...purpose of the establishment of the ADOZ is the encouragement of compatible land uses in the vicinity of airports and the promotion of public health and safety of the general public and the welfare and safety of airport..."

The ADOZ extends approximately one mile from either side of the runway as well as one mile off both runway ends. Generally, the ADOZ ordinance acknowledges and includes the FAR Part 77 airspace surfaces and the noise zones defined in terms of the noise contours. It also states that whenever the ALP is amended, the Airport Environs Plan Area Map shall also be deemed amended. The Planning and Zoning Department of Santa Cruz County is the agency responsible for administering the ordinance.

The ADOZ ordinance, shown as an overlay on the off-airport land use plan in Chapter 8, is similar to the adoption of an Airport Influence Area (AIA) in accordance with House Bill 2491. This legislation gave airport owners the ability to designate an area around the airport, which is exposed to noise and overflights as determined by the airport owner or operator. Arizona Department of Transportation, Aeronautics Division, recommended that this area be based on the airport traffic patterns as defined in FAA guidance. The ADOZ defined for Nogales International is similar to this traffic pattern.

Also shown on the off-airport land use plan in Chapter 8 is the zoning around the airport. Santa Cruz has primarily designated the airport environs as General Rural (GR) which means the property is zoned to accommodate one residence per 180,000 square feet (4.1 acres) with a lifestyle of rural nature (to include animals and agriculture). While this is a low-density residential zoning, it still allows residential development in the immediate vicinity of the airport boundaries. An area southwest of the airport (off extended centerline for Runway 3) is zoned as Suburban Ranch, which allows higher residential density with one residence per 72,000 square feet (1.7 acres). An area to the east of the airport is zoned as Light Industrial (M1). Light industrial development adjacent to the airport is considered compatible with airport operations. The ADOZ ordinance will provide close monitoring of all proposed development, particularly residential, in this area.

7.4.3 Noise

As described earlier, the primary cause of incompatibility between an airport and the surrounding community is aircraft noise. Noise-sensitive development often surrounds an airport before the problem is recognized. Noise is a major source of environmental pollution and represents a threat to the serenity and quality of life for those individuals exposed to it.

The degree of which people will suffer from the nuisance of aircraft noise varies depending on their activities at any given time. While people are less disturbed by noise when they are driving, working, or shopping, they are more disturbed when they are at home. Many residents living near airports already complain that aircraft noise is disturbing regardless of whether their home is inside what is considered an incompatible "noise contour" around an airport.

While FAA has published noise compatibility guidelines, they explicitly state that determination of noise compatibility and regulation of land use are purely local responsibilities. There are variations in human tolerance to aircraft noise. For example, it may be tolerated more by people living in a noisier urban environment than by people living in rural communities.

Methodology

To define the effect of aircraft-generated noise on a community, an effective and appropriate measure of cumulative noise exposure is needed. The Federal Aviation Administration Integrated Noise Model (INM 6.0c) was used to measure noise in this study. The Integrated Noise Model, over a 24-hour period, accounts for separate aircraft flying along flight tracks identified as straight-line or curved segments. These flight tracks are coupled with other data relating to noise, slant range, and engine thrust for each distinct aircraft type in the fleet mix to provide a cumulative measure of daily noise, with a penalty for nighttime aircraft activity (Day-Night Sound Level [DNL] metric). This methodology is consistent with existing measurement technologies. This methodology has been adopted by the FAA in response to the requirements of the Airport Safety and Noise Abatement Act of 1979 for a standardized noise system and is also recognized by the Environmental Protection Agency (EPA), and the Department of Housing and Urban Development (HUD) as an appropriate measure of cumulative noise exposure.

Noise is expressed as the Day-Night Average Sound Level, or DNL (formerly referred to as Ldn). DNL is the national standard accepted by the FAA for describing cumulative noise exposure and identifying noise/land use compatibility issues. DNL is the average noise level in decibels (dB) over a full 24-hour period with a 10-decibel (dB) penalty applied to noise events occurring at night (10:00 p.m. to 7:00 a.m.). DNL contours do not represent actual noise conditions present on any specific day or absolute boundaries of acceptability in personal response to noise.

Application of the DNL measurement methodology produces a series of noise level contour lines (DNL contours) which depict noise levels. These are superimposed on a map of the airport and its environs. Contour lines are a summation of all the noise produced by aircraft operations for a year. The DNL levels for Nogales International Airport use forecast information pertaining to daily aircraft operations, and actual runway utilization, flight track utilization, and aircraft flight track profiles. DNL mapping is primarily a planning tool. Noise exposure contours should be viewed as a means for comparing average noise impacts, not precisely defining them relative to a specific location at a specific time.

Integrated Noise Model (INM 6.0c) Input Data

Noise modeling for the Nogales International Airport used the following type of information as input.

- Existing (1999) and forecast operations (through 2020)
- Runway utilization by departure-arrival track usage
- Day/night operations split
- Touch-n-go (T&G) operations
- Flight tracks for arrivals, departures, and T&G's
- Airport Elevation

- Mean Maximum Temperature

Since Nogales does not have an air traffic control tower, some operational information used for the INM Model had to be estimated. Estimates were prepared using input from FAA records, Santa Cruz County, the FBO, and airport users.

Noise Modeling Output

For the purpose of this study, a set of four noise contours were modeled to include the 55, 60, 65, and 75 DNL. These contours were modeled for the base year (1999) and the end of the planning period (2020).

The Off-Airport Land Use/Noise Maps, (see Chapter 8) illustrate the 1999 and 2020 noise contours, respectively. The existing off-airport land use served as the base sheet for the contours to provide a better gauge of the potential noise impacts. As shown, both the 75 and 65 DNL contours are contained on the airport for both the base year (1999) and 2020 conditions. Off Runway 3 end, the 60 DNL contours extend outside the airport boundary by approximately ¼-mile for the base year and just over a ½-mile for the year 2020. However, the 60 DNL contour generally remains inside the airport boundary on the east and West Side of the airport for both the base year and 2020. The 55 DNL extends well outside the airport boundary and curves around to the northwest where the majority of the air traffic approaches and departs.

While FAA guidance states that all land uses are compatible with levels below 65 DNL, it is important to reiterate that this does not imply that the population beyond the 65 DNL contour will not experience noise. In fact, there are many airports receiving significant noise complaints and airport opposition from a population well outside the 65 DNL. Further, many of the residents located adjacent to these airports were not complaining until airport activity grew – typically synonymous with community growth. Thus, those land uses that are the most sensitive to noise should be carefully sited with long-term growth in mind. Such noise-sensitive land uses include residential areas, schools, hospitals, churches, and auditoriums.

7.5 RECOMMENDATIONS

This Plan recommends that Santa Cruz County, in coordination with the communities surrounding the airport, make continued progress towards protecting the future viability of Nogales International. The Santa Cruz County ADOZ ordinance provides the vehicle in which this protection can be provided. Continued efforts to include closely monitoring all proposed development and ensuring that all developers and future residents are aware of the airport and its growing activity is important to achieve the best protection. This will ensure the community's large investment is protected and the economic benefits from the facility extend long into the future.