# Citizen's Brochure

## for the

## 452d Air Mobility Wing

## Air Installation Compatible Use Zone Study

## March Air Reserve Base, California

## August 2005

## What is AICUZ?

The Air Installation Compatible Use Zone (AICUZ) program concerns people, and their comfort, safety, and protection. This pamphlet briefly summarizes the 2005 March Air Reserve Base (ARB) AICUZ Study, an extensive analysis of the effects of aircraft noise, accident potential, and compatible land use and development upon present and future neighbors of the March ARB. The AICUZ program seeks a cooperative understanding and a reasonable solution to this intricate problem.

## Is there a problem?

Military airfields attract development to immediate surrounding areas. In the absence of compatible land use controls, inappropriate uses may be made of properties near or adjacent to the installation causing eventual conflicts between flight operations and surrounding landowners. Because land close to March ARB is subject to aircraft noise and accident potential, certain types of development are not suitable.

## What has been done?

The March ARB has attempted to be a good neighbor by restricting flying activities that could adversely affect its neighbors. For example, the majority of base-assigned aircraft flying operations are conducted between dawn and dusk, Monday through Saturday. Practice approach and departure operations are also normally conducted during these hours. However, flying operations are not limited to these flying times. In addition to the base-assigned aircraft, civilian and cargo aircraft operations are conducted by the March Joint Powers Authority and the California Department of Forestry. Civilian and cargo operations are conducted during the day, evening, and nighttime hours. Flight pattern altitudes and the runway approach angles have been adjusted over the years in an effort to reduce noise impacts while maintaining safe operations. The base has demonstrated a spirit of cooperation by participating with surrounding communities in the areawide planning process. Continued cooperation by the March ARB, local governments, and the local populace will further reduce the potential for land use conflicts. This action will help ensure that future land uses will be compatible and beneficial.

## What are the benefits?

In addition to protecting public safety and health, primary benefits include protecting the taxpayers' investment in national defense represented by March ARB, and protecting economic benefits to the surrounding communities generated by base activities and employment. March ARB's expenditures for salaries, contracts, construction, retirement pay, tuition, aid to schools, health insurance payments, and off-base accommodations for travelers enhance the local economy. In 2004, March ARB employed nearly 9,167 people with an annual payroll of about $153 million. Through service and construction contracts, including primary and secondary employment and payrolls, more than $423 million enters the local economy. While shrinking budgets challenge the leadership at March ARB, the installation continues to be a strong partner in the economic future of the local communities.

## Why AICUZ now?

March ARB has recently been approved to base C-17 aircraft. Modifications to flight operations at March ARB have resulted in changes to the noise contours outlined in the 1998 AICUZ Study. Information provided in the 2005 AICUZ Study is intended to offer assistance to those planning the future of March ARB's adjacent townships. By using the updated noise modeling program and information provided by Base personnel and the March Joint Powers Authority, neighboring communities are better equipped to make land use decisions and adopt land use controls which are compatible with March ARB, yet able to accommodate growth.

## What does AICUZ mean to me?

The AICUZ program means protection of public safety and health as well as protection of the Air Force's national defense mission, which includes training pilots. The AICUZ program itself is a composite of many factors: average noise levels, aircraft flight paths and altitudes, and accident potential. The noise contour map identifies the clear zone and accident potential zones, as well as the noise zones in increments of 5 decibels (dB), ranging from a Community Noise Equivalent Level (CNEL) of 60 to 80 dBA. The noise zones depict the average sound levels for a particular area using a CNEL system for describing the noise environment. The accompanying Land Use/Aircraft Noise Compatibility Guidelines table provides a quick reference of compatible land uses for the various noise and accident potential zones around March ARB. More detailed information can be found in the updated March ARB AICUZ Study.

## How can I help?

Historically, the citizens of the cities of Riverside, Perris, and Moreno Valley; and Riverside County have worked with March ARB personnel in cooperative efforts to better serve the needs and desires of all parties concerned. March ARB

has collectively found solutions, which have maximized benefits to the local communities and to March ARB. If the future of March ARB is to be as bright as its past, you, the citizens of the cities of Riverside, Perris, and Moreno Valley; and Riverside County need to participate in the solution of our mutual concerns. We request your careful and considered review of the recommendations contained in the 2005 March ARB AICUZ Study. In brief, these recommendations include

(a) The AICUZ Study should be adopted as an official guideline for future planning.

(b) Zoning ordinances for local communities should be adopted, or modified, to reflect the compatible land uses outlined in the March ARB AICUZ Study.

(c) Final development plans should have notices identifying the potential of aircraft overflight.

(d) Fair disclosure ordinances should be enacted to specify disclosure to the public of those AICUZ items directly related to operations at March ARB.

(e) Height control of structures near flight paths should be regulated by incorporation into zoning ordinances.

(f) Comprehensive plans should include the land use recommendations of the AICUZ Study.

(g) Subdivision regulations should provide for rejection of new subdivisions or developments not compatible with AICUZ land use objectives and provide controls for continued development in existing subdivisions.

(h) Building codes should be amended to require noise level reduction efforts for structures to be built in noise zones, where alternative locations are not an option.

(i) Capital improvement programs should be carefully reviewed to discourage incompatible land use patterns, with particular emphasis on utility extension planning.

## Who prepared the AICUZ study?

The AICUZ Study was developed by many concerned people at March ARB. The complete AICUZ Study is available through the Public Affairs Office at March ARB. Only the major points of the complete AICUZ Study are included in this pamphlet.

## What are the compatibility guidelines?

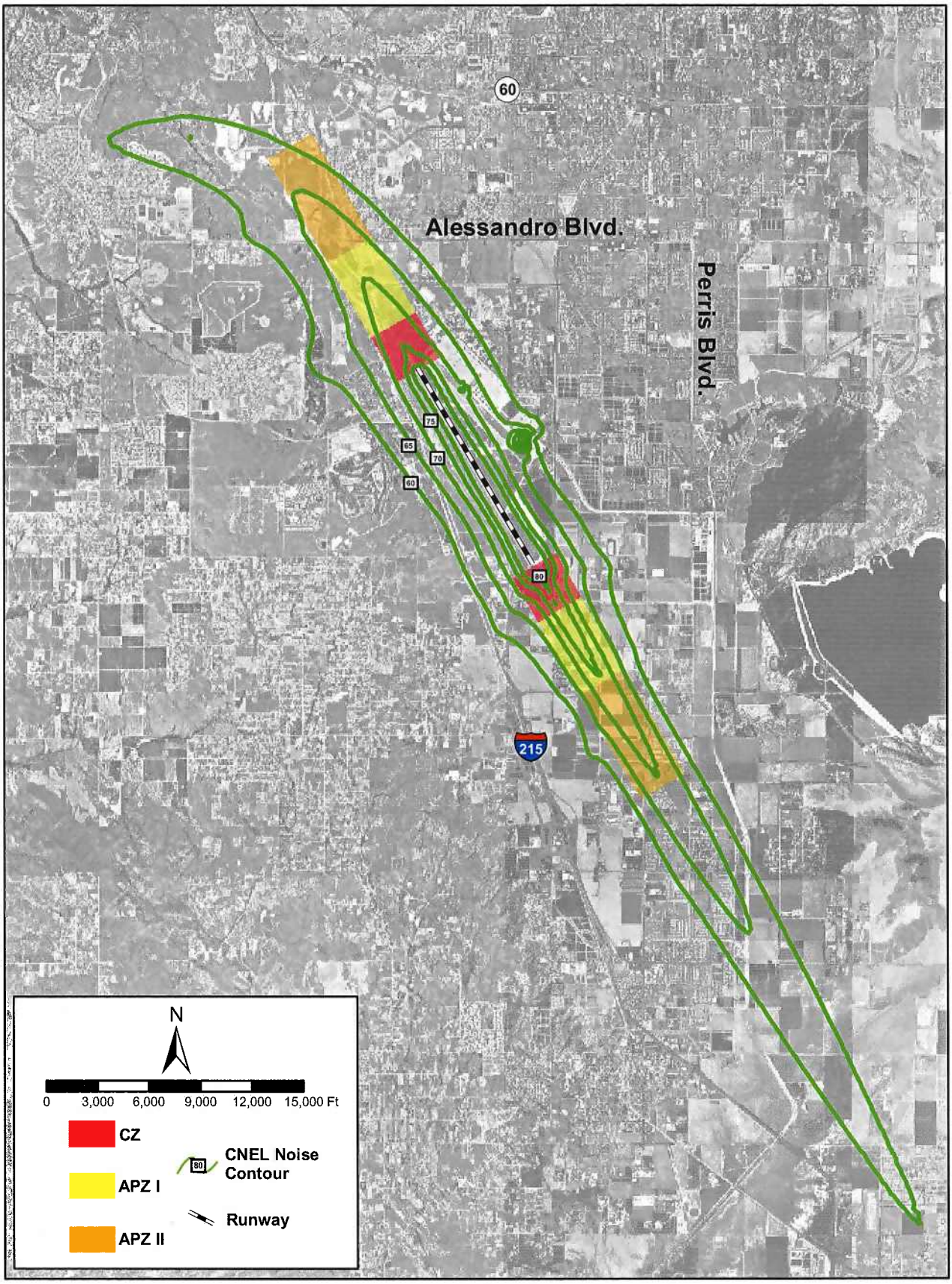
The following table lists the compatibility of various land uses with accident potential zones. A more comprehensive summary of land use compatibility with respect to aircraft noise and accident potential is included in Table 3-1 of the complete 2005 March ARB AICUZ Study.

**For further information, contact:**
**March ARB Base Civil Engineer**
**951-655-4851**

### Land Use/Accident Potential Zone Compatibility Guidelines

| *Generalized Land Use* | *Clear Zone* | *APZ I* | *APZ II* |
|---|---|---|---|
| Residential | No | No | Yes [1] |
| Manufacturing | No | No [2] | Yes |
| Transportation, communications, and utilities | No [3] | Yes [4] | Yes |
| Trade, business, and offices | No | Yes [2] | Yes |
| Shopping districts | No | Yes [2] | Yes [2] |
| Public and quasi-public services | No | No | Yes [5] |
| Recreation | No | Yes [6,7,8] | Yes |
| Public Assembly | No | No | No |
| Agriculture and mining | No | Yes [9] | Yes |

1. Suggested maximum density of 1–2 dwelling units per acre, possibly increased under a Planned Unit Development where maximum lot coverage is less than 20 percent.
2. Within each land use category, uses exist where further deliberating by local authorities could be needed due to the variation of densities in people and structures. Shopping malls and shopping centers are considered incompatible use in any accident potential zone (CZ, APZ I, or APZ II).
3. The placement of structures, buildings, or aboveground utility lines in the CZ is subject to severe restrictions. In a majority of the CZs, these items are prohibited. See Air Force Instruction 32-7060 and Air Force Joint Manual 32-8008 for specific guidance.
4. No passenger terminals and no major aboveground transmission lines in APZ I.
5. Low-intensity office uses only. Meeting places, auditoriums, and the like are not recommended.
6. Facilities must be low intensity.
7. Clubhouse not recommended.
8. Areas for gatherings of people are not recommended.
9. Factors to be considered: labor intensity, structural coverage, explosive characteristics, and air pollution.




**Forecast CNEL Noise Zones and Accident Potential Zones**

# Air Installation Compatible Use Zone Study

## for

## March Air Reserve Base

## March Air Reserve Base, California

**August 2005**

## *Abbreviations and Acronyms*

| | |
|---|---|
| 163 ARW | 163 Air Refueling Wing |
| 452 AMW | 452d Air Mobility Wing |
| AFCEE | Air Force Center for Environmental Excellence |
| AFRC | Air Force Reserve Command |
| AGL | above ground level |
| AICUZ | Air Installation Compatible Use Zone |
| APZ | Accident Potential Zone |
| ARB | Air Reserve Base |
| ATC | Air Traffic Control |
| CAARNG | California Air National Guard |
| CNEL | Community Noise Equivalent Level |
| CZ | Clear Zone |
| DB | decibel |
| DBA | A-Weighted decibel |
| DNL | Day-Night Average A-Weighted Sound Level |
| DOD | Department of Defense |
| EA | Environmental Assessment |
| FAA | Federal Aviation Administration |
| FAR | Federal Aviation Regulations |
| FHA | Federal Housing Authority |
| FY | fiscal year |
| HUD | Department of Housing and Urban Development |
| IMC | Instrument Meteorological Conditions |
| IR | Instrument Route |
| KIAS | Knots Indicated Air Speed |
| MAJCOM | Major Command |
| MJPA | March Joint Powers Authority |
| MOA | Military Operations Area |
| Mph | miles per hour |
| MSL | mean sea level |
| MTR | Military Training Route |
| NM | nautical mile |
| NOAD | North American Air Defense |
| NZ | Noise Zone |
| PAA | Primary Authorized Aircraft |
| SEL | Sound Exposure Level |
| SLUCM | Standard Land Use Coding Manual |
| U.S. | United States |
| USAF | United States Air Force |
| USEPA | United States Environmental Protection Agency |
| VFR | Visual Flight Rule |
| VMC | Visual Meteorological Conditions |
| VR | Visual Route |

**DEPARTMENT OF THE AIR FORCE**
**AIR FORCE RESERVE COMMAND**

MEMORANDUM FOR AREA GOVERNMENTS

FROM: 452 AMW/CC
2145 Graeber Street, Suite 117
March ARB CA 92518-1667

SUBJECT: Air Installation Compatible Use Zone Study

1. The Department of Defense's Air Installation Compatible Use Zone (AICUZ) Program is intended to promote compatible land uses in nongovernment areas adjacent to military airfields. This AICUZ Study for March Air Reserve Base (ARB), Riverside County, California, is designed to aid in the development of local planning mechanisms that will protect public safety and health and preserve the mission and operational capabilities of March ARB.

2. The Study outlines the location of runway clear zones, aircraft accident potential zones, and noise contours. In addition, incompatible land uses are identified and compatible land use recommendations are provided for areas in the vicinity of the base. It is our hope that this information will be incorporated into your community plans, zoning ordinances, subdivision regulations, building codes, and other related documents, such as the *Joint Land Use Study* (JLUS).

3. The basic objective of the AICUZ program is to achieve compatible uses of public and private lands in the vicinity of military airfields by controlling incompatible development through local actions. This AICUZ Study provides March ARB aircraft noise contours based upon the Day-Night Average A-weighted Sound Level (DNL) metric used by the U.S. Air Force and Community Noise Equivalent Level (CNEL) used by the State of California. It also provides the information necessary to maximize beneficial use of the land surrounding March ARB while minimizing the potential for degradation of the health and safety of the affected public.

4. We greatly value the positive relationship that March ARB has experienced with its neighbors over the years. As a partner in the process, we have attempted to minimize noise disturbances through such actions as avoiding flights over heavily populated areas and minimizing military night flights. In addition, March ARB has a working relationship with the community through the JLUS and the Joint Use Agreement between March ARB and the Joint Powers Authority. We solicit your cooperation in implementing the recommendation and guidelines presented in this AICUZ report.

5. This AICUZ study is being released with two sets of noise contours, which are based on Current (2005) and Forecast (2010) aircraft operations in both Day-Night Average A-Weighted Sound Level and Community Noise Equivalent Level noise metrics.

JAMES T. RUBEOR, Brig Gen, USAFR
Commander

# AIR INSTALLATION COMPATIBLE USE ZONE STUDY
# FOR
# MARCH AIR RESERVE BASE

March Air Reserve Base, California

PREPARED BY

ENGINEERING-ENVIRONMENTAL MANAGEMENT, INC.
510 EAST RAMSEY
SAN ANTONIO, TEXAS 78216

AUGUST 2005

# AIR INSTALLATION COMPATIBLE USE ZONE STUDY FOR MARCH AIR RESERVE BASE, CALIFORNIA

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# 1. Air Installation Compatible Use Zone Study

## 1.1 Introduction

The Air Installation Compatible Use Zone (AICUZ) Study is an update to the 1998 March Air Reserve Base (ARB) AICUZ Study. This update presents the Current (2005) and Forecast (2010) noise contours produced by aircraft operations at March ARB. This AICUZ Study reaffirms the United States (U.S.) Air Force (USAF) policy of promoting public health, safety, and general welfare in areas surrounding USAF installations. It provides compatible use Guidelines for land use areas around the base. This information is provided to assist local communities in future planning and zoning activities. Differences between the Current and Forecast noise contours are attributable to

- Changes in flight operations and aircraft for mission purposes
- Proposed changes in Joint Powers Authority Commercial and Cargo Aircraft Operations
- Technical improvements to the NOISEMAP software program, (used for calculating the noise contours)

## 1.2 Purpose and Need

The purpose of the USAF AICUZ program is to promote compatible land development in areas exposed to aircraft noise and accident potential. As neighboring cities and counties prepare and modify their land use development plans, recommendations from this updated AICUZ Study should be considered in their planning process to prevent incompatibilities that might compromise March ARB's ability to fulfill its mission requirements and assist the residents of the cities of Moreno Valley, Riverside, and Perris; and the County of Riverside to avoid safety hazards. Accident potential and aircraft noise should be major considerations in their planning processes.

Land use guidelines set forth in the USAF AICUZ program reflect land use recommendations for clear zones (CZs), accident potential zones (APZs) I and II, and applicable noise zones (NZs). These guidelines have been established on the basis of studies prepared and sponsored by the USAF, U.S. Department of Housing and Urban Development (HUD), U.S. Environmental Protection Agency (USEPA), Federal Aviation Administration (FAA), Federal Housing Authority (FHA), and state and local agencies. The guidelines recommend land uses that are compatible with airfield operations while allowing maximum beneficial use of adjacent

properties. This study contains recommendations developed to assist local governments in determining land uses that are compatible with airport environs.

## 1.3 Process and Procedure

A project kick-off meeting and data collection site visit for this document were conducted at March ARB from September 29 through October 1, 2003. The purpose of the site visit was to collect information and verify the average daily operations at the airfield for aircraft operations and maintenance data by aircraft type. Data were provided according to flight track (where they fly), flight profile (how they fly), and ground run-up (engine maintenance activities).

The AICUZ program uses approved computer modeling technology (NOISEMAP 6.5) to define noise levels in areas near USAF installations. An analysis was conducted of all flying operations (i.e., military, commercial, civilian) conducted at March ARB, including types of aircraft, flight patterns used, variations in altitude, power settings, number of operations, and hours of operation. An operation is defined as any takeoff (departure), landing (arrival), or individual climbout and descent portion of a closed pattern such as a touch-and-go or missed approach. This information was used to develop the noise contours contained in this study. The Department of Defense (DOD) NOISEMAP methodology, the Day-Night Average A-Weighted Sound Level (DNL) metric, and Community Noise Equivalent Level (CNEL) metric used by the State of California were used to define the NZs for March ARB.

After verification of accuracy, data were entered into the NOISEMAP 6.5 software program and converted into DNL and CNEL noise contours. Flight operations were distributed on flight tracks based on a primary wind direction, personnel interviews, and aircraft destination. Appendix A contains detailed information about the AICUZ program. Noise contours and AICUZ maps presented in Sections 3 and 4 of this study are based on both the current (2005) aircraft operations and forecasted (2010) aircraft operations. As such, the Current Scenario and Forecast Scenario are presented in this document.

# 2. Installation Description

## 2.1 Mission

Several military missions are supported by the aircraft and personnel at March ARB. The mission of the 452d Air Mobility Wing (452 AMW) is to provide airlift support for the USAF in peacetime and to train for tactical combat airlift and airdrop of personnel and supplies in wartime. In 1998, the 452 AMW operated 16 C-141C aircraft in support of its airlift mission. Currently, the 452 AMW operates 10 KC-135R aircraft. The 452 AMW converted from C-141C aircraft to eight C-17 aircraft in fiscal year (FY) 2005. The California Air National Guard (CAANG) is the primary tenant organization assigned to March ARB. The 163 Air Refueling Wing (163 ARW) of the CAANG operates 10 KC-135R aircraft. The 120th Fighter Wing, Montana ANG, is based out of Great Falls, Montana, and operates four F-16 aircraft at March ARB with two additional aircraft added as mission requires. Two of the four F-16 aircraft are used for training exercises, and two are kept on 24-hour alert in support of the North American Air Defense (NOAD) mission.

As the host unit at March ARB, the 452 AMW is responsible for providing certain on-base services and facilities that are common to the Wing and tenant organizations. These include law enforcement, fire department, fuel storage area, base operations, and service for transient aircraft.

The Department of Homeland Security, Riverside Air Unit operates two UH-60A BlackHawk helicopters and one light single-engine Cessna airplane in support of Homeland Security, state, and local law enforcement missions. Often, an AS-350 light helicopter is also operationally assigned.

In addition to the military entities at March ARB, airport facilities are used by civilian aircraft and organizations. A joint use agreement was created on May 7, 1997, between the DOD and the March Joint Powers Authority (MJPA) to establish March Air Field as a joint use airport. A joint use airport is defined by the USAF as one where the facilities are owned and operated by the USAF and are made available for use by civil aviation. Consequently, the joint use agreement permits the establishment and operation of commercial aviation where civilian and military entities share essential aviation facilities (MJPA 2005).

In support of the Joint Use Agreement with MJPA and the ongoing cooperation with the Riverside County and the local municipalities (i.e., cities of Moreno Valley, Perris, and Riverside), a *Joint Land Use Study* (JLUS) is being completed. The objective of the JLUS is the

future adoption of an airport Comprehensive Land Use Plan for March ARB/March Inland Port by the MJPA and the Riverside County Airport Land Use Commission. The study is to be conducted under the direction of the MJPA. A grant from the U.S. Department of Defense Office of Economic Adjustment is the primary funding source for the project. The JLUS will include two major components:

- An airport land use compatibility plan to be adopted by March JPA and the Riverside County Airport Land Use Commission; and
- Implementation measures to be adopted by all five of the neighboring land use jurisdictions—Riverside County, March JPA, and the cities of Moreno Valley, Perris, and Riverside.

## 2.2 Location

March ARB is in western Riverside County, California, approximately 70 miles east of Los Angeles (see Figure 2-1). The base, which is composed of an airfield and associated support facilities, occupies approximately 2,300 acres of contiguous property (see Figure 2-2 for a vicinity map of March ARB). The MJPA planning area surrounds March ARB. In addition, the cities of Riverside, Moreno Valley, and Perris are adjacent to, or in close proximity to the base. Runway 14/32 is in the western portion of the base (see Figure 2-3).

## 2.3 Economic Impact

In FY 2004, March ARB employed nearly 9,167 persons; more than half of whom were employed by the 452 AMW. The 452 AMW includes 5,154 Air Force Reservists and 1,030 Air Reserve Technicians or civilians; all of whom live off base (Adams 2005).

March ARB's total expenditures were $117,892,781 in FY 2004 and the total annual payroll was approximately $153,615,510 (see Table 2-1). The payroll expenditure for March ARB, combined with the expenditure on operations and maintenance-related activities, is estimated to have had an overall economic impact of $423,622,617 (Adams 2005).

**Table 2-1. FY 2004 Economic Impact of March ARB**

| Category | Annual Amount ($) |
|---|---|
| Total Annual Payroll | 153.6 M |
| Total Annual Expenditures | 117.8 M |
| Estimated Value of Jobs Created | 152.2 M |
| **Grand Total of Economic Impact** | **423.6 M** |


**Figure 2-1. Location of March ARB**

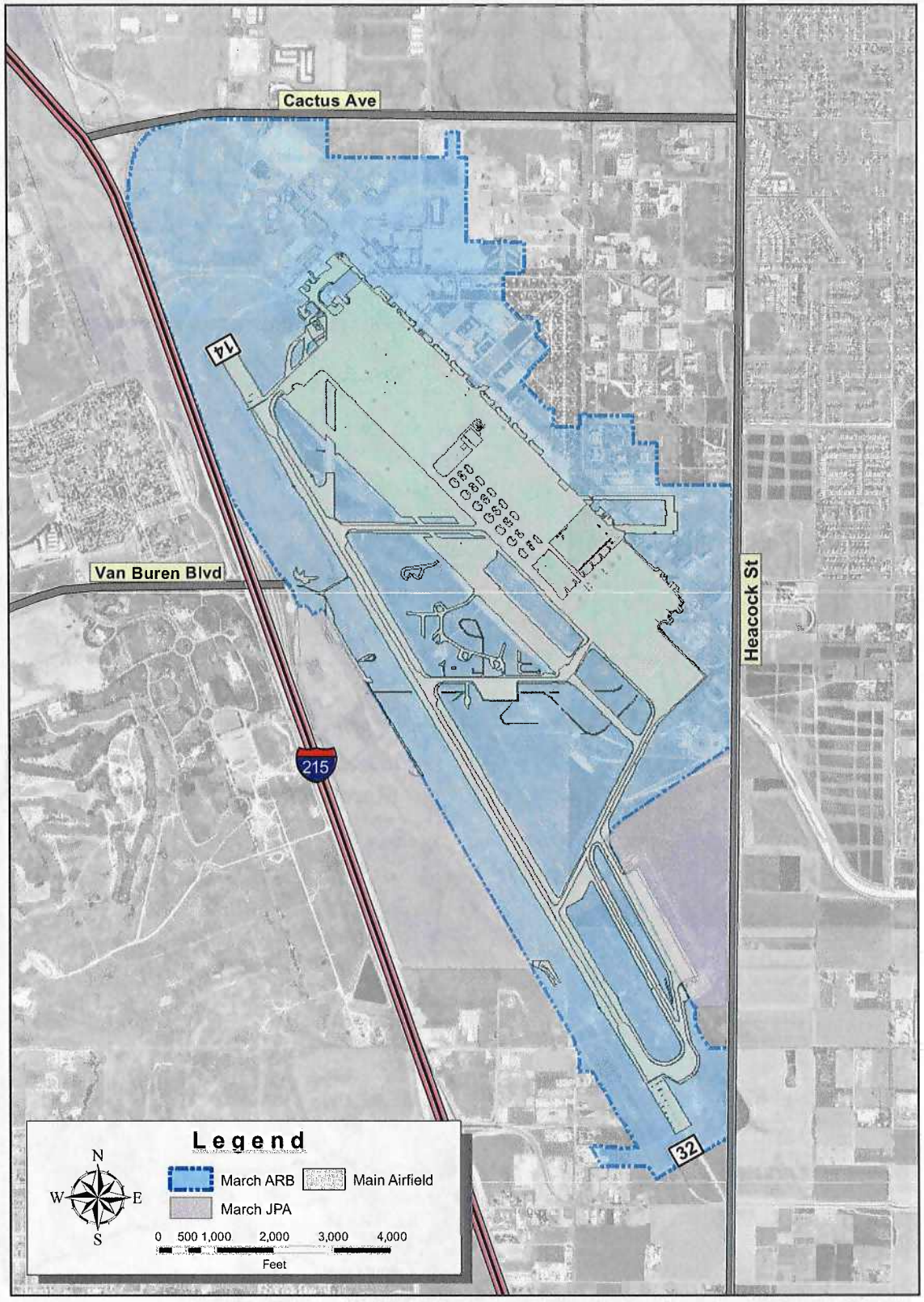



**Figure 2-2. March ARB Main Airfield**

The Region of Influence for economic activities at March ARB is Riverside County, California. Data relevant to Riverside County, the State of California, and the United States are provided in Table 2-2. To comply with Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, ethnicity and poverty status in the vicinity of March ARB were examined and compared to state and national data. The United States Census Bureau bases the poverty status of families and individuals on threshold variables, including income, family size, number of family members under 18 and over 65 years of age, and amount spent on food. The U.S. poverty threshold is $13,738 for a family of three, and 12.4 percent of the U.S. population were below the poverty level in 2000 (MARB 2003a). Based on the 2000 U.S. Census Bureau (Table 2-2), Riverside County and the State of California have a slightly higher poverty level than the national level.

March ARB provides support for approximately 40,813 annual aircraft operations, of which 7,660 are C-141 aircraft operations, 2,460 are C-17 operations, and 14,431 are KC-135R aircraft operations.

**Table 2-2. Race and Poverty Characteristics in Riverside County, the State of California, and the U.S.**

| | U.S. | State of California | Riverside County, California |
|---|---|---|---|
| Total Population | 281,421,906 | 33,871,648 | 1,545,387 |
| Percent White | 75.1 | 59.5 | 65.6 |
| Percent Black or African American | 12.3 | 6.7 | 6.2 |
| Percent American Indian, Eskimo, or Aleut | 0.9 | 1.0 | 1.2 |
| Percent Asian or Pacific Islander | 3.7 | 11.2 | 4.0 |
| Percent Other | 5.5 | 16.8 | 18.7 |
| Percent Reporting 2 or more races | 2.4 | 4.7 | 4.4 |
| Percent Living in Poverty | 12.4 | 14.2 | 14.2 |

Source: U.S. Bureau of Census 2000

## 2.4 Flying Activity

To describe the relationship between aircraft operations and land use, it is necessary to fully evaluate the exact nature of flying activities. An inventory was completed for the number of aircraft based at March ARB, where those aircraft fly, how high they fly, how many times they

fly over a given area, and at what time of day they operate. The current aircraft activity at March ARB is summarized in Table 2-3.

Aircraft operations in Table 2-3 have been divided into military and civilian. Military operations include based, transient, and contract military carrier; civilian operations consist of MJPA cargo operations. With 33,637 annual operations, military aircraft account for 82 percent of the operations at March ARB. When looking exclusively at military operations, based aircraft have the highest percentage of nighttime operations. Approximately 9 percent of the operations occur at night (between 10 p.m. and 7 a.m.), approximately 12 percent occur in the evening (7 p.m. to 10 p.m.) and 79 percent occur during the daytime (7 a.m. to 7 p.m.). Civilian operations have a higher percentage of nighttime operations than military. Approximately 45 percent of the operations occur at night, 13 percent occur during evening hours, and 42 percent occur during the daytime.

To the maximum extent possible, engine run-up locations have been established in areas that minimize noise for people on base, as well as for those in the surrounding communities. Normal base operations do not include late night engine run-ups, but heavy work loads or unforeseen contingencies sometimes require a limited number of nighttime engine run-ups.

Airfield planning considers three primary aircraft operational/land use determinants: (1) accident potential to land users, (2) aircraft noise, and (3) hazards to operations from land uses (e.g., height obstructions). Each of these concerns is addressed in conjunction with mission requirements and safe aircraft operations to determine the optimum flight track for each aircraft type. The departures, arrivals, and closed-pattern flight tracks depicted in Figures 2-3, 2-4, and 2-5, respectively, are the result of such planning. These flight tracks are not aircraft-type dependent and have been configured to implement practicable mitigation measures to reduce noise impacts on the local community while maintaining flight safety standards.

Flight track configuration results from the following considerations:

- Take-off patterns routed to avoid heavily populated areas when possible
- USAF criteria governing the aircraft speed, rate of climb, and turning radius
- Efforts to control and schedule missions to keep noise levels low, especially at night
- Coordination with the FAA to minimize conflict with civilian aircraft operations

**Table 2-3. Summary of Current Airfield Operations**

| Aircraft (Substitution) | Average Daily Arrival Operations | | | Average Daily Departure Operations | | | Average Daily Closed Pattern Operations | | | Total Average Daily Operations | Total Annual Operations |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Day | Evening | Night | Day | Evening | Night | Day | Evening | Night | | |
| MILITARY AIRCRAFT | | | | | | | | | | | |
| **Based** | | | | | | | | | | | |
| AH-1G | 2.13 | 0.00 | 0.00 | 2.13 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.26 | 128 |
| C-141A | 1.85 | 0.59 | 0.01 | 2.28 | 0.16 | 0.01 | 9.94 | 2.34 | 0.00 | 29.46 | 7,660 |
| C-17 | 2.01 | 0.58 | 0.04 | 2.01 | 0.58 | 0.04 | 1.68 | 0.29 | 0.13 | 9.46 | 2,460 |
| CH-46E | 4.43 | 0.00 | 0.00 | 4.43 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 8.86 | 266 |
| CH-53E | 3.43 | 0.00 | 0.00 | 3.43 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.87 | 206 |
| F-16 | 1.78 | 0.15 | 0.00 | 1.78 | 0.15 | 0.00 | 0.84 | 0.07 | 0.00 | 5.68 | 1,477 |
| KC-135R | 2.40 | 1.01 | 0.88 | 3.26 | 0.73 | 0.31 | 12.02 | 4.86 | 6.58 | 55.51 | 14,431 |
| UH-1N | 4.67 | 0.00 | 0.00 | 4.67 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 9.34 | 280 |
| UH60A | 1.08 | 0.00 | 0.00 | 1.08 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.15 | 560 |
| *Subtotal* | *23.78* | *2.33* | *0.93* | *25.07* | *1.62* | *0.36* | *24.48* | *7.56* | *6.71* | *131.59* | *27,468* |
| **Transient** | | | | | | | | | | | |
| AV-8B | 0.10 | 0.00 | 0.00 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 68 |
| C-12 | 0.71 | 0.00 | 0.00 | 0.71 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.41 | 480 |
| C-130H&N&P | 0.79 | 0.00 | 0.00 | 0.79 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.59 | 540 |
| C-141A | 0.22 | 0.00 | 0.00 | 0.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.43 | 146 |
| C-17 | 0.50 | 0.00 | 0.00 | 0.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 340 |
| C-21A | 0.09 | 0.00 | 0.00 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.19 | 64 |
| C-5A | 0.82 | 0.00 | 0.00 | 0.82 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.65 | 560 |
| C-9A | 2.33 | 0.00 | 0.00 | 2.33 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.65 | 1,581 |

**Table 2-3. Summary of Current Airfield Operations (continued)**

| Aircraft (Substitution) | Average Daily Arrival Operations | | | Average Daily Departure Operations | | | Average Daily Closed Pattern Operations | | | Total Average Daily Operations | Total Annual Operations |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Day | Evening | Night | Day | Evening | Night | Day | Evening | Night | | |
| F-16 | 0.18 | 0.00 | 0.00 | 0.18 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.35 | 120 |
| F-18 | 0.27 | 0.00 | 0.00 | 0.27 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.53 | 180 |
| KC-10A | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 680 |
| KC-135R | 0.32 | 0.00 | 0.00 | 0.32 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.65 | 220 |
| P-3A | 0.04 | 0.00 | 0.00 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.07 | 26 |
| SW-3 | 0.15 | 0.00 | 0.00 | 0.15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.31 | 104 |
| T-37B | 0.05 | 0.00 | 0.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 36 |
| T-38A | 0.07 | 0.00 | 0.00 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.14 | 46 |
| *Subtotal* | *7.63* | *0.00* | *0.00* | *7.63* | *0.00* | *0.00* | *0.00* | *0.00* | *0.00* | *15.27* | *5,191* |
| **Contract Military Carrier** | | | | | | | | | | | |
| B-737-D9N | 0.73 | 0.14 | 0.05 | 0.73 | 0.14 | 0.05 | 0.00 | 0.00 | 0.00 | 1.83 | 220 |
| B-747SP | 0.73 | 0.14 | 0.05 | 0.73 | 0.14 | 0.05 | 0.00 | 0.00 | 0.00 | 1.83 | 220 |
| B-757RR | 0.22 | 0.04 | 0.01 | 0.22 | 0.04 | 0.01 | 0.00 | 0.00 | 0.00 | 0.55 | 66 |
| B-767-CF6 | 0.15 | 0.03 | 0.01 | 0.15 | 0.03 | 0.01 | 0.00 | 0.00 | 0.00 | 0.37 | 44 |
| B-777 | 0.27 | 0.05 | 0.02 | 0.27 | 0.05 | 0.02 | 0.00 | 0.00 | 0.00 | 0.68 | 82 |
| DC-10-10 | 0.20 | 0.04 | 0.01 | 0.20 | 0.04 | 0.01 | 0.00 | 0.00 | 0.00 | 0.50 | 60 |
| DC-10-20 (DC-10-30) | 0.13 | 0.03 | 0.01 | 0.13 | 0.03 | 0.01 | 0.00 | 0.00 | 0.00 | 0.33 | 40 |
| DC-10-30 | 0.20 | 0.04 | 0.01 | 0.20 | 0.04 | 0.01 | 0.00 | 0.00 | 0.00 | 0.50 | 60 |
| L-1011 | 0.62 | 0.12 | 0.04 | 0.62 | 0.12 | 0.04 | 0.00 | 0.00 | 0.00 | 1.55 | 186 |
| *Subtotal* | *3.26* | *0.61* | *0.20* | *3.26* | *0.61* | *0.20* | *0.00* | *0.00* | *0.00* | *8.15* | *978* |
| **Military Aircraft Total** | | | | | | | | | | | **33,637** |

**Table 2-3. Summary of Current Airfield Operations (continued)**

| Aircraft (Substitution) | Average Daily Arrival Operations | | | Average Daily Departure Operations | | | Average Daily Closed Pattern Operations | | | Total Average Daily Operations | Total Annual Operations |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Day | Evening | Night | Day | Evening | Night | Day | Evening | Night | | |
| **CIVILIAN AIRCRAFT** | | | | | | | | | | | |
| **Joint Powers Authority** | | | | | | | | | | | |
| ***DHL Cargo*** | | | | | | | | | | | |
| 767-200F (767-CF6) | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 2.00 | 624 |
| 767-200F (767-CF6) | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 312 |
| 727-200 (727EM2) | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 312 |
| 727-200 (727EM2) | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 4.00 | 1,248 |
| 747-400 | 2.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.00 | 1,248 |
| A300 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 312 |
| DC-8 | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 624 |
| DC-9 | 0.00 | 1.33 | 2.67 | 0.00 | 0.00 | 4.00 | 0.00 | 0.00 | 0.00 | 8.00 | 2,496 |
| *Subtotal* | *5.00* | *3.33* | *4.67* | *6.00* | *0.00* | *7.00* | *0.00* | *0.00* | *0.00* | *26.00* | *7,176* |
| **Civilian Aircraft Total** | | | | | | | | | | | **7,176** |
| **GRAND TOTAL** | **39.68** | **6.28** | **5.80** | **41.97** | **2.23** | **7.56** | **24.48** | **7.56** | **6.71** | **181.00** | **40,813** |

Notes:

The total annual operations are derived by multiplying the number of daily operations by the number of days that particular aircraft operates in an average year.

Closed patterns account for two operations.

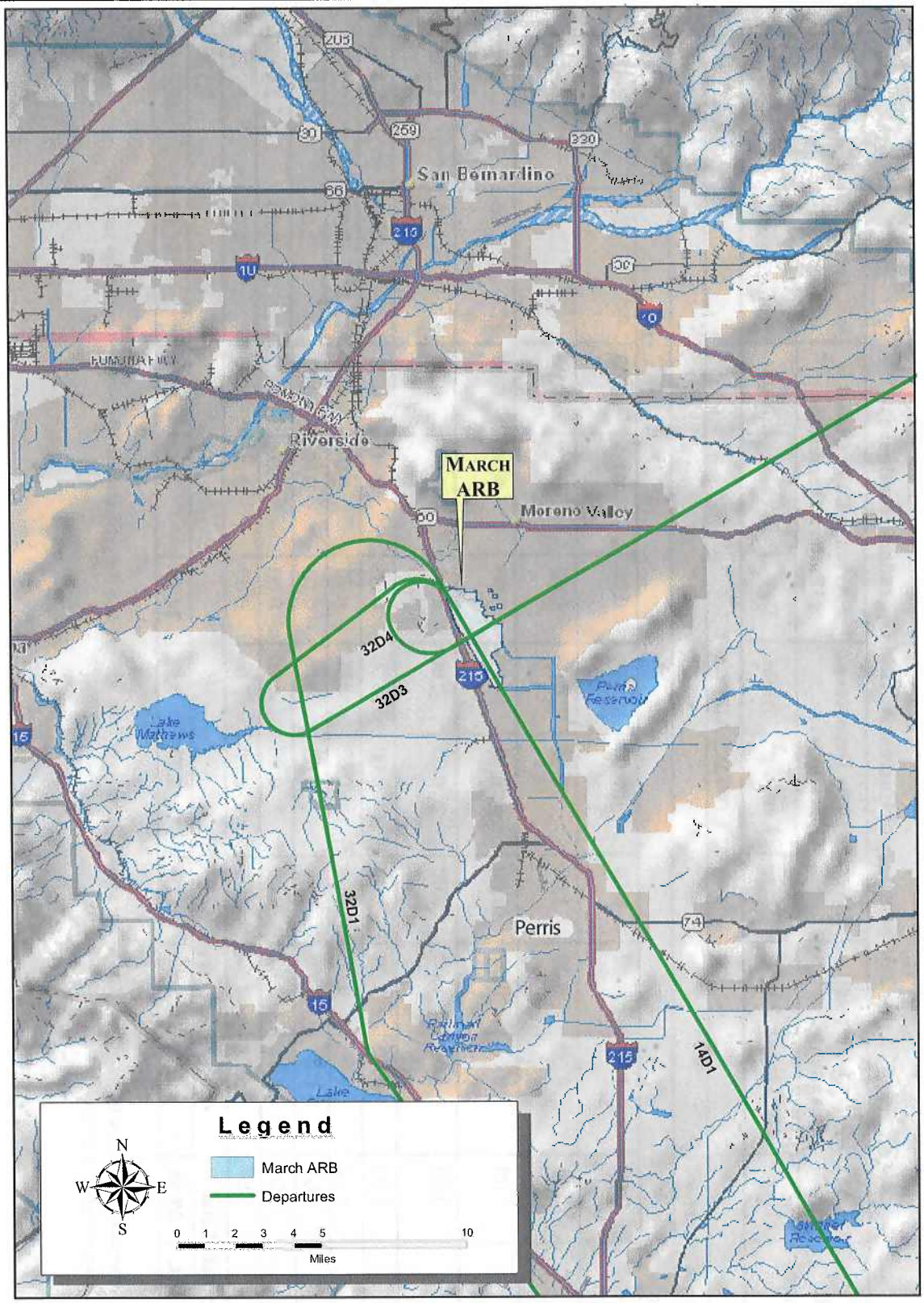



**Figure 2-3. March ARB Flight Tracks - Departures**

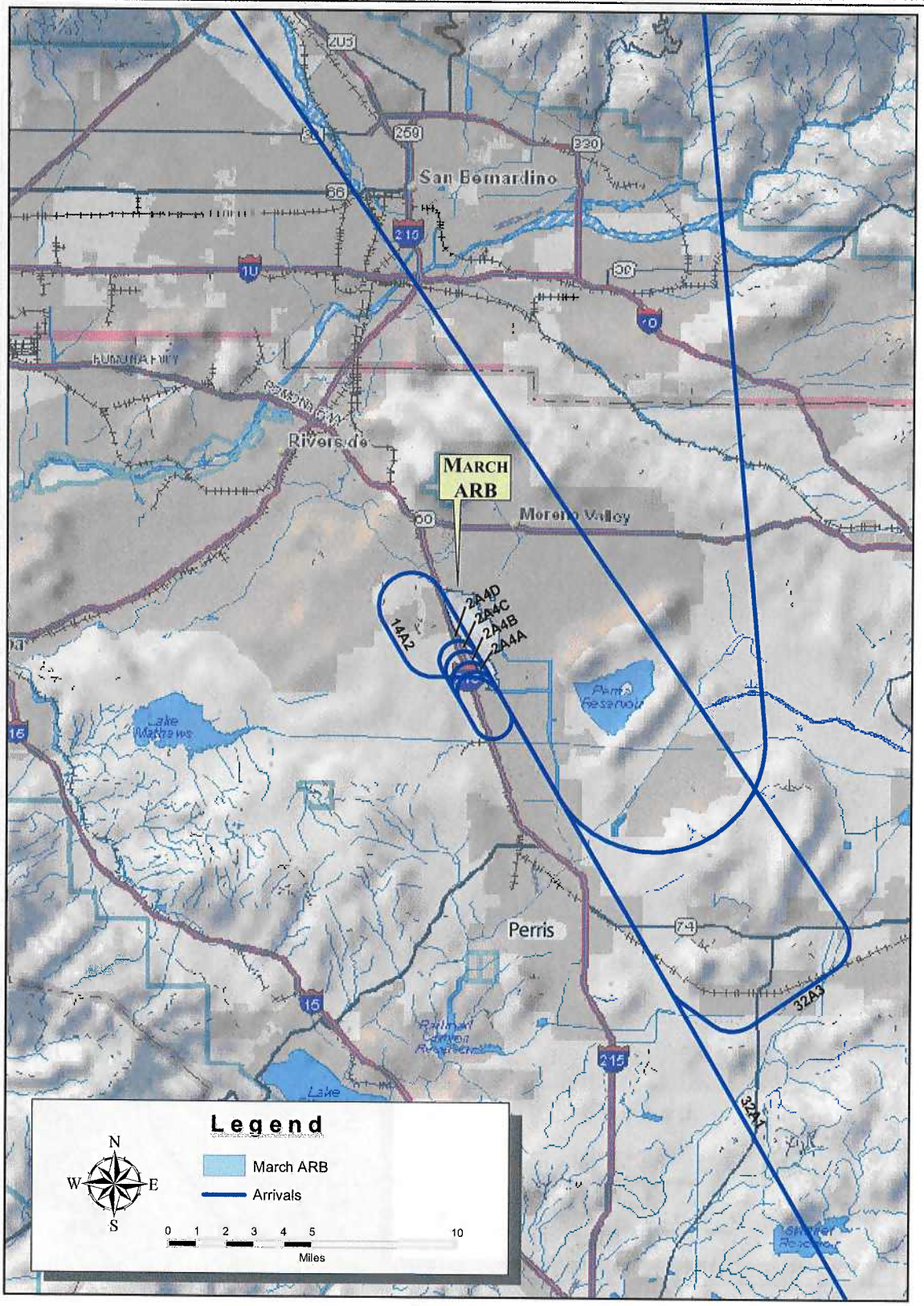



**Figure 2-4. March ARB Flight Tracks - Arrivals**

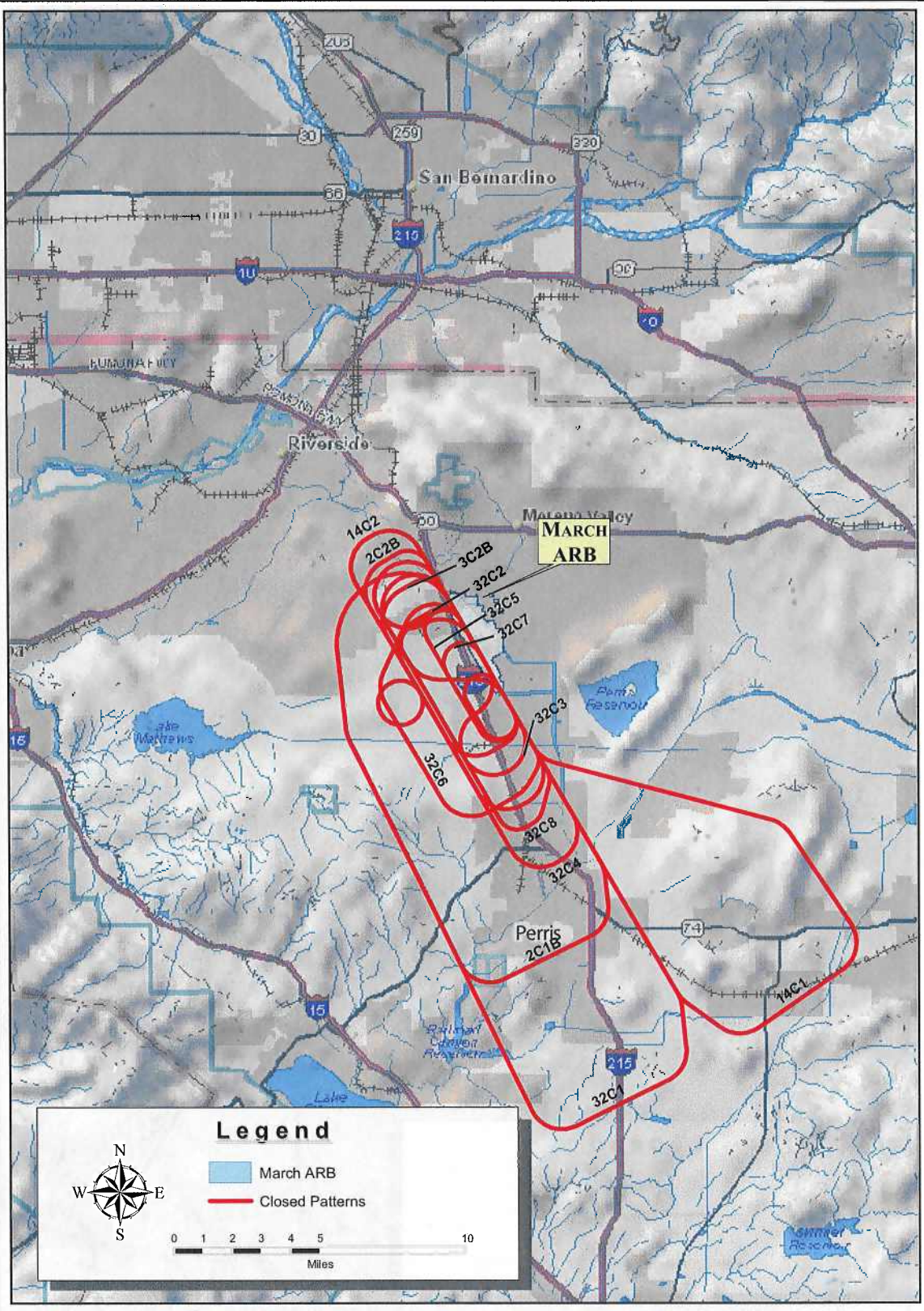



**Figure 2-5. March ARB Flight Tracks - Closed Patterns**

Most procedures governing aircraft operations and airspace use distinguish between two types of flight rules, visual and instrument, which dictate how and where a pilot can operate. Pilot qualifications, certifications, and the type of flight aviation dictate which rules must be used. For instance, general aviation pilots who possess only a private license and fly light aircraft normally operate under visual flight rules (VFR).

There are two categories of airspace, or airspace areas, regulatory and nonregulatory. The vast majority of airspace within the United States is regulatory airspace, subject to regulations of the FAA. Within these two categories, further classifications include controlled, uncontrolled, special use airspace, and airspace for special use. The categories and types of airspace are dictated by the following:

- Complexity or density of aircraft movement
- Nature of the operations conducted within the airspace
- Level of safety required
- National and public interest in the airspace

***Controlled Airspace.*** Controlled airspace is a generic term that encompasses the different classifications (Classes A, B, C, D, and E) of airspace and defines dimensions within which air traffic control service is provided to flight under instrument meteorological conditions (IMC), and to flights under visual meteorological conditions (VMC). Figure 2-6 shows the FAA airspace classifications. All military and civilian aircraft are subject to Federal Aviation Regulations (FARs).

Class A airspace includes all operating altitudes of 18,000 feet or more above mean sea level (MSL). Class A airspace is most frequently utilized by commercial aircraft at altitudes between 18,000 and 45,000 feet above MSL.

Class B airspace typically comprises contiguous cylinders of airspace, stacked one upon another and extending from the surface up to 10,000 feet above MSL. To operate in Class B airspace, pilots must contact appropriate controlling agencies and receive clearance to enter the airspace.

Additionally, aircraft operating within Class B airspace must be equipped with specialized electronics that allow air traffic controllers to accurately track aircraft speed, altitude, and position. Class B airspace is typically associated with major airport complexes such as Los Angeles International Airport, California.

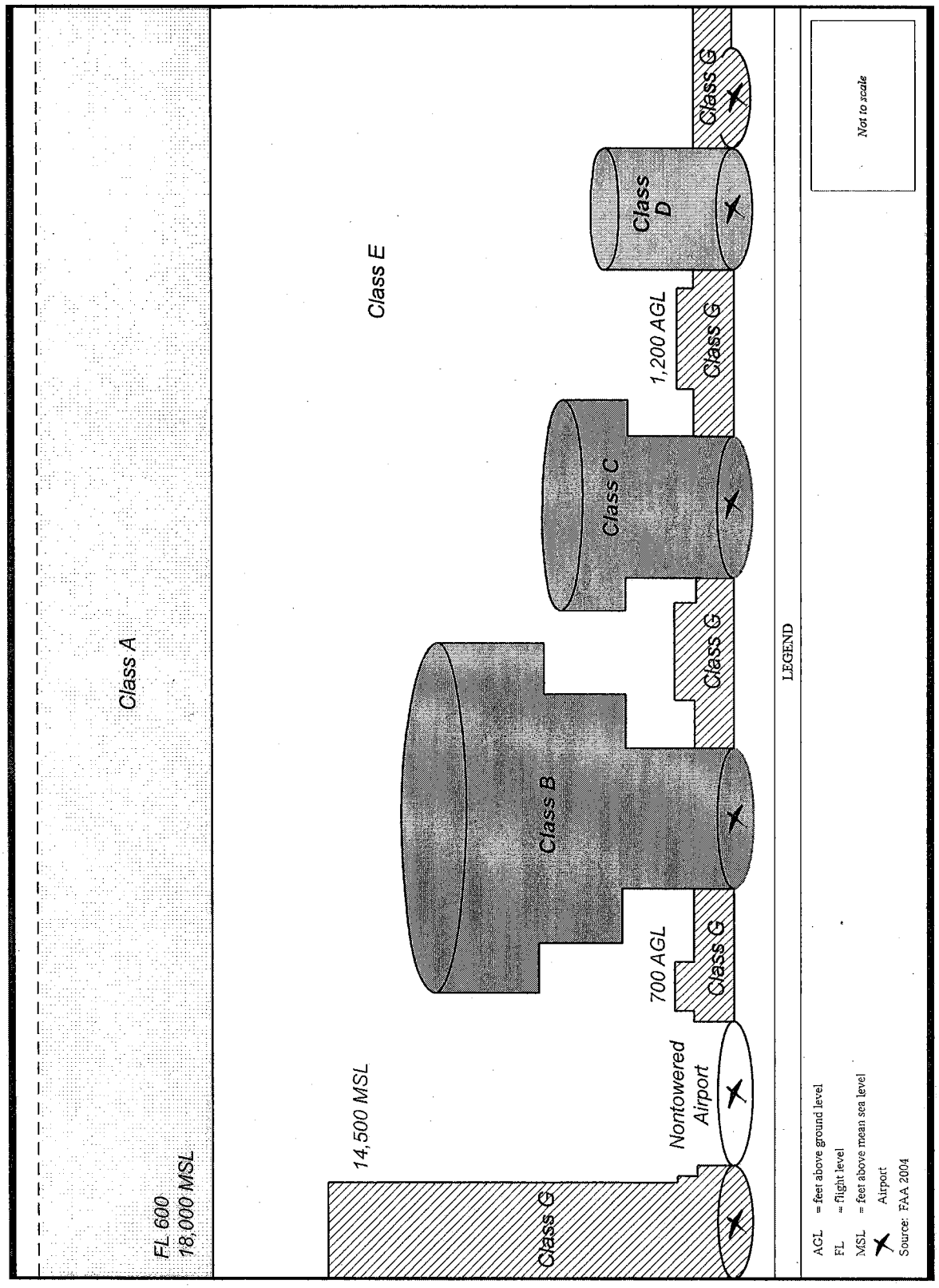



**Figure 2-6. Federal Aviation Administration Controlled Airspace Classifications**

Class C airspace can be described as controlled airspace that extends from the surface or a given altitude to a specified higher altitude. Class C airspace is designed and implemented to provide additional air traffic control into and out of primary airports where aircraft operations are periodically at high-density levels, such as March ARB, California. All aircraft operating within Class C airspace are required to maintain two-way radio communication with local air traffic control (ATC) facilities.

Class D airspace encompasses a 5-statute-mile radius of an operating ATC-controlled airport. It extends from the ground to 2,500 feet above ground level (AGL) or higher. All aircraft operating within Class D airspace must be in two-way communication with the ATC facility.

Class E airspace can be described as general controlled airspace. It includes designated Federal airways consisting of the high altitude (J or "Jet" Route) system and low altitude (V or "Victor" Route) system. Federal airways have a width of 4 statute miles on either side of the airway centerline, and can be structured between the altitudes of 700 feet AGL and 18,000 feet above MSL. These airways frequently intersect approach and departure paths from both military and civilian airfields. Class E airspace might range from ground level at nontowered airfields up to 18,000 feet above MSL. The majority of Class E airspace is where more stringent airspace control has not been established.

***Uncontrolled Airspace.*** Uncontrolled airspace (Class G) is not subject to restrictions that apply to controlled airspace. Limits of uncontrolled airspace extend from the surface to 700 feet AGL in urban areas, and from the surface to 1,200 feet AGL in rural areas. Uncontrolled airspace can extend above these altitudes to as high as 14,500 feet above MSL if no other types of controlled airspace have been assigned. ATC does not have authority to exercise control over aircraft operations within uncontrolled airspace. Primary users of uncontrolled airspace are general aviation aircraft operating under VMC.

***Special Use Airspace.*** Special use airspace consists of airspace within which specific activities must be confined, or wherein limitations are imposed on aircraft not participating in those activities. With the exception of Controlled Firing Areas, special use airspace is depicted on aeronautical charts. Chart depictions include hours of operation, altitudes, and the agency controlling the airspace. All special use airspace descriptions are contained in FAA Order 7400.8. Examples of special use airspace in the local flying area of March ARB are restricted areas (R-2501), military operations area (MOAs) (Turtle MOA), and warning areas (W-291).

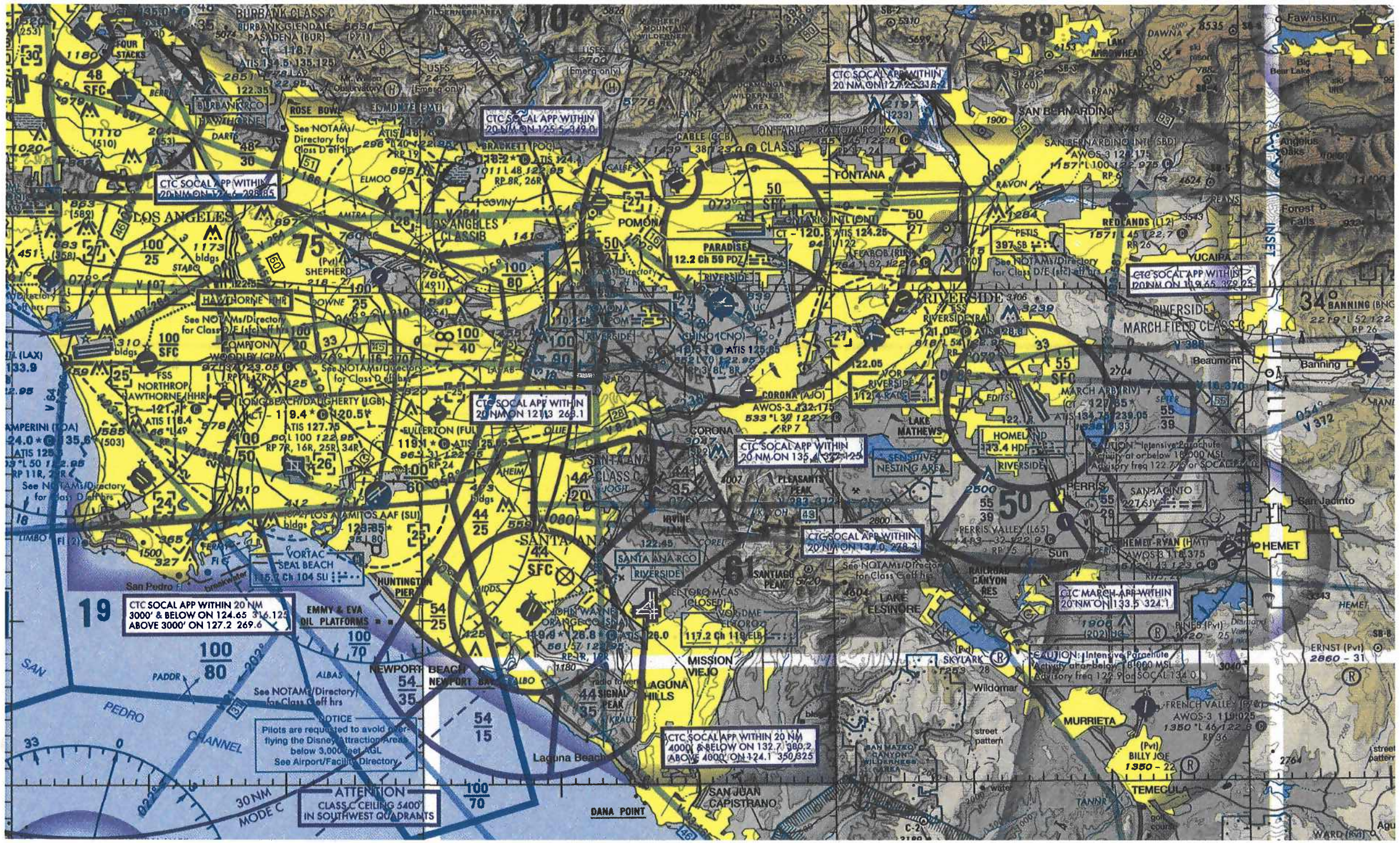
***Airspace for Special Use.*** Airspace for special use are areas used by military aircraft that do not put restrictions on nonparticipating aircraft. They are designated as such for informational purposes for general aviation. Examples of airspace for special use are military training routes (MTRs), slow routes, and air-to-air refueling tracks.

MTRs are flight paths that provide a corridor for low-altitude navigation and training. Low-altitude navigation and training is important because aircrews might be required to fly at low altitudes for tens or hundreds of miles to avoid detection in combat conditions. To train realistically and safely, the military and the FAA have developed MTRs. These allow the military to train for low-altitude navigation at airspeeds in excess of 250 knots indicated airspeed (KIAS) (approximately 285 miles per hour [mph]). There are two types of MTRs, instrument routes (IRs) and visual routes (VRs). Typical MTRs are from 4 to 10 nautical miles (NMs) wide, and have altitude structures from 100 feet AGL to 5,000 feet MSL or higher. The centerlines of MTRs are depicted on aeronautical charts.

Slow Routes are similar to MTRs in structure but are utilized by aircraft that normally operate at low-level airspeeds of less than 250 KIAS. Slower aircraft, such as the C-141 aircraft, can fly safely in the same airspace environment with civilian or commercial air traffic by practicing see-and-avoid techniques under VMC. Slow routes are designated through military approval channels and do not require FAA coordination. The maximum altitude that can be flown in Slow Routes is 1,500 feet AGL.

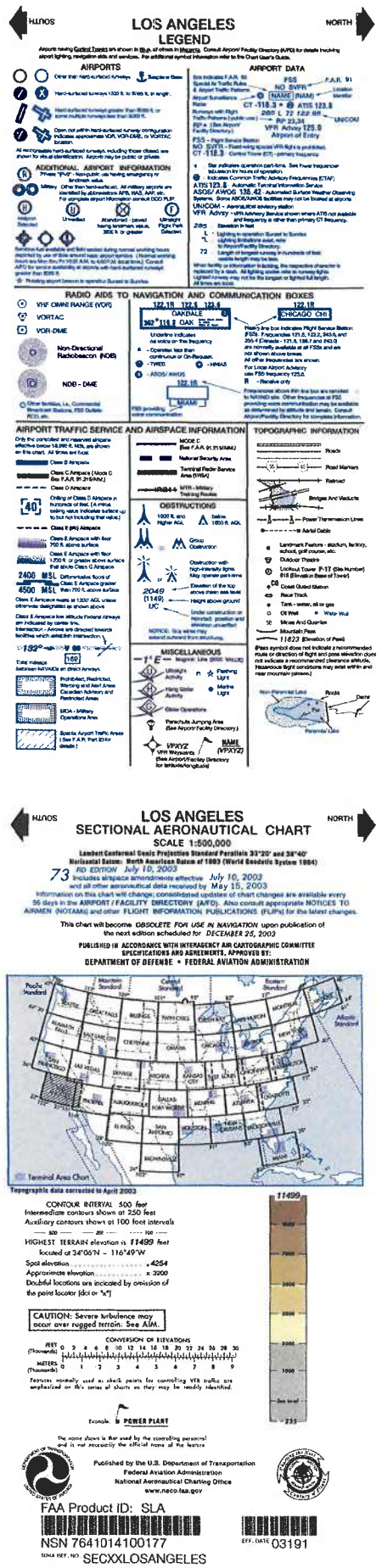
Air refueling tracks and anchors are airspace designated by the FAA for air-refueling operations. Air refueling tracks have designated entry points (initial points), altitude blocks, and exit points. Air refueling tracks are normally flown from point A to point B on a straight line. Refueling anchors have the same restrictions as air refueling tracks. Refueling anchors are flown using a racetrack pattern to remain within designated airspace. Anchor tracks might also be associated with other designated airspace, such as ATC Assigned Airspace or warning areas (over water).

Figure 2-7 depicts airspace areas in the vicinity of March ARB. The airfield is encompassed by Class C airspace up to 10,000 feet above MSL. March ARB has its own ATC personnel to provide flight tracking and aircraft separation services for instrument flight rules (IFR) and VFR aircraft in the vicinity of March ARB. March Radar Ground Control Approach provides Class C services within March ARB Class C Inner and Outer Core airspace and associated Class C Outer Area airspace. March ARB associated Class C Outer Area airspace is defined as the airspace




Reference: FAA Sectional Raster Aeronautical Charts, West Volume 0309, 09-04-03

**Figure 2-7. Local Controlled Airspace in Vicinity of March ARB**



within a 20 NM radius of the centers of the associated Class C Inner Core airspace. Air traffic control services within the March ARB Class C airspace are provided by the March ARB control tower (FAA 2004). Between the hours of 7:00 a.m. and 11:00 p.m. daily ATC services within the March ARB Class C and associated airspace are provided by the March ARB tower and GCA. Between the hours of 11:00 p.m. and 7:00 a.m., March ARB airspace converts from Class C to Class D with ATC services provided by the March ARB tower. In certain situations, aircraft separation requirements might necessitate different routing than the flight tracks shown in Figures 2-4 through 2-6.

# 3. Land Use Compatibility Guidelines

## 3.1 Introduction

DOD developed the AICUZ program for military airfields in 1973. Using this program, DOD works to protect aircraft operational capabilities at its installations and to assist local government officials in protecting and promoting public health, safety, and quality of life. The primary goal of the AICUZ program is to promote compatible land use and development around military airfields by providing information on aircraft noise exposure, height restrictions, and accident potential.

This AICUZ Study describes three basic types of constraints that affect, or result from, flight operations. The first constraint involves areas the FAA and DOD have identified for height restrictions (see Appendix D). USAF obstruction criteria are based on FAR Part 77, Subpart C. The height restrictions are to prevent human-made structures from being built in the flight path of aircraft using airports. Aircraft approach and depart from airports on a diagonal line that gets farther from the ground as distance from the airport increases. The height obstruction criteria reflect this principle, and permit the placement of taller structures as distance from the airport increases.

The second constraint involves NZs produced by the computerized DNL and DOD NOISEMAP methodologies. The DOD NOISEMAP 6.5 software program, which is similar to FAA's Integrated Noise Model but is specific to military aircraft, produces contours showing the noise levels generated by aircraft operations. This AICUZ Study contains noise contours plotted in increments of 5 A-Weighted decibels (dBA), ranging from a DNL of 65 to 80 dBA and a CNEL of 60 to 80 dBA. Figures 3-1 and 3-2 show noise contours for the current aircraft operations in DNL and CNEL, respectively. Additional information on noise methodology is contained in Appendix C.

The third constraint involves APZs based on a statistical analysis of past aircraft accidents. DOD analysis has determined that the areas immediately beyond the ends of the runways and along the approach and departure flight paths have the highest potential for aircraft accidents. Based on this analysis, DOD developed three zones that have a relative potential for accidents (CZs, APZs I and II).

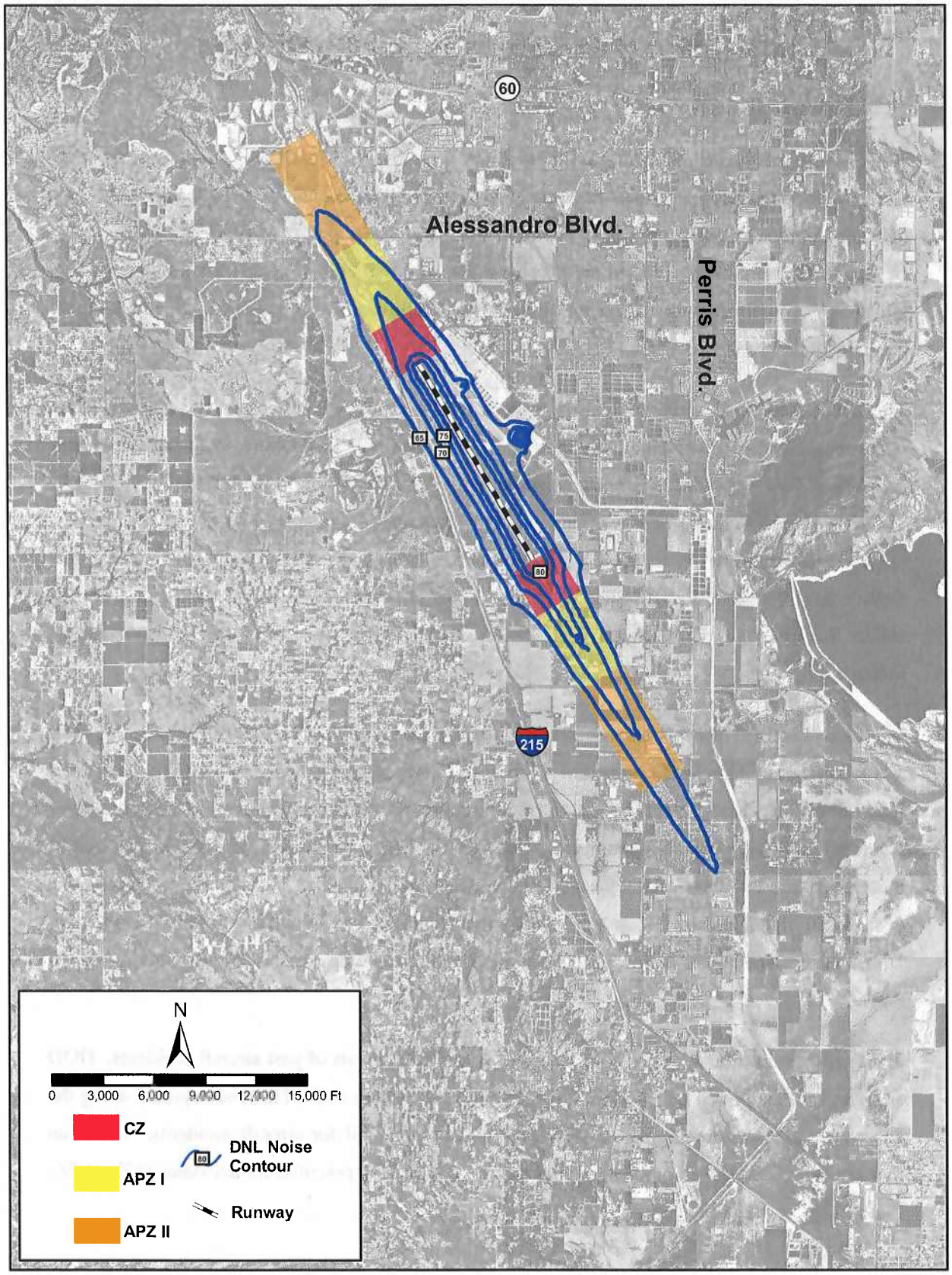



**Figure 3-1. Current DNL Noise Zones and Accident Potential Zones**

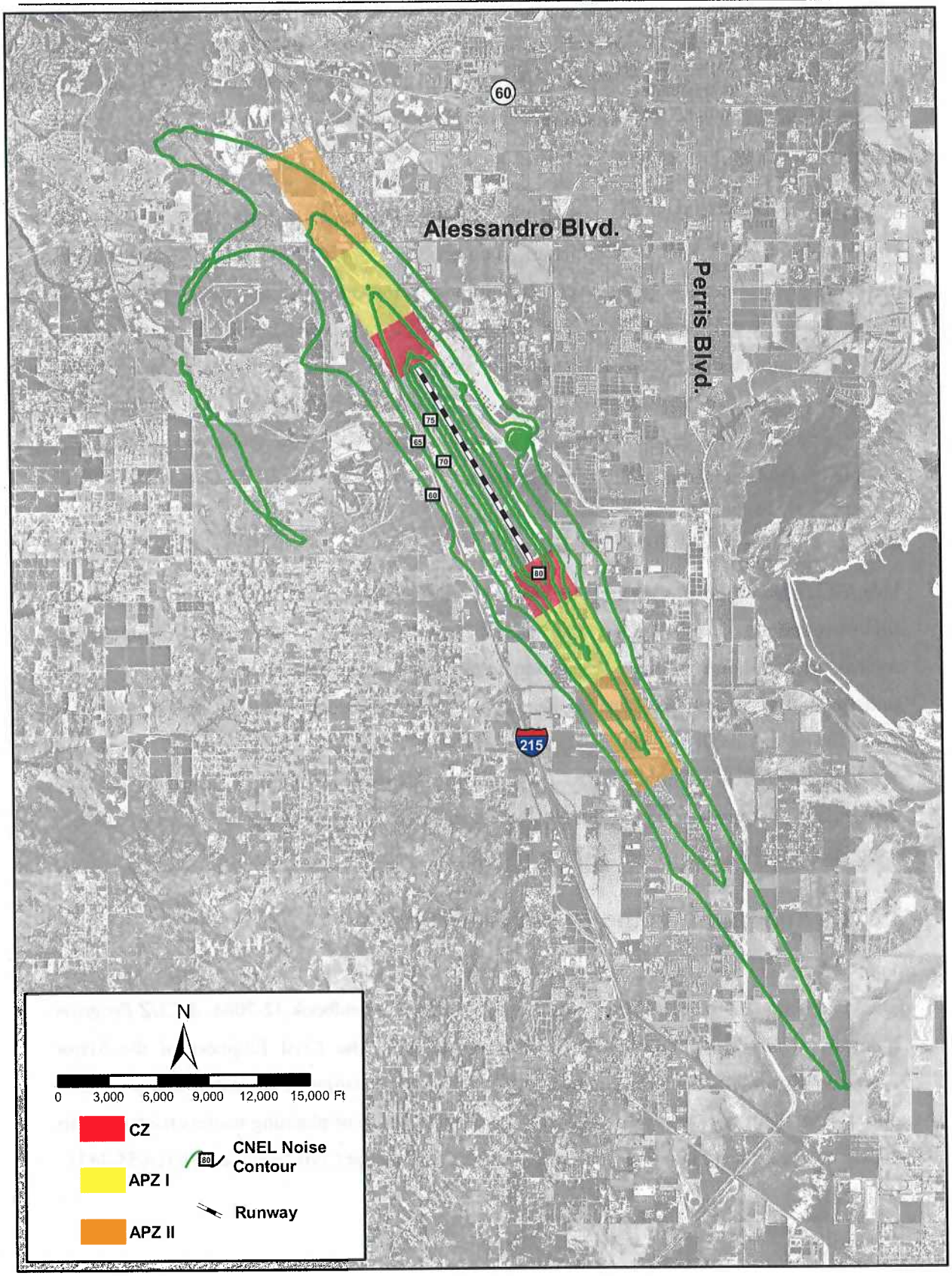



**Figure 3-2. Current CNEL Noise Zones and Accident Potential Zones**

For each runway at March ARB, CZs encompass an area 3,000 feet wide by 3,000 feet long. APZ I is 3,000 feet wide by 5,000 feet long and APZ II is 3,000 feet wide by 7,000 feet long. CZs and APZs for March ARB are presented in this section. Additional information on APZs is contained in Appendix B of this report.

CZs, depicted in red in the noise zone figures, lie closest to the ends of the runway and are the areas of highest risk for accident potential. The overall risk is such that DOD generally acquires the land through purchase or easement to prevent development. APZ I, shown in yellow on Figure 3-1, is an area beyond the CZ, which possesses a high potential for accidents. APZ II, shown in orange on Figure 3-1, is an area beyond APZ I with measurable potential for accidents. While aircraft accident potential in APZs I and II do not necessarily warrant acquisition by the USAF, land use planning and controls are strongly encouraged for the protection of the public. Compatible land uses are specified for these zones.

## 3.2 Land Use Compatibility

This AICUZ study contains general land use guidelines related to safety and noise associated with aircraft operations. Table 3-1 lists land uses that are compatible or incompatible with various combinations of noise exposure (measured in decibels [dBs]), and accident potential. Noise guidelines are essentially the same as those published by the Federal Interagency Committee on Urban Noise in the June 1980 publication, *Guidelines for Considering Noise in Land Use Planning Control.* The *Standard Land Use Coding Manual (SLUCM),* published by the U.S. Department of Transportation and FHA, has been used for identifying and coding land use activities.

## 3.3 Participation in the Planning Process

As local communities prepare their land use plans, AFRC must be ready to provide input. Air Force Instruction 32-7063, *AICUZ Program*, and Air Force Handbook 32-7084, *AICUZ Program Manager's Guide*, give broad AICUZ responsibilities to the Civil Engineer of the Major Command responsible for a base. Responsibility for representation of the installation's interests to local communities is usually delegated to the installation. For planning matters related to this AICUZ study, local communities may call the March ARB Base Civil Engineer at 951-655-4851.

## Table 3-1. Land Use Compatibility

| Land Use | | APZs | | | Noise Zones (in dBs) | | | |
|---|---|---|---|---|---|---|---|---|
| SLUCM No. | Name | CZ | APZ I | APZ II | 65–69 | 70–74 | 75–79 | 80+ |
| 10 | Residential | | | | | | | |
| 11 | Household units | | | | | | | |
| 11.11 | Single units; detached | N | N | Y[1] | A[11] | B[11] | N | N |
| 11.12 | Single units; semidetached | N | N | N | A[11] | B[11] | N | N |
| 11.13 | Single units; attached row | N | N | N | A[11] | B[11] | N | N |
| 11.21 | Two units; side-by-side | N | N | N | A[11] | B[11] | N | N |
| 11.22 | Two units; one above the other | N | N | N | A[11] | B[11] | N | N |
| 11.31 | Apartments; walk-up | N | N | N | A[11] | B[11] | N | N |
| 11.32 | Apartments; elevator | N | N | N | A[11] | B[11] | N | N |
| 12 | Group quarters | N | N | N | A[11] | B[11] | N | N |
| 13 | Residential hotels | N | N | N | A[11] | B[11] | N | N |
| 14 | Mobile home parks or courts | N | N | N | N | N | N | N |
| 15 | Transient lodgings | N | N | N | A[11] | B[11] | C[11] | N |
| 16 | Other residential | N | N | N[1] | A[11] | B[11] | N | N |
| 20 | Manufacturing | | | | | | | |
| 21 | Food and kindred products; manufacturing | N | N[2] | Y | Y | Y[12] | Y[13] | Y[14] |
| 22 | Textile mill products; manufacturing | N | N[2] | Y | Y | Y[12] | Y[13] | Y[14] |
| 23 | Apparel and other finished products made from fabrics, leather, and similar materials; manufacturing | N | N | N[2] | Y | Y[12] | Y[13] | Y[14] |
| 24 | Lumber and wood products (except furniture); manufacturing | N | Y[2] | Y | Y | Y[12] | Y[13] | Y[14] |
| 25 | Furniture and fixtures; manufacturing | N | Y[2] | Y | Y | Y[12] | Y[13] | Y[14] |
| 26 | Paper and allied products; manufacturing | N | Y[2] | Y | Y | Y[12] | Y[13] | Y[14] |
| 27 | Printing, publishing, and allied industries | N | Y[2] | Y | Y | Y[12] | Y[13] | Y[14] |

**Table 3-1. Land Use Compatibility (continued)**

| Land Use | | APZs | | | Noise Zones (in dBs) | | | |
|---|---|---|---|---|---|---|---|---|
| SLUCM No. | Name | CZ | APZ I | APZ II | 65-69 | 70-74 | 75-79 | 80+ |
| 28 | Chemicals and allied products; manufacturing | N | N | N[2] | Y | Y[12] | Y[13] | Y[14] |
| 29 | Petroleum refining and related industries | N | N | N | Y | Y[12] | Y[13] | Y[14] |
| 30 | Manufacturing | | | | | | | |
| 31 | Rubber and misc. plastic products; manufacturing | N | N[2] | N[2] | Y | Y[12] | Y[13] | Y[14] |
| 32 | Stone, clay, and glass products; manufacturing | N | N[2] | Y | Y | Y[12] | Y[13] | Y[14] |
| 33 | Primary metal industries | N | N[2] | Y | Y | Y[12] | Y[13] | Y[14] |
| 34 | Fabricated metal products; manufacturing | N | N[2] | Y | Y | Y[12] | Y[13] | Y[14] |
| 35 | Professional, scientific, and controlling instruments; photographic and optical goods; watches and clocks; manufacturing | N | N | N[2] | Y | A | B | N |
| 39 | Miscellaneous manufacturing | N | Y[2] | Y[2] | Y | Y[12] | Y[13] | Y[14] |
| 40 | Transportation, communications, and utilities | | | | | | | |
| 41 | Railroad, rapid rail transit, and street railroad transportation | N[3] | Y[4] | Y | Y | Y[12] | Y[13] | Y[14] |
| 42 | Motor vehicle transportation | N[3] | Y | Y | Y | Y[12] | Y[13] | Y[14] |
| 43 | Aircraft transportation | N[3] | Y[4] | Y | Y | Y[12] | Y[13] | Y[14] |
| 44 | Marine craft transportation | N[3] | Y[4] | Y | Y | Y[12] | Y[13] | Y[14] |
| 45 | Highway and street right-of-way | N[3] | Y | Y | Y | Y[12] | Y[13] | Y[14] |
| 46 | Automobile parking | N[3] | Y[4] | Y | Y | Y[12] | Y[13] | Y[14] |
| 47 | Communications | N[3] | Y[4] | Y | Y | A[15] | B[15] | N |
| 48 | Utilities | N[3] | Y[4] | Y | Y | Y | Y[12] | Y[13] |

**Table 3-1. Land Use Compatibility (continued)**

| Land Use | APZs | Noise Zones (in dBs) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SLUCM No. | Name | CZ | APZ I | APZ II | 65-69 | 70-74 | 75-79 | 80+ |
| 50 | Trade | | | | | | | |
| 51 | Wholesale trade | N | Y[2] | Y | Y | Y[12] | Y[13] | Y[14] |
| 52 | Retail trade-building materials, hardware, and farm equipment | N | Y[2] | Y | Y | Y[12] | Y[13] | Y[14] |
| 53 | Retail trade-general merchandise | N | N[2] | Y[2] | Y | A | B | N |
| 54 | Retail trade-food | N | N[2] | Y[2] | Y | A | B | N |
| 55 | Retail trade-automotive, marine craft, aircraft, and accessories | N | Y[2] | Y[2] | Y | A | B | N |
| 56 | Retail trade-apparel and accessories | N | N[2] | Y[2] | Y | A | B | N |
| 57 | Retail trade-furniture, home furnishings, and equipment | N | N[2] | Y[2] | Y | A | B | N |
| 58 | Retail trade-eating and drinking establishments | N | N | N[2] | Y | A | B | N |
| 59 | Other retail trade | N | N[2] | Y[2] | Y | A | B | N |
| 60 | Services | | | | | | | |
| 61 | Finance, insurance and real estate services | N | N | Y[6] | Y | A | B | N |
| 62 | Personal services | N | N | Y[6] | Y | A | B | N |
| 62.4 | Cemeteries | N | Y[7] | Y[7] | Y | Y[12] | Y[13] | Y[14, 21] |
| 63 | Business services | N | Y[8] | Y[8] | Y | A | B | N |
| 64 | Repair services | N | Y[2] | Y | Y | Y[12] | Y[13] | Y[14] |
| 65 | Professional services | N | N | Y[6] | Y | A | B | N |
| 65.1 | Hospitals, nursing homes | N | N | N | A* | B* | N | N |
| 65.1 | Other medical facilities | N | N | N | Y | A | B | N |
| 66 | Contract construction services | N | Y[6] | Y | Y | A | B | N |
| 67 | Governmental services | N | N | Y[6] | Y* | A* | B* | N |
| 68 | Educational services | N | N | N | A* | B* | N | N |
| 69 | Miscellaneous services | N | N[2] | Y[2] | Y | A | B | N |

**Table 3-1. Land Use Compatibility (continued)**

| Land Use | APZs | Noise Zones (in dBs) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SLUCM No. | Name | CZ | APZ I | APZ II | 65-69 | 70-74 | 75-79 | 80+ |
| 70 | Cultural, entertainment and recreational services | | | | | | | |
| 71 | Cultural activities (including churches) | N | N | N[2] | A* | B* | N | N |
| 71.2 | Nature exhibits | N | Y[2] | Y | Y* | N | N | N |
| 72 | Public assembly | N | N | N | Y | N | N | N |
| 72.1 | Auditoriums, concert halls | N | N | N | A | B | N | N |
| 72.11 | Outdoor music shell, amphitheaters | N | N | N | N | N | N | N |
| 72.2 | Outdoor sports arenas, spectator sports | N | N | N | Y[17] | Y[17] | N | N |
| 73 | Amusements | N | N | Y[8] | Y | Y | N | N |
| 74 | Recreational activities (including golf courses, riding stables, water recreation) | N | Y[8,9, 10] | Y | Y* | A* | B* | N |
| 75 | Resorts and group camps | N | N | N | Y* | Y* | N | N |
| 76 | Parks | N | Y[8] | Y[8] | Y* | Y* | N | N |
| 79 | Other cultural, entertainment, and recreation | N | Y[9] | Y[9] | Y* | Y* | N | N |
| 80 | Resources production and extraction | | | | | | | |
| 81 | Agriculture (except livestock) | Y[16] | Y | Y | Y[18] | Y[19] | Y[20] | Y[20, 21] |
| 81.5 to 81.7 | Livestock farming and animal breeding | N | Y | Y | Y[18] | Y[19] | Y[20] | Y[20, 21] |
| 82 | Agriculture-related activities | N | Y[5] | Y | Y[18] | Y[19] | N | N |
| 83 | Forestry activities and related services | N[5] | Y | Y | Y[18] | Y[19] | Y[20] | Y[20, 21] |
| 84 | Fishing activities and related services | N[5] | Y[5] | Y | Y | Y | Y | Y |
| 85 | Mining activities and related services | N | Y[5] | Y | Y | Y | Y | Y |
| 89 | Other resources production and extraction | N | Y[5] | Y | Y | Y | Y | Y |

## Table 3-1. Land Use Compatibility (continued)

**LEGEND**

SLUCM – Standard Land Use Coding Manual, U.S. Department of Transportation.

Y – (Yes) – Land uses and related structures are compatible without restriction.

N – (No) – Land use and related structures are not compatible and should be prohibited.

$Y^X$ – (yes with restrictions) – Land use and related structures generally compatible; see notes indicated by the superscript.

$N^X$ – (no with exceptions) – See notes indicated by the superscript.

NLR – Noise Level Reduction (NLR) (outdoor to indoor) to be achieved through incorporation of noise attenuation measures into the design and construction of the structures.

A, B, or C – Land use and related structures generally compatible; measures to achieve NLR for A (DNL 65–69 dB), B (DNL 70–74 dB), C (DNL 75–79 dB), need to be incorporated into the design and construction of structures.

$A^*$, $B^*$, and $C^*$ – Land use generally compatible with NLR; however, measures to achieve an overall noise level reduction do not necessarily solve noise difficulties and additional evaluation is warranted. See appropriate notes below.

* – The designation of these uses as "compatible" in this zone reflects individual Federal agency and program considerations of general cost and feasibility factors, as well as past community experiences and program objectives. Localities, when evaluating the application of these guidelines to specific situations, might have different concerns or goals to consider.

**NOTES**

1. Suggested maximum density of 1–2 dwelling units per acre, possibly increased under a Planned Unit Development where maximum lot coverage is less than 20 percent.
2. Within each land use category, uses exist where further deliberating by local authorities might be needed due to the variation of densities in people and structures. Shopping malls and shopping centers are considered incompatible use in any accident potential zone (CZ, APZ I, or APZ II).
3. The placement of structures, buildings, or aboveground utility lines in the CZ is subject to severe restrictions. In a majority of the CZs, these items are prohibited. See Air Force Instruction 32-7060, *Interagency and Intergovernmental Coordination for Environmental Planning*, and Air Force Joint Manual 32-8008, *Airfield and Heliport Planning Criteria*, for specific guidance.
4. No passenger terminals and no major aboveground transmission lines in APZ I.
5. Factors to be considered: labor intensity, structural coverage, explosive characteristics, and air pollution.
6. Low-intensity office uses only. Meeting places, auditoriums, etc. are not recommended.
7. Excludes chapels.
8. Facilities must be low intensity.
9. Clubhouse not recommended.
10. Areas for gatherings of people are not recommended.
11. a) Although local conditions might require residential use, it is discouraged in DNL 65–69 dB and strongly discouraged in DNL 70–74 dB. The absence of viable alternative development options should be determined, and an evaluation indicating a demonstrated community need for residential use would not be met if development were prohibited in these zones should be conducted prior to approvals.

    b) Where the community determines the residential uses must be allowed, measures to achieve outdoor-to-indoor noise level reduction (NLR) for DNL 65–69 dB and DNL 70–74 dB should be incorporated into building codes and considered in individual approvals.

    c) NLR criteria will not eliminate outdoor noise problems. However, building location and site planning, and design and use of berms and barriers can help mitigate outdoor exposure, particularly from near-ground-level sources. Measures that reduce outdoor noise should be used whenever practical in preference to measures which only protect interior spaces.
12. Measures to achieve the same NLR as required for facilities in DNL 65–69 dB range must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
13. Measures to achieve the same NLR as required for facilities in DNL 70–74 dB range must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
14. Measures to achieve the same NLR as required for facilities in DNL 75–79 dB range must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
15. If noise sensitive, use indicated NLR; if not, the use is compatible.
16. No buildings.
17. Land use is compatible provided special sound reinforcement systems are installed.
18. Residential buildings require the same NLR as required for facilities in DNL 65–69 dB range.
19. Residential buildings require the same NLR as required for facilities in DNL 70–74 dB range.
20. Residential buildings are not permitted.
21. Land use is not recommended. If the community decides the use is necessary, personnel should wear hearing protection devices.

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# 4. Land Use Analysis

## 4.1 Introduction

Land use planning and control is a dynamic process. The specific characteristics of land use determinants will reflect the changing conditions of the economic, social, and physical environment of a community, as well as changing public concern. The planning process works to accommodate this fluidity, in that many decisions are not based solely on boundary lines, but rather on more generalized area designations.

## 4.2 Existing Land Use

March ARB is in southern California, approximately 70 miles east of downtown Los Angeles and 100 miles north of San Diego. March ARB lies within western Riverside County, one of the largest counties in California. The county is composed of 7,214 square miles and extends from the Arizona border to within 10 miles of the Pacific Ocean. The total population of Riverside County exceeded 1.5 million in 2000 and was estimated to exceed 1.7 million in 2003. Between 1990 to 2000 the county population increased by 32 percent (U.S. Bureau of Census 2000). The average population density in Riverside County was approximately 214 persons per square mile in 2000, although the eastern portion of the county is more rural and less developed than the western portion.

In addition to being the county seat, the City of Riverside is the largest city in Riverside County and has a population of approximately 255,166 (U.S. Bureau of Census 2000). Population and economic growth in Riverside County are influenced by its proximity to the greater Los Angeles metropolitan area, which serves as the economic and population center for southern California. The city of Los Angeles is west of March ARB and has a population of about 3.7 million; Los Angeles County has about 9.5 million (U.S. Bureau of Census 2000). This area is home to 28 percent of the state's residents. Figure 2-1 shows the location of March ARB in relation to California and the surrounding region.

March ARB comprises approximately 2,258 acres of U.S. Government-owned and easement land, and is surrounded by the City of Riverside to the northwest, the City of Moreno Valley to the north and east, and the City of Perris to the south. Unincorporated areas of Riverside County lie to the west of the base. As previously mentioned, the MJPA has land use authority for the land immediately surrounding March ARB (see Figure 2-2). This land consists of residential, commercial, and light industrial development. Table 4-1 summarizes the acreage by noise dB

zone category for the current aircraft operations in the vicinity of March ARB. Table 4-2 provides a detailed breakdown by land use type for the current aircraft operations noise zones. Some incompatibilities exist around March ARB as a result of noise exposure. Figure 4-1 illustrates the existing land use coverage surrounding March ARB for the current aircraft operations noise zones. Land use data were obtained January 2005 from Riverside County.

Various designated land uses are found within the March ARB CZs, APZs I, and APZs II. According to Land Use Compatibility, which is based on land use categories outlined in the SLUCM, the placement of structures or buildings in the CZ is subject to severe restrictions, or might be prohibited. While land use such as agricultural land is compatible within the CZ, the March ARB CZs are also composed of areas zoned for industrial/manufacturing and residential (see Figure 4-2). The north CZ is zoned Open Space and has a CZ Overlay that requires consistency with the AICUZ. The USAF has purchased development easements within the entire south CZ that prevents development of buildings. Depending on the specific type of land use within APZs I and II, coverage such as industrial/manufacturing and business/office could be permitted depending on the specific use. Other land uses such as public facilities or roadways and agricultural land will be permitted within APZs I and II (MARB 2003b). Some incompatibilities exist around March ARB as a result of CZ and APZ guidelines.

The City of Riverside is composed of a variety of land uses. Land uses in the southeastern section of the city, primarily residential and commercial, are subject to CNEL of 60 to 70 dB noise levels. Some areas north and west of the base are zoned for residential use and are subject to CNEL of 60 to 70 dB noise levels.

Land use in the City of Moreno Valley, north and east of March ARB, is predominantly residential and commercial. The area adjacent to the northern base boundary and Alessandro Boulevard is primarily agricultural and vacant land, with some industrial activity. Adjacent to the eastern edge of the base, land is used for residential, commercial, and agricultural activities. Two areas in the City of Moreno Valley, subject to aircraft noise levels between CNEL of 60 and 75 dB, are north of the base and adjacent to Interstate 215 on the eastern border of the base. An area north of the base is zoned residential and is subject to CNEL of 60 to 70 dB aircraft noise levels (MARB 1998).

**Table 4-1. Land Use Acreage within Current DNL Noise Zones**

| Contour Value (DNL) | Land Use Category | Acres |
|---|---|---|
| 65 – 69 | March ARB | 491.04 |
| | Agricultural | 554.61 |
| | Commercial | 170.56 |
| | Industrial | 128.82 |
| | Public | 46.40 |
| | Residential | 135.90 |
| | Roads | 113.28 |
| | Unknown | 115.98 |
| | Subtotal | 1,756.59 |
| 70 – 74 | March ARB | 480.52 |
| | Agricultural | 186.43 |
| | Commercial | 34.49 |
| | Industrial | 0.00 |
| | Public | 18.88 |
| | Residential | 12.55 |
| | Roads | 10.52 |
| | Unknown | 20.26 |
| | Subtotal | 763.65 |
| 75 – 79 | March ARB | 264.15 |
| | Agricultural | 43.42 |
| | Commercial | 0.00 |
| | Industrial | 0.00 |
| | Public | 0.00 |
| | Residential | 0.39 |
| | Roads | 1.95 |
| | Unknown | 8.37 |
| | Subtotal | 318.28 |
| 80+ | March ARB | 321.76 |
| | Agricultural | 0.00 |
| | Commercial | 0.00 |
| | Industrial | 0.00 |
| | Public | 0.00 |
| | Residential | 0.00 |
| | Roads | 0.00 |
| | Unknown | 0.00 |
| | Subtotal | 321.76 |
| **Total** | | **3,160.28** |

Source: Riverside County Northwest County CD (shapefile = "parcel"), January 2005

**Table 4-2. Land Use Compatibility Based on Current DNL Noise Zones**

| Contour Value (DNL) | USAF Land Use Recommendation | Acres |
|---|---|---|
| 65 – 69 | March ARB | 491.05 |
| | Compatible | 1,036.62 |
| | Potentially Incompatible | 228.92 |
| | Incompatible | 0.00 |
| | Subtotal | 1,756.59 |
| 70 – 74 | March ARB | 480.52 |
| | Compatible | 196.95 |
| | Potentially Incompatible | 86.19 |
| | Incompatible | 0.00 |
| | Subtotal | 763.65 |
| 75 – 79 | March ARB | 264.15 |
| | Compatible | 45.36 |
| | Potentially Incompatible | 8.37 |
| | Incompatible | 0.39 |
| | Subtotal | 318.27 |
| 80+ | March ARB | 321.76 |
| | Compatible | 0.00 |
| | Potentially Incompatible | 0.00 |
| | Incompatible | 0.00 |
| | Subtotal | 321.76 |
| **Total** | | **3,160.27** |

Source: Riverside County Northwest County CD (shapefile = "parcel"), January 2005

The City of Perris is south of March ARB and consists of residential, commercial, and industrial areas. Adjacent lands are zoned for a mixture of residential, commercial, and industrial purposes. South of the base, within APZ II, several mobile homes are subject to CNEL of 60 to 80 dB noise levels (MARB 1998). The local governments adjacent to March ARB are interested in protecting the base mission and in preventing any future encroachments into the area surrounding the base. There are several plans and policies related to land use near March ARB, including the *AICUZ Program* and the *MJPA General Plan, 1999*.

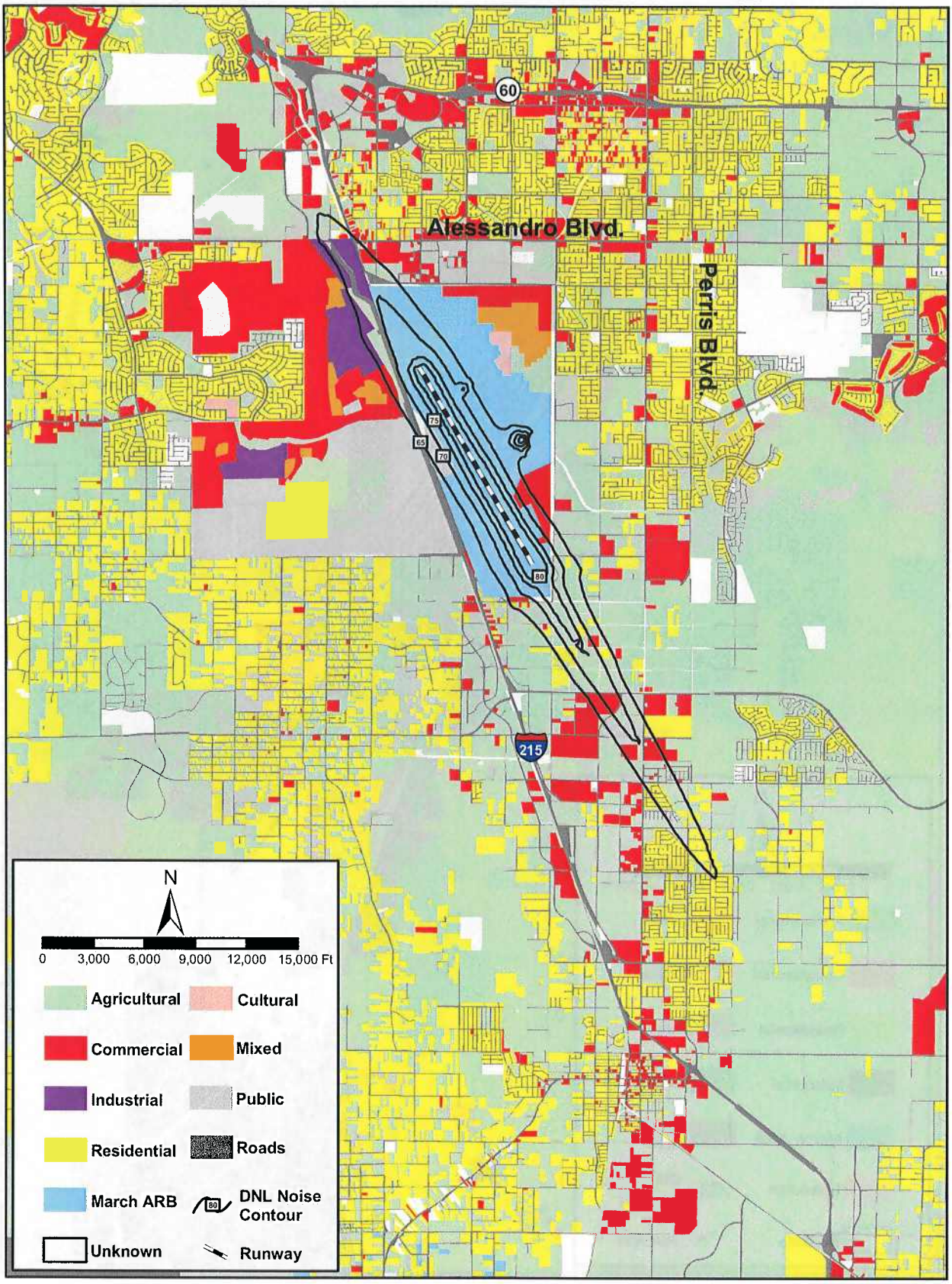


**Figure 4-1. Existing Land Use with Current DNL Noise Zones in the Vicinity of March ARB**

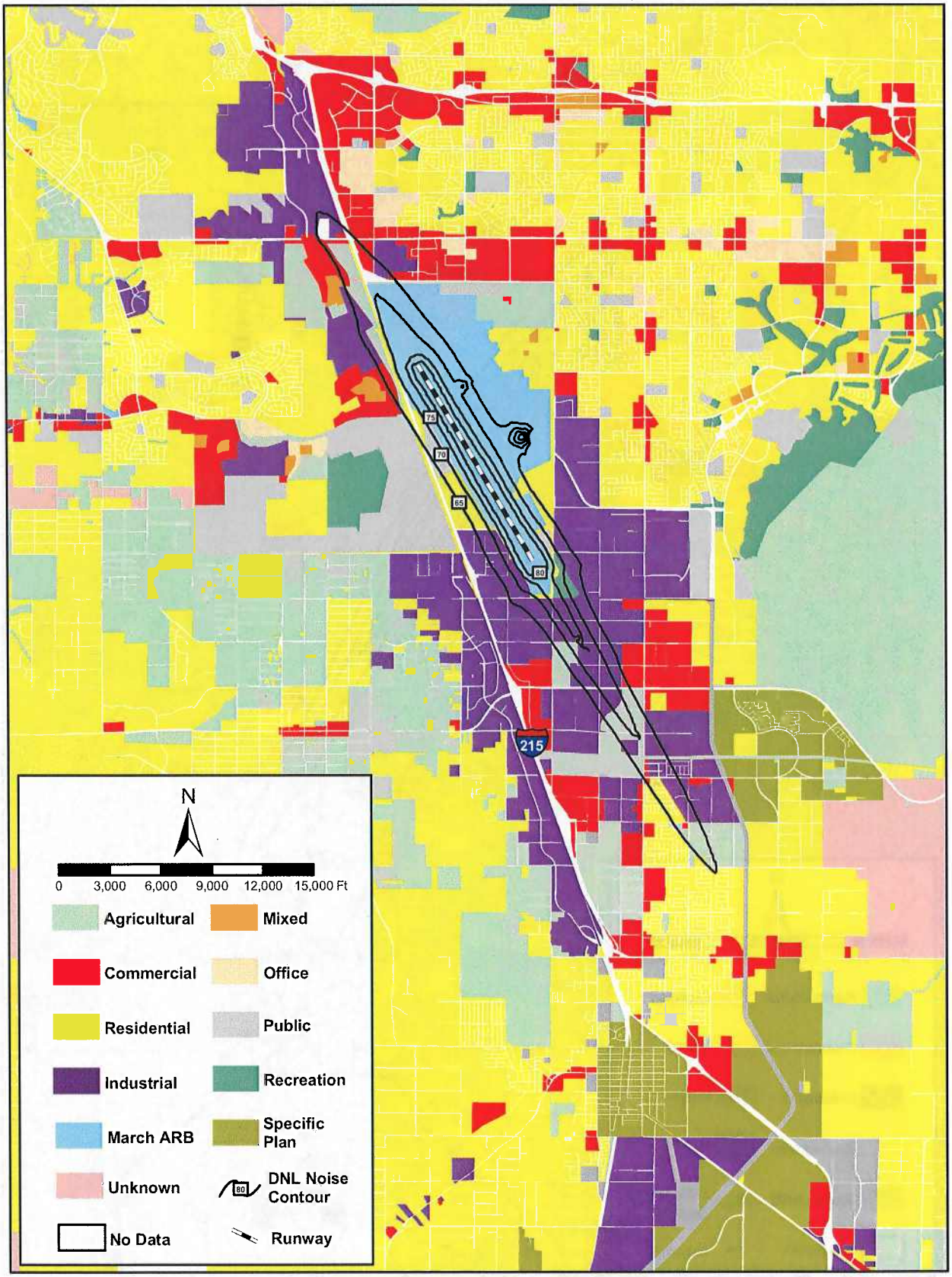


**Figure 4-2. Existing Zoning with Current DNL Noise Zones in the Vicinity of March ARB**

## 4.3 Current Zoning

Zoning refers to the division of a municipality into districts and establishment of regulations to govern the use, placement, and size of lots and structures. The exact zoning designation of any parcel of land should be determined through consultation with local planning agencies.

Land use restrictions in the March ARB environs involve a combination of conventional zoning, airfield overlay district zoning, and building and construction standards for noise attenuation. These restrictions are a result of the community's willingness to guide development in a manner compatible with March ARB operations.

According to current zoning maps, the area within March ARB boundaries is largely agricultural. As the distance increases from the March ARB runways, land use along the typical flight corridors changes to areas designated for such uses as medium-density residential, light industrial, and commercial retail. Figure 4-2 illustrates the current zoning in the vicinity of March ARB. Zoning data were obtained from the city of Moreno Valley on March 25, 2005, Riverside County on January 3, 2005, and the city of Perris on June 8, 2004. Updated zoning data from the city of Riverside had not been received at the time this document was released, however the most recent data provided by Riverside County was incorporated where applicable.

The March ARB environs is an ideal example of how communities neighboring an airbase have cooperated with USAF to ensure incompatible land uses will be minimized in the environs. The jurisdictions have been extremely proactive in their stance on land use restrictions and guidelines in an effort to ensure continued airbase viability. The local governments around March ARB are interested in protecting the base mission and in preventing any future encroachments into the area surrounding the base.

For example, Riverside County has developed a comprehensive three-part, integrated project called the Riverside County Integrated Project to determine future conservation, transportation, housing, and economic needs within Riverside County (RCIP 2003).

The *March Business Center – Specific Plan* (February 2003) contains CZ, APZ I, and APZ II overlay districts in the northern section of March ARB airfield. Property inside of the overlay districts must be in full compliance with the 1998 AICUZ with respect to land use and height restrictions. MJPA has approved a plan with industrial uses west of the airport within the CZ, APZ I, and APZ II; this plan will be in full compliance with the overlay districts.

On the southern side of the airfield, the USAF has purchased easements in the south CZ to prevent incompatible development. Currently, there are no land use conflicts in the north CZ, however there are approximately 14 acres of potentially incompatible and 3 acres of incompatible land uses in the south CZ.

## 4.4 Incompatible Land Uses

### 4.4.1 Noise Zones

Under the AICUZ Program, DOD identifies noise zones as a tool for local planning agencies. The DOD and other Federal agencies use DNL of 65 dB as a land use planning threshold. However, in the State of California, CNEL of 60 dB is used in land use planning. Additional details of the methodologies used to produce the noise contours are presented in Appendix A. Table 4-2 summarizes the acreage by NZs in the vicinity of March ARB. The majority of potentially incompatible land is inside of the DNL of 65–69 dB NZ. Property considered to be incompatible land use consisted of 0.39 acres in the DNL of 75–79 dB NZ. Land use compatibility under the Current Scenario is shown in Figure 4-3.

### 4.4.2 Accident Potential Zones

Various segments of land zoned commercial, industrial, and residential exist along the CZs, APZs I, and APZs II. As previously mentioned, overlay districts are present in the northern CZs, APZs I, and APZs II. Land use inside of the overlay districts must be in full compliance with the 1998 AICUZ. Table 4-3 summarizes the land use compatibility within the CZs and APZs.

#### Clear Zones

Land classified as industrial, agricultural/open space, and commercial are within the CZs either north or south of March ARB. As shown on Figure 4-4, there is an area of commercial property in the south CZ that is considered incompatible and an area of unknown land use that is considered potentially incompatible. The USAF has purchased development easements in the south CZ to prevent further incompatible growth in the area. There are no incompatible or potentially incompatible land uses within the north CZ.

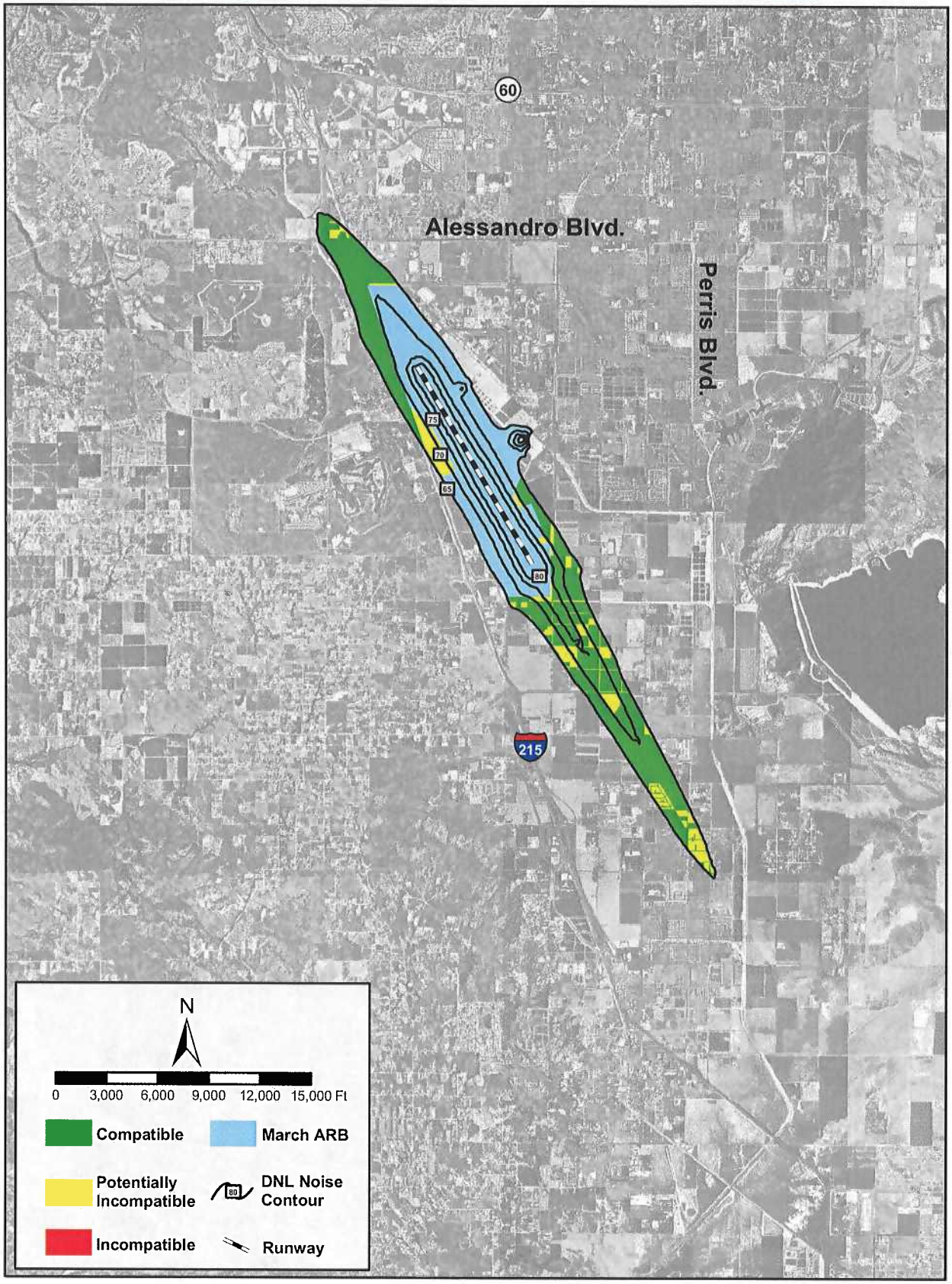


**Figure 4-3. Land Use Compatibility Based on Current DNL Noise Zones**

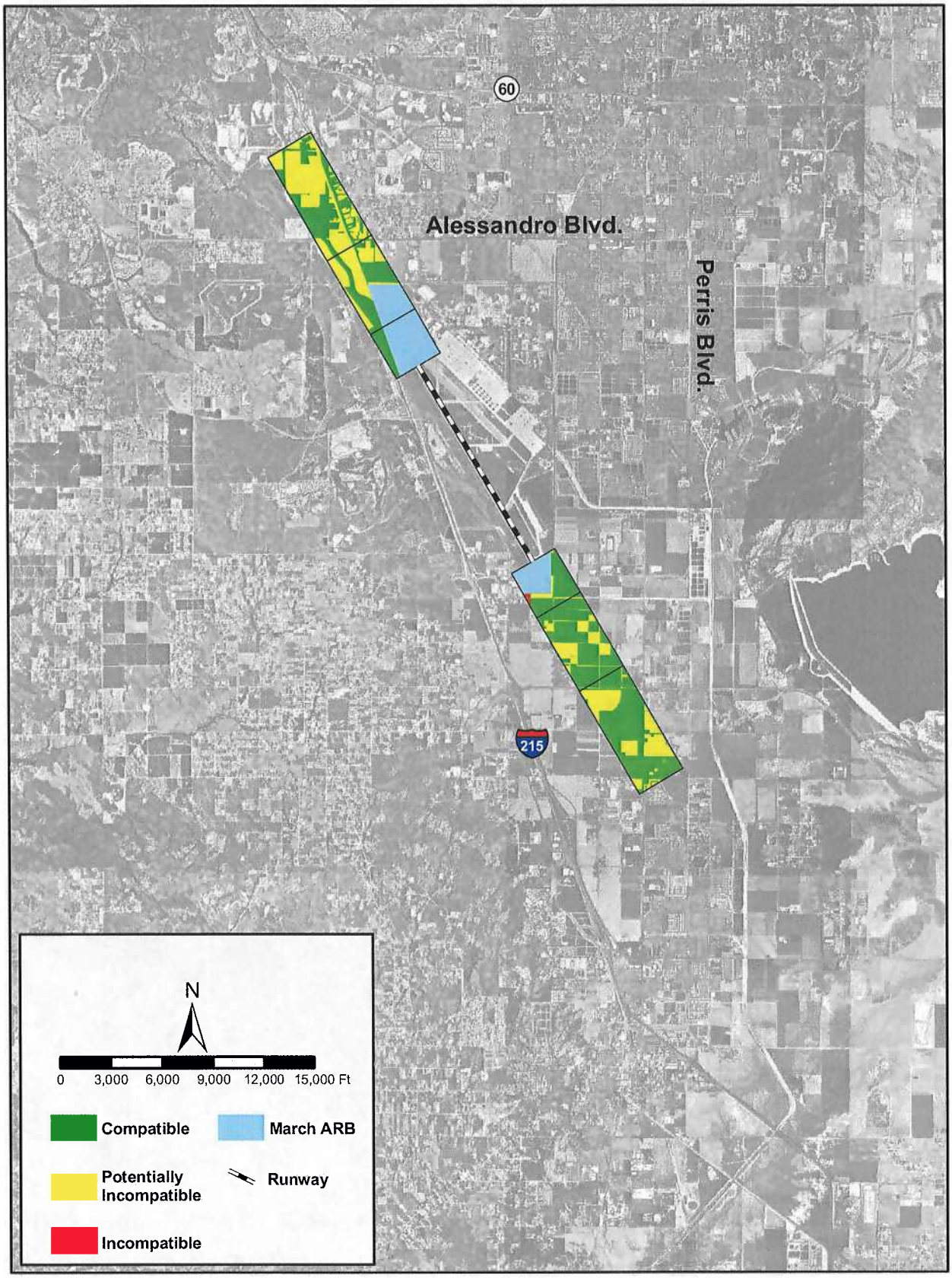


**Figure 4-4. Land Use Compatibility Based on Accident Potential Zones**

**Table 4-3. Land Use Compatibility Based on Accident Potential Zones**

| Contour Value (DNL) | USAF Land Use Recommendation | Acres |
|---|---|---|
| **North End** | | |
| CZ – North End | March ARB | 169.03 |
| | Compatible | 37.58 |
| | Potentially Incompatible | 0.00 |
| | Incompatible | 0.00 |
| | Subtotal | 206.61 |
| APZ I – North End | March ARB | 97.94 |
| | Compatible | 123.69 |
| | Potentially Incompatible | 122.72 |
| | Incompatible | 0.00 |
| | Subtotal | 344.35 |
| APZ II – North End | March ARB | 0.00 |
| | Compatible | 207.81 |
| | Potentially Incompatible | 274.29 |
| | Incompatible | 0.00 |
| | Subtotal | 482.10 |
| | **Total** | **1,033.06** |
| **South End** | | |
| CZ – South End | March ARB | 90.86 |
| | Compatible | 97.97 |
| | Potentially Incompatible | 14.31 |
| | Incompatible | 3.47 |
| | Subtotal | 206.61 |
| APZ I – South End | March ARB | 0.00 |
| | Compatible | 253.01 |
| | Potentially Incompatible | 91.34 |
| | Incompatible | 0.00 |
| | Subtotal | 344.35 |
| APZ II – South End | March ARB | 0.00 |
| | Compatible | 318.84 |
| | Potentially Incompatible | 163.26 |
| | Incompatible | 0.00 |
| | Subtotal | 482.10 |
| | **Total** | **1,033.06** |

Source: Riverside County Northwest County CD (shapefile = "parcel"), January 2005

### Accident Potential Zone I

Residential, industrial, agricultural/open space, and commercial land uses are found within March ARB APZs I. As shown on Figure 4-4, some potentially incompatible land is located in the north APZ I. These land uses include residential, commercial, industrial, and mixed use. Potentially incompatible land use in the south APZ I includes residential and commercial property. Table 3-1 provides a specific listing of the acceptable land uses within APZ I.

### Accident Potential Zone II

Within APZ II, residential development might be compatible providing it does not exceed USAF density recommendations of one to two dwelling units per acre. Potentially incompatible land inside of the north and south APZ II consists mainly of commercial and residential uses. No incompatible land exists within the APZ II zones.

## 4.4.3 Planning Considerations

AICUZ noise contours describe the noise characteristics of a specific operational environment and will change if a significant operational change is made. Should a new mission be established at March ARB, adding a larger number of airplanes or different aircraft types, the AICUZ would be amended.

Additionally, DOD recommends that the AICUZ Study be used with all other planning data. Therefore, specific land use control decisions should not be based solely on AICUZ boundaries. March ARB has provided flight track, APZ, and noise contour information in this study that reflects the most current and accurate picture of aircraft activities.

# 5. Potential Future Missions

The USAF actively studies areas around March ARB subject to aircraft noise and potential hazards of aircraft accidents. The AICUZ program was developed to describe current air operations and, in some cases, possible future operations scenarios. The Forecasted Scenario reflects proposed operations for 2010.

## 5.1 Forecasted Mission

The *Environmental Assessment of the Beddown of C-17 Aircraft at March Air Reserve Base, California* analyzes AFRC's Proposed Action and the No Action Alternative. A Finding of No Significant Impact was prepared by the USAF that determined there would be no significant impacts from the replacement of the aging C-141C Starlifter aircraft with the more modern C-17 Globemaster III aircraft. The USAF also determined that it is operationally prudent to maintain strategic airlift capability on the West Coast to continue to meet present and future air mobility requirements. The AFRC is replacing the 452 AMW aircraft based at March ARB, California. The 452 AMW had 10 C-141C Primary Authorized Aircraft (PAA) at the beginning of 2005. Since that time, C-141C aircraft have been retired; in April 2005 there were four C-141C PAA. These aircraft are being replaced with C-17. In addition to the change proposed by the military, the MJPA will begin commencing additional approved operations. The results of these proposed changes are summarized in Tables 5-1 and 5-2, and Figures 5-1 and 5-2, which present the noise zones in DNL and CNEL noise metrics, respectively.

Table 5-1 is divided into military, civilian, and other aircraft operations. Military operations include based, transient, and contract military carriers. Civilian operations include cargo and corporate aircraft from the MJPA. Other aircraft operations consist of aircraft operations from the California Department of Forestry. Operations under the Forecasted Scenario are expected to increase for both military and civilian aircraft. It is anticipated that military-based aircraft will increase their annual operations by more than 10,000. Aircraft from military transient and contract military carriers will increase by about 400 operations annually.

Under the Current Scenario, military aircraft consist of approximately 82 percent of the total operations. Under the Forecast Scenario the percent of military operations at March ARB would decrease to about 65 percent, civilian operations would increase to 30 percent, and California Department of Forestry aircraft operations would be make up the remaining five percent.

**Table 5-1. Summary of Forecast Airfield Operations**

| Aircraft (Substitution) | Average Daily Arrival Operations | | | Average Daily Departure Operations | | | Average Daily Closed Pattern Operations | | | Total Average Daily Operations | Total Annual Operations |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Day | Evening | Night | Day | Evening | Night | Day | Evening | Night | | |
| MILITARY AIRCRAFT | | | | | | | | | | | |
| **Based** | | | | | | | | | | | |
| AH-1G | 4.17 | 0.00 | 0.00 | 4.17 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 8.33 | 250 |
| C-17 | 13.48 | 3.85 | 0.29 | 13.48 | 3.85 | 0.29 | 11.29 | 1.96 | 0.87 | 63.46 | 16,500 |
| CH-46E | 5.00 | 0.00 | 0.00 | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 10.00 | 300 |
| CH-53E | 5.00 | 0.00 | 0.00 | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 10.00 | 300 |
| F-16 | 1.99 | 0.17 | 0.00 | 1.99 | 0.17 | 0.00 | 0.94 | 0.07 | 0.00 | 6.35 | 1,650 |
| KC-135R | 3.00 | 1.26 | 1.10 | 4.07 | 0.91 | 0.38 | 14.99 | 6.06 | 8.21 | 69.23 | 18,000 |
| UH-1N | 5.00 | 0.00 | 0.00 | 5.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 10.00 | 300 |
| UH60A | 1.85 | 0.00 | 0.00 | 1.85 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 3.69 | 960 |
| *Subtotal* | *39.48* | *5.28* | *1.39* | *40.55* | *4.92* | *0.67* | *27.22* | *8.09* | *9.08* | *181.06* | *38,260* |
| **Transient** | | | | | | | | | | | |
| AV-8B | 0.10 | 0.00 | 0.00 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 68 |
| C-12 | 0.82 | 0.00 | 0.00 | 0.82 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.65 | 560 |
| C-130H&N&P | 0.79 | 0.00 | 0.00 | 0.79 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.59 | 540 |
| C-17 | 0.76 | 0.00 | 0.00 | 0.76 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.53 | 520 |
| C-21A | 0.09 | 0.00 | 0.00 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.19 | 64 |
| C-5A | 0.82 | 0.00 | 0.00 | 0.82 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.65 | 560 |
| C-9A | 2.35 | 0.00 | 0.00 | 2.35 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.71 | 1,600 |
| F-16 | 0.18 | 0.00 | 0.00 | 0.18 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.35 | 120 |

**Table 5-1. Summary of Forecast Airfield Operations (continued)**

| Aircraft (Substitution) | Average Daily Arrival Operations | | | Average Daily Departure Operations | | | Average Daily Closed Pattern Operations | | | Total Average Daily Operations | Total Annual Operations |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Day | Evening | Night | Day | Evening | Night | Day | Evening | Night | | |
| F-18 | 0.27 | 0.00 | 0.00 | 0.27 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.53 | 180 |
| KC-10A | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 680 |
| KC-135R | 0.50 | 0.00 | 0.00 | 0.50 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 340 |
| P-3A | 0.04 | 0.00 | 0.00 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.08 | 30 |
| SW-3 | 0.18 | 0.00 | 0.00 | 0.18 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.35 | 120 |
| T-37B | 0.05 | 0.00 | 0.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.11 | 36 |
| T-38A | 0.07 | 0.00 | 0.00 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.14 | 46 |
| *Subtotal* | *8.03* | *0.00* | *0.00* | *8.03* | *0.00* | *0.00* | *0.00* | *0.00* | *0.00* | *16.07* | *5,464* |
| **Contract Military Carrier** | | | | | | | | | | | |
| B-737-D9N | 1.07 | 0.20 | 0.07 | 1.07 | 0.20 | 0.07 | 0.00 | 0.00 | 0.00 | 2.67 | 320 |
| B-747SP | 0.73 | 0.14 | 0.05 | 0.73 | 0.14 | 0.05 | 0.00 | 0.00 | 0.00 | 1.83 | 220 |
| B-757RR | 0.22 | 0.04 | 0.01 | 0.22 | 0.04 | 0.01 | 0.00 | 0.00 | 0.00 | 0.55 | 66 |
| B-767-CF6 | 0.21 | 0.04 | 0.01 | 0.21 | 0.04 | 0.01 | 0.00 | 0.00 | 0.00 | 0.53 | 64 |
| B-777 | 0.40 | 0.08 | 0.03 | 0.40 | 0.08 | 0.03 | 0.00 | 0.00 | 0.00 | 1.00 | 120 |
| DC-10-10 | 0.20 | 0.04 | 0.01 | 0.20 | 0.04 | 0.01 | 0.00 | 0.00 | 0.00 | 0.50 | 60 |
| DC-10-20 (DC-10-30) | 0.13 | 0.03 | 0.01 | 0.13 | 0.03 | 0.01 | 0.00 | 0.00 | 0.00 | 0.33 | 40 |
| DC-10-30 | 0.20 | 0.04 | 0.01 | 0.20 | 0.04 | 0.01 | 0.00 | 0.00 | 0.00 | 0.50 | 60 |
| L-1011 | 0.62 | 0.12 | 0.04 | 0.62 | 0.12 | 0.04 | 0.00 | 0.00 | 0.00 | 1.55 | 186 |
| *Subtotal* | *3.79* | *0.71* | *0.24* | *3.79* | *0.71* | *0.24* | *0.00* | *0.00* | *0.00* | *9.47* | *1,136* |
| **Military Aircraft Total** | | | | | | | | | | | **44,860** |

**Table 5-1. Summary of Forecast Airfield Operations (continued)**

| Aircraft (Substitution) | Average Daily Arrival Operations | | | Average Daily Departure Operations | | | Average Daily Closed Pattern Operations | | | Total Average Daily Operations | Total Annual Operations |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Day | Evening | Night | Day | Evening | Night | Day | Evening | Night | | |
| CIVILIAN AIRCRAFT | | | | | | | | | | | |
| **Joint Powers Authority** | | | | | | | | | | | |
| ***DHL Cargo*** | | | | | | | | | | | |
| 767-200F (767-CF6) | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 2.00 | 624 |
| 767-200F (767-CF6) | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 312 |
| 727-200 (727EM2) | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 312 |
| 727-200 (727EM2) | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 4.00 | 1,248 |
| 747-400 | 2.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.00 | 1,248 |
| A300 | 1.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 312 |
| DC-8 | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 624 |
| DC-9 | 0.00 | 1.33 | 2.67 | 0.00 | 0.00 | 4.00 | 0.00 | 0.00 | 0.00 | 8.00 | 2,496 |
| *Subtotal* | *5.00* | *3.33* | *4.67* | *6.00* | *0.00* | *7.00* | *0.00* | *0.00* | *0.00* | *26.00* | *7,176* |
| ***Cargo (Other)*** | | | | | | | | | | | |
| 767-200F (767-CF6) | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.00 | 1,456 |
| 727-200 (727EM2) | 0.67 | 0.11 | 2.22 | 1.80 | 0.77 | 0.43 | 0.00 | 0.00 | 0.00 | 6.00 | 1,872 |
| 747-400 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.00 | 1,456 |

**Table 5-1. Summary of Forecast Airfield Operations (continued)**

| Aircraft (Substitution) | Average Daily Arrival Operations | | | Average Daily Departure Operations | | | Average Daily Closed Pattern Operations | | | Total Average Daily Operations | Total Annual Operations |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Day | Evening | Night | Day | Evening | Night | Day | Evening | Night | | |
| 777 | 1.50 | 1.50 | 0.00 | 1.50 | 1.50 | 0.00 | 0.00 | 0.00 | 0.00 | 6.00 | 936 |
| A320 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 4.00 | 1,456 |
| AN-124 (74720B) | 0.00 | 3.00 | 0.00 | 3.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 6.00 | 936 |
| DC-8 | 0.00 | 2.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.00 | 1,456 |
| DC-9 | 0.00 | 2.00 | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 0.00 | 0.00 | 4.00 | 1,248 |
| DC-10/30 | 0.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 4.00 | 1,456 |
| *Subtotal* | *4.17* | *12.61* | *4.22* | *10.30* | *8.27* | *2.43* | *0.00* | *0.00* | *0.00* | *42.00* | *12,272* |
| ***Corporate*** | | | | | | | | | | | |
| Challenger 601 | 0.50 | 0.50 | 0.00 | 0.50 | 0.50 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 276 |
| Global Express (Gulfstream V) | 0.50 | 0.50 | 0.00 | 0.50 | 0.50 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 350 |
| Gulfstream V | 0.50 | 0.50 | 0.00 | 0.50 | 0.50 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 350 |
| Hawker HS125 (Lear 25) | 0.50 | 0.50 | 0.00 | 0.50 | 0.50 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 300 |
| Lear 60 (Lear 35) | 0.50 | 0.50 | 0.00 | 0.50 | 0.50 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 276 |
| *Subtotal* | *2.50* | *2.50* | *0.00* | *2.50* | *2.50* | *0.00* | *0.00* | *0.00* | *0.00* | *10.00* | *1,552* |
| **Civilian Aircraft Total** | | | | | | | | | | | **21,000** |

**Table 5-1. Summary of Forecast Airfield Operations (continued)**

| Aircraft (Substitution) | Average Daily Arrival Operations | | | Average Daily Departure Operations | | | Average Daily Closed Pattern Operations | | | Total Average Daily Operations | Total Annual Operations |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Day | Evening | Night | Day | Evening | Night | Day | Evening | Night | | |
| **OTHER AIRCRAFT** | | | | | | | | | | | |
| **California Department of Forestry** | | | | | | | | | | | |
| DC4 (DC6) | 0.78 | 0.15 | 0.05 | 0.78 | 0.15 | 0.05 | 0.00 | 0.00 | 0.00 | 1.94 | 350 |
| DC6 | 0.01 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.03 | 6 |
| DC7 (DC6) | 0.04 | 0.01 | 0.00 | 0.04 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.09 | 16 |
| OV-10 | 0.92 | 0.17 | 0.06 | 0.92 | 0.17 | 0.06 | 0.00 | 0.00 | 0.00 | 2.31 | 416 |
| P2V (P3A) | 0.12 | 0.02 | 0.01 | 0.12 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.31 | 56 |
| P3A | 0.07 | 0.01 | 0.00 | 0.07 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.17 | 30 |
| PSP2H (P3A) | 0.10 | 0.02 | 0.01 | 0.10 | 0.02 | 0.01 | 0.00 | 0.00 | 0.00 | 0.26 | 46 |
| S2A (DC3) | 0.29 | 0.06 | 0.02 | 0.29 | 0.06 | 0.02 | 0.00 | 0.00 | 0.00 | 0.73 | 132 |
| S2T (DC3) | 5.10 | 0.96 | 0.32 | 5.10 | 0.96 | 0.32 | 0.00 | 0.00 | 0.00 | 12.74 | 2,294 |
| UH-1H | 0.88 | 0.16 | 0.05 | 0.88 | 0.16 | 0.05 | 0.00 | 0.00 | 0.00 | 2.19 | 394 |
| *Subtotal* | *8.31* | *1.56* | *0.52* | *8.31* | *1.56* | *0.52* | *0.00* | *0.00* | *0.00* | *20.78* | *3,740* |
| **Other Aircraft Total** | | | | | | | | | | | **3,740** |
| | | | | | | | | | | | |
| **GRAND TOTAL** | **71.28** | **25.99** | **11.04** | **79.48** | **17.96** | **10.86** | **27.22** | **8.09** | **9.08** | **305.38** | **69,600** |

Notes:

The total annual operations are derived by multiplying the number of daily operations by the number of days that particular aircraft operates in an average year.

Closed-patterns account for two operations.

**Table 5-2. Land Use Acreage within Forecast DNL Noise Zones**

| Contour Value (DNL) | Land Use Category | Acres |
|---|---|---|
| 65–69 | March ARB | 507.20 |
| | Agricultural | 635.96 |
| | Commercial | 233.96 |
| | Industrial | 186.20 |
| | Mixed | 3.15 |
| | Public | 48.13 |
| | Residential | 203.58 |
| | Roads | 210.32 |
| | Unknown | 46.99 |
| | Subtotal | 2,075.50 |
| 70 – 74 | March ARB | 527.31 |
| | Agricultural | 208.58 |
| | Commercial | 45.90 |
| | Industrial | 0.10 |
| | Public | 34.74 |
| | Residential | 14.57 |
| | Roads | 32.62 |
| | Unknown | 24.77 |
| | Subtotal | 888.59 |
| 75 – 79 | March ARB | 289.82 |
| | Agricultural | 58.15 |
| | Commercial | 0.59 |
| | Industrial | 0.00 |
| | Public | 0.00 |
| | Residential | 0.78 |
| | Roads | 2.18 |
| | Unknown | 9.41 |
| | Subtotal | 360.92 |
| 80+ | March ARB | 345.56 |
| | Agricultural | 0.00 |
| | Commercial | 0.00 |
| | Industrial | 0.00 |
| | Public | 0.00 |
| | Residential | 0.00 |
| | Roads | 0.00 |
| | Unknown | 0.00 |
| | Subtotal | 345.56 |
| **Total** | | **3,670.57** |

Source: Riverside County Northwest County CD (shapefile = "parcel"), January 2005

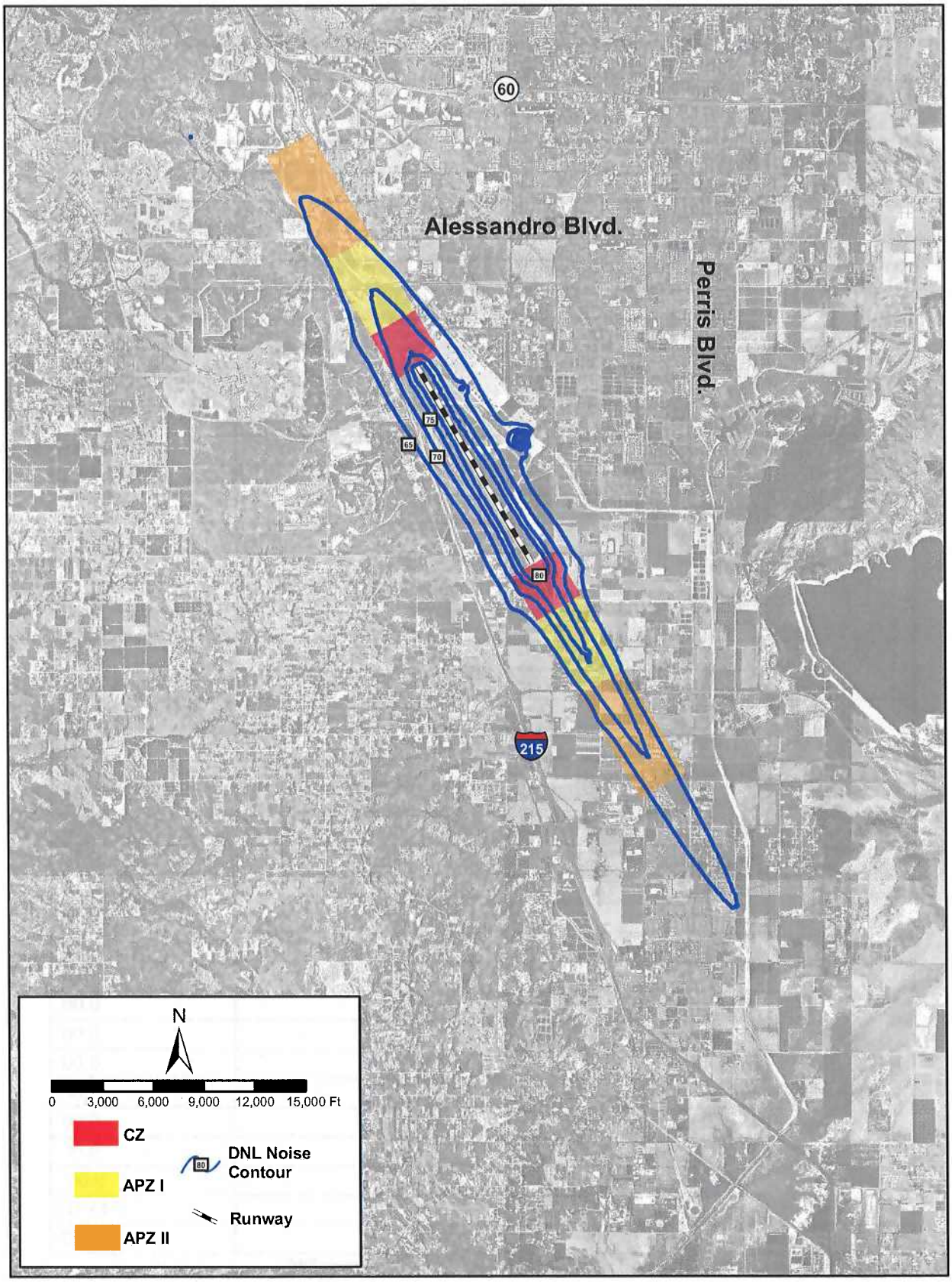


**Figure 5-1. Forecast DNL Noise Zones and Accident Potential Zones**

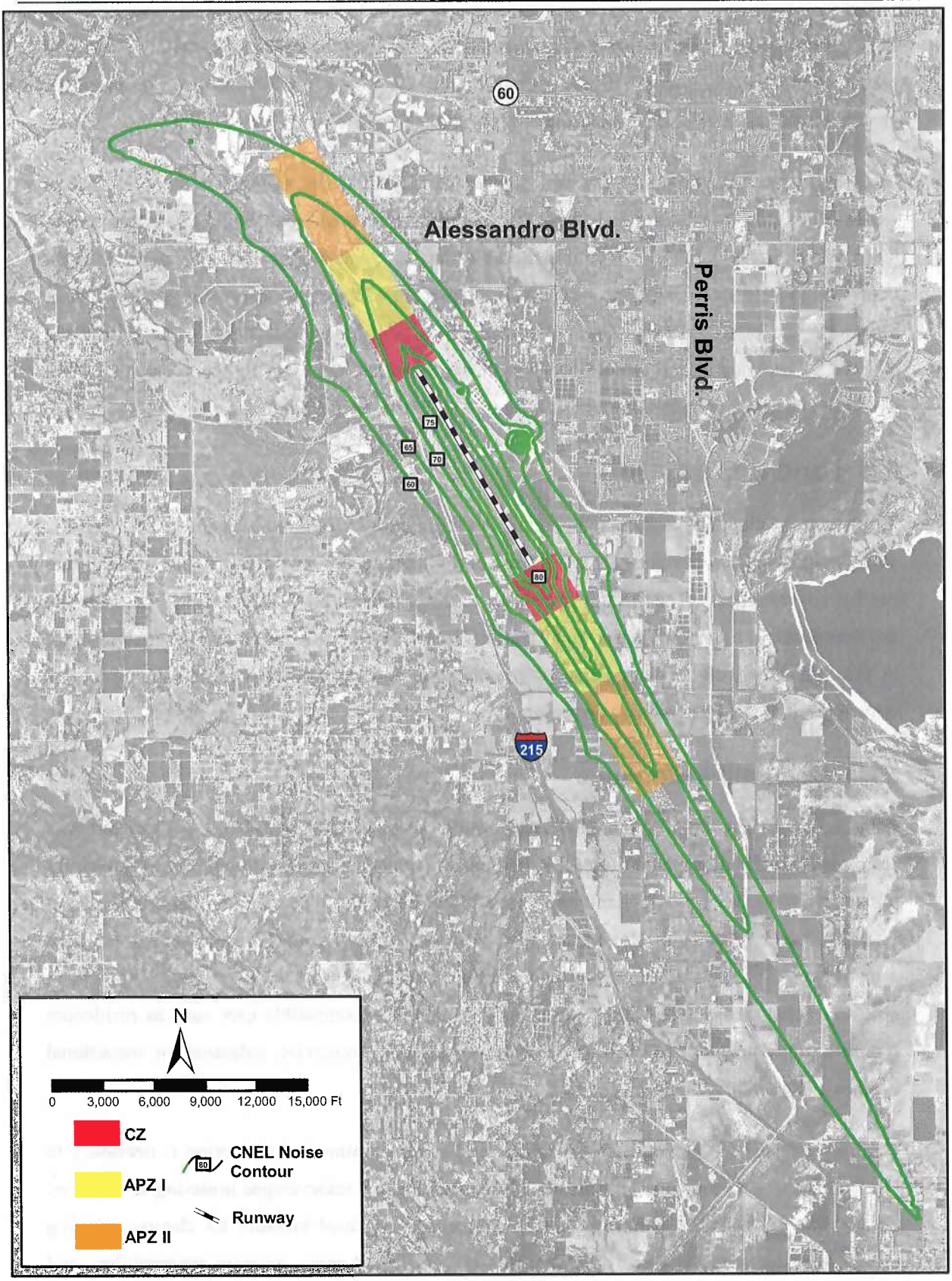


**Figure 5-2. Forecast CNEL Noise Zones and Accident Potential Zones**

This change is due to the anticipated increase in civilian aviation operations; mainly cargo and corporate organizations proposing to operate to and from March Global Port. The proposed change would result in an increase in annual operations from 7,176 to about 21,000.

Like the Current Scenario, the greatest number of nighttime and evening military operations would occur from based aircraft; almost 80 percent of their operations would take place during the daytime. Civilian aircraft would continue to have a greater number of operations at night compared to military aircraft. Approximately 27 percent of the cargo operations would occur at night, 36 percent would occur during evening hours, and 37 percent would occur during the daytime. Corporate aircraft would also fly during the night and evening hours, however there would not be as many operations between 7 a.m. and 7 p.m. as the cargo aircraft.

## 5.2 Land Use Controls

Three types of planning controls (compatible zoning, building code modifications, and avigation easements) have been developed to minimize conflicts between military and civilian airfields and nearby communities. The planning controls prevent further encroachment by incompatible development and future conflicts with aircraft activities. March ARB is an important contributor to the economic well-being of adjacent communities and support from local communities is critical to the airfield's continued operation.

### 5.2.1 Compatible Zoning

Zoning changes can control future land use. Zoning can ensure that the land uses of a community are properly situated in relation to each other, and it is the most commonly used legal device for implementing land use plans. Land use compatibility under the Forecasted Scenario is shown in Figure 5-3 and Table 5-3. Zoning changes can assist airport compatibility by directing new growth into compatible areas preventing the future development of noise-sensitive land uses in noise-impacted areas. Noise-impacted areas that contain incompatible uses such as residences can be rezoned to more compatible categories, such as commercial, industrial, or transitional businesses.

Due to the relative impermanence of zoning regulations, continuous monitoring is necessary to preclude the encroachment of incompatible development into undeveloped noise-impacted areas. Zoning that achieves compatibility will be subject to continued pressure for change. Zoning changes can increase the value of land within noise-affected areas, promote compatibility, and leave land in private ownership on the tax rolls for an economically productive community.

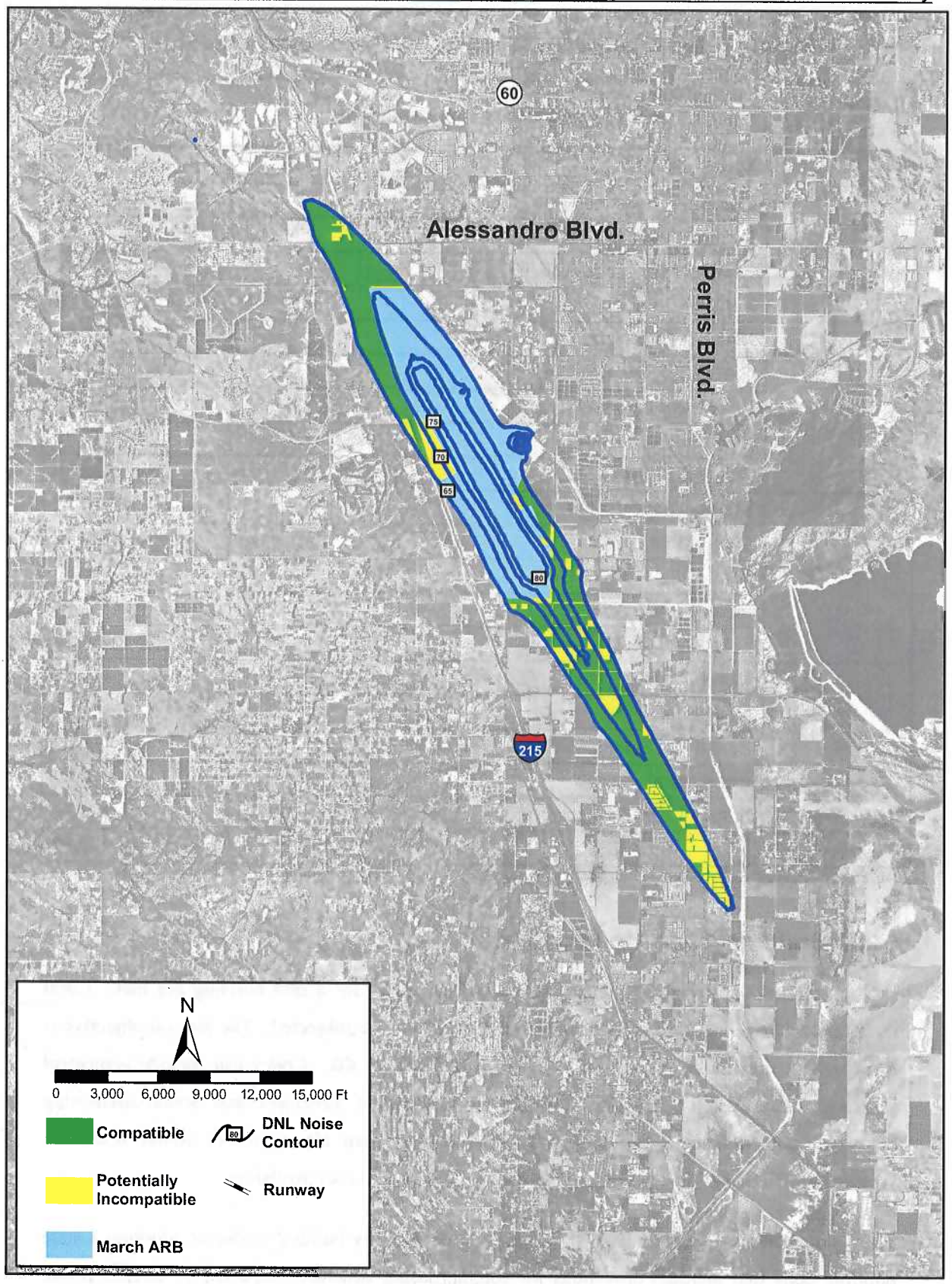


**Figure 5-3. Land Use Compatibility Based on Forecast DNL Noise Zones**

**Table 5-3. Land Use Compatibility based on Forecast DNL Noise Zones**

| Contour Value (DNL) | USAF Land Use Recommendation | Acres |
|---|---|---|
| 65 – 69 | March ARB | 507.20 |
| | Compatible | 1,266.44 |
| | Potentially Incompatible | 301.85 |
| | Incompatible | 0.00 |
| | Subtotal | 2,075.50 |
| 70 – 74 | March ARB | 527.31 |
| | Compatible | 241.19 |
| | Potentially Incompatible | 120.10 |
| | Incompatible | 0.00 |
| | Subtotal | 888.59 |
| 75 – 79 | March ARB | 289.82 |
| | Compatible | 60.33 |
| | Potentially Incompatible | 10.00 |
| | Incompatible | 0.78 |
| | Subtotal | 360.92 |
| 80+ | March ARB | 345.56 |
| | Compatible | 0.00 |
| | Potentially Incompatible | 0.00 |
| | Incompatible | 0.00 |
| | Subtotal | 345.56 |
| **Total** | | **3,670.57** |

Source: Riverside County Northwest County CD (shapefile = "parcel"), January 2005

## 5.2.2 Building Code Modifications

Building codes can ensure that the structural requirements for a safe building are met. Local codes can address the noise levels to which the structures are subjected. The general objective is to achieve a maximum interior noise level of DNL of 45 dB. Codes can include acoustical treatment standards for new or modified noise-sensitive structures and sound-attenuating construction techniques. Building code modifications can also establish sound insulation standards, such as wall insulation, double-pane windows, and roof insulation.

Local jurisdictions are responsible for modifying community building codes or adopting a state building code that includes provisions for soundproofing structures impacted by aircraft noise. Provisions for building code modifications, including sound insulation of exterior noise sources,

require local legislation and implementation by building inspectors. The additional sound insulation slightly increases the cost of the construction.

Building standards and zoning within the March ARB environs appropriately address AICUZ development concerns with respect to the 1998 AICUZ Study noise contours. Zoning and building standards limit the types of land uses in areas impacted by noise and accident potential, as previously described, and require the incorporation of noise-level reduction measures within new building construction impacted by AICUZ noise contours. Adoption and strict enforcement of these ordinances by the local government has limited, and is expected to continue to effectively limit, incompatible land uses. Land use density restrictions should also curtail incompatible development within March ARB APZs.

### 5.2.3 Avigation Easements

An avigation easement is a property right acquired from a land owner that grants the right-of-flight; the right to cause noise, dust, etc., related to aircraft flight; the right to restrict or prohibit certain lights, electromagnetic signals and bird-attracting land uses; the right to unobstructed airspace over the property above a specified height and the right of ingress/egress upon the land to exercise those rights. The MJPA has acquired avigation easements from developments within the cities of Perris, Moreno Valley, and Riverside.

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# 6. Implementation

Implementation of the AICUZ Study must be a joint effort between the USAF and adjacent communities. The USAF's role is to minimize the impact of March ARB operations on local communities. The role of the communities is to ensure that development is compatible with accepted planning and development principles and practices.

## 6.1 U.S. Air Force Responsibilities

In general, the USAF perceives its AICUZ responsibilities as encompassing the areas of flying safety, noise abatement, and participation in the land use planning process.

Well-maintained aircraft and well-trained aircrews do much to ensure that aircraft accidents are avoided; however, history demonstrates that accidents do occur. It is imperative that flights be routed over sparsely populated areas whenever possible to reduce the exposure of lives and property to a potential accident.

USAF regulations require commanders to periodically review existing traffic patterns, instrument approaches, minimum weather conditions under which aircraft can use the airfield (e.g., visibility, ceiling), and operating practices. These factors are evaluated in terms of their potential to affect populated areas and other local situations. To satisfy this requirement, all AICUZ plans must include an analysis of flying and flying-related activities designed to reduce and control the effects of such operations on surrounding land areas.

March ARB is sensitive to community concerns with respect to noise exposure and has implemented an aircraft noise complaint program. In an effort to reduce the noise effects of March ARB operations on surrounding communities, the base restricts nighttime flying activities and has routed flight tracks to avoid populated areas. Aircraft engine maintenance run-up activities are not normally performed between 10:00 p.m. and 7:00 a.m., except for high-priority mission requirements. As previously mentioned, about 80 percent of based military operations occur during the daytime (between 7 a.m. and 7 p.m.). Civilian operations account for a larger portion of night and evening operations. Nighttime and evening cargo operations (between 7 p.m. and 7 a.m.) account for approximately 58 percent under the Current Scenario and approximately 63 percent of forecasted operations.

The preparation and presentation of this study is one phase of USAF's continuing participation in the local planning process. It is recognized that as local communities update their land use plans, the USAF must be ready to provide additional input.

It is also recognized that the AICUZ program will be an ongoing activity even after compatible development plans are adopted and implemented. Base personnel are prepared to participate in the continuing discussion of zoning and other land use matters as they might affect, or might be affected by, March ARB operations. Base personnel will also be available to provide information, criteria, and guidelines to state, regional, and local planning bodies; civic associations; and similar groups.

## 6.2 Local Community Responsibilities

The residents of Riverside County have a long history of working with personnel at March ARB. Adoption of the following recommendations will strengthen this relationship, increase the health and safety of the public, and help protect the integrity of the base's flying mission.

- Ensure that the comprehensive plans of Riverside County incorporate AICUZ policies and guidelines. Use overlay maps of the AICUZ noise contours and SLUCM to evaluate existing and future land use proposals.
- Modify existing zoning ordinances to support compatible land uses outlined in this study.
- Ensure height and obstruction ordinances reflect current USAF and FAR Part 77 requirements.
- Modify building codes to ensure that new construction within AICUZ areas has recommended noise-level-reduction measures incorporated into the design and construction of these facilities.
- Continue to inform March ARB of planning and zoning actions that have the potential to affect base operations. Develop a working group to include city planners, county planners, community planners, and the March ARB Air Field Manager to discuss AICUZ concerns and major development proposals that could affect airfield operations.

# 7. References


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# APPENDIX A

## AICUZ CONCEPT, PROGRAM, METHODOLOGY, AND POLICIES

# APPENDIX A

## AICUZ CONCEPT, PROGRAM, METHODOLOGY, AND POLICIES

### A.1 Concept

Federal legislation, national sentiment, and other external forces, which directly affect the United States Air Force (USAF), have served to greatly increase the USAF's role in environmental and planning issues. Problems of airfield encroachment from incompatible land uses surrounding installations, as well as air and water pollution and socioeconomic impact, require continued and intensified USAF involvement. The nature of these problems dictates direct USAF participation in comprehensive community and land use planning. Effective, coordinated planning that bridges the gap between the Federal government and the local communities requires the establishment of good working relationships with local citizens, local planning officials, and state and Federal officials. This planning depends on creating an atmosphere of mutual trust and helpfulness. The Air Installation Compatible Use Zone (AICUZ) concept has been developed in an effort to

- Protect local citizens from the noise exposure and accident potential associated with flying activities.
- Prevent degradation of the USAF capability to achieve its mission by promoting compatible land use planning.

The land use guidelines in this document are a composite of a number of other land use compatibility studies that have been refined to fit the March Air Reserve Base (ARB) aviation environment.

### A.2 Program

Installation commanders establish and maintain active programs to achieve the maximum feasible land use compatibility between air installations and neighboring communities. The program requires that all appropriate government bodies and citizens be fully informed whenever AICUZ or other planning matters affecting the installation are under consideration. This includes continuous programs designed to

- Provide information, criteria, and guidelines to Federal, state, regional, and local planning bodies, civic associations, and similar groups.

- Inform such groups of the requirements of the flying activity, noise exposure, aircraft accident potential, and AICUZ plans.
- Describe the noise-reduction measures that are being used.
- Ensure that all reasonable, economical, and practical measures are taken to reduce or control the impact of noise-producing activities. These measures include such considerations as proper location of engine test facilities, provision of sound suppressors where necessary, and adjustment of flight patterns and techniques to minimize the noise impact on populated areas. This must be done without jeopardizing safety or operational effectiveness.

## A.3 Methodology

The AICUZ program analyzes land areas on which certain land uses might obstruct airspace use or otherwise be hazardous to aircraft operations; and land areas, which are exposed to the safety hazards of aircraft operations. The AICUZ Study includes

- A depiction of accident potential zones (APZs) and clear zones (CZs) based on past USAF aircraft accidents and installation operational data (Appendix B).
- Noise zones (NZs) developed using NOISEMAP modeling program, which depicts NZs in terms of Day-Night Average A-Weighted Sound Level (DNL) metric and Community Noise Equivalent Level (CNEL) (Appendix C).
- The area designated by the Federal Aviation Administration (FAA) and the USAF for height limitations in approach and departure zones of the base (Appendix D).

The APZs, CZs, and NZs are the basic building blocks for land use planning in the AICUZ Study process. Compatible land uses are specified for these zones in Sections A.6 (Accident Potential) and A.7 (Noise Zones).

As part of the AICUZ program, the only real property acquisition for which the USAF has requested congressional authorization, and the base and major commands request appropriation, are the areas designated as CZs. Land use within the CZs extends off base onto private property controlled by March ARB via perpetual easements, thereby ensuring compatible uses. Compatible land use controls for the remaining airfield environs should be accomplished through the community land use planning process.

## A.4 AICUZ Land Use Development Policies

The basis for any effective land use control system is the development of, and subsequent adherence to, policies that serve as the evaluation standard for all land use planning and control actions. March ARB recommends the following policies be considered for incorporation into the comprehensive plans of agencies in the vicinity of the base.

**A.4.1 Policy 1.** To promote the public health, safety, peace, comfort, convenience, and general welfare of the inhabitants of the airfield, it is necessary to

- Guide, control, and regulate future growth and development.
- Promote orderly and appropriate use of land.
- Protect the character and stability of existing land uses.
- Prevent the destruction or impairment of the airfield and the public investment therein.
- Enhance the quality of living in the areas affected.
- Protect the general economic welfare by restricting incompatible land use.

**A.4.2 Policy 2.** In furtherance of Policy 1, it is appropriate to

- Establish guidelines of land use compatibility.
- Restrict or prohibit incompatible land use.
- Prevent establishment of any land use that would unreasonably endanger aircraft operations and the continued use of the airfield.
- Incorporate the AICUZ concept into community land use plans, modifying them when necessary.
- Adopt appropriate ordinances to implement airfield environs land use plans.

**A.4.3 Policy 3.** Within the boundaries of the AICUZ, certain land uses are inherently incompatible. The following land uses are not in the public's interest and must be restricted or prohibited:

- Uses that release into the air any substance, such as steam, dust, or smoke, that would impair visibility or otherwise interfere with the operation of aircraft.
- Uses that produce light emissions, either direct or indirect (reflective), that would interfere with pilot vision.

- Uses that produce electrical emissions that would interfere with aircraft communication systems or navigation equipment.
- Uses that attract birds or waterfowl, such as operation of sanitary landfills, maintenance or feeding stations, or growth of certain vegetation.
- Uses that provide for structures within 10 feet of aircraft approach-departure or transitional surfaces.

**A.4.4 Policy 4**. Certain noise levels of varying duration and frequency create hazards to both physical and mental health. A limited, though definite, danger to life exists in certain areas adjacent to airfields. Where these conditions are sufficiently severe, it is not consistent with public health, safety, and welfare to allow the following land uses:

- Residential
- Retail business
- Office buildings
- Public buildings (e.g., schools, churches)
- Recreation buildings and structures

**A.4.5 Policy 5.** Land areas below takeoff and final approach flight paths are exposed to significant danger of aircraft accidents. The density of development and intensity of use must be limited in such areas.

**A.4.6 Policy 6.** Different land uses have different sensitivities to noise. Standards of land use acceptability should be adopted based on these noise sensitivities. In addition, a system of Noise Level Reduction guidelines for new construction should be implemented to permit certain uses where they would otherwise be prohibited.

**A.4.7 Policy 7.** Land use planning and zoning in the airfield environs cannot be based solely on aircraft-generated effects. Allocation of land used within the AICUZ should be further refined by consideration of

- Physiographic factors
- Climate and hydrology
- Vegetation
- Surface geology

- Soil characteristics
- Intrinsic land use capabilities and constraints
- Existing land use
- Land ownership patterns and values
- Economic and social demands
- Cost and availability of public utilities, transportation, and community facilities
- Other noise sources

Compatibility guidelines must not be considered inflexible standards. They are the framework within which land use compatibility questions can be addressed and resolved. In each case, full consideration must be given to the following local conditions:

- Previous community experience with aircraft accidents and noise
- Local building construction and development practices
- Existing noise due to other urban or transportation noise sources
- Time period of aircraft operations and land use activities
- Specific site analysis
- Noise buffers, including topography

Although these basic guidelines cannot resolve all land use compatibility issues, they offer a reasonable framework within which to work.

## A.5 Basic Land Use Compatibility

Each runway end at March ARB has a 3,000-foot-by-3,000-foot CZ and two APZs (Appendix B). Accident potential on or adjacent to the runway or within the CZ is so high that the necessary land use restrictions would prohibit reasonable economic use of land. As stated previously, it is USAF policy to request Congress to authorize and appropriate funds for acquisition of the necessary real property interests in CZs to prevent incompatible land uses. Control of CZs has been acquired through perpetual easement at March ARB.

APZ I is less critical than the CZ, but still possesses a significant risk factor. This 3,000-foot-by-5,000 foot area has land use compatibility guidelines that are sufficiently flexible to allow reasonable economic use of the land, such as industrial/manufacturing, transportation, communication/utilities, wholesale trade, open space, recreation, and agriculture; however, uses that concentrate people in small areas are not recommended.

APZ II is less critical than APZ I, but still possesses potential for accidents. APZ II, is 3,000 feet wide by 7,000 feet long, extending to 15,000 feet from the runway threshold when added to the CZ and APZ I. Acceptable uses in APZ II include those of APZ I, as well as low-density single family residential and personal and business services, and commercial/retail trade uses of low intensity or scale of operation. High-density functions such as multistory buildings, places of assembly (e.g., theaters, churches, schools, restaurants), and high-density office uses are not considered appropriate.

High densities of people should be limited to the maximum extent possible. The optimum density recommended for residential usage (where it does not conflict with noise criteria) in APZ II is one dwelling per acre. For most nonresidential usage, buildings should be limited to one story and the lot coverage should not exceed 20 percent.

## A.6 Accident Potential

Land use guidelines in the airfield vicinity are based on a hazard index system that compares the relationship of accident occurrence for five areas:

- On or adjacent to the runway
- Within the CZ
- In APZ I
- In APZ II
- In all other areas within a 10-nautical-mile radius of the runway

Accident potential on or adjacent to the runway or within the CZ is so high that few uses are acceptable. The risk outside APZ I and APZ II, but within the 10-nautical-mile radius area, is significant, but is acceptable if sound planning practices are followed.

Land use guidelines for APZs I and II have been developed. The main objective is to restrict all people-intensive uses because there is greater risk in these areas. The basic guidelines aim to prevent land uses with certain characteristics:

- High residential density characteristics.
- High labor intensity.
- Involve aboveground explosive, fire, toxic, corrosive, or other hazardous characteristics.
- Promote population concentrations.
- Involve utilities and services required for areawide populations where disruption would have an adverse impact (e.g., telephone, gas).
- Concentrate people who are unable to respond to emergency situations (e.g., children, elderly, handicapped).
- Pose hazards to aircraft operations.

There is no question that these guidelines are relative. Ideally, there should be no people-intensive uses in APZs I or II; however, free market and private property systems prevent this where there is land development demand. To go beyond these guidelines, however, substantially increases risk by placing more people in areas where there might be an aircraft accident.

## A.7 Noise Zones

Nearly all studies analyzing aircraft noise and residential compatibility recommend no residential uses in NZs above DNL 75 decibels (dB). Usually, no restrictions are recommended below NZ DNL 65 dB. Between DNL 65 and 74 dB there is currently no consensus. These areas might not qualify for Federal mortgage insurance in residential categories according to U.S. Department of Housing and Urban Development (HUD) Regulation 24 Code of Federal Regulations (CFR) Section 51B. In many cases, HUD approval requires noise-attenuation measures, the Regional Administrator's concurrence, and an Environmental Impact Statement. The Department of Veterans Affairs also has airfield noise and accident restrictions, which apply to their home loan guarantee program. USAF land use recommendations also state that whenever possible residential land use should be below DNL 65 dB.

Most industrial/manufacturing uses are compatible in the airfield environs. Exceptions are uses such as research or scientific activities, which require lower noise levels. Noise attenuation measures are recommended for portions of buildings devoted to office use, receiving the public, or where there is a requirement for low background noise levels.

Transportation, communications, and utility categories have higher noise level compatibility because they generally are not people-intensive. When people use land for these purposes, the

use is generally very short in duration; however, when buildings are required for these uses, additional evaluation is warranted.

The commercial/retail trade and personal and business services categories are compatible without restriction up to DNL 70 dB; however, they are generally incompatible above DNL 80 dB. Between DNL 70 and 80 dB, noise-level-reduction measures should be included in the design and construction of buildings.

The nature of most uses in the public and quasi-public services category requires a quieter environment, and attempts should be made to locate these uses below DNL 65 dB (a USAF land use recommendation), or else provide adequate noise level reduction.

Although recreational use has often been recommended as compatible with high noise levels, recent research has resulted in a more conservative view. Above DNL 75 dB, noise becomes a factor, which limits the ability to enjoy such uses. Where the requirement to hear is a function of the use (e.g., music shell), compatibility is limited. Buildings associated with golf courses and similar uses should be noise-attenuated.

Forestry activities; livestock farming; and uses in the resources production, extraction, and open space categories are compatible almost without restrictions within all NZs.

# APPENDIX B

## CLEAR ZONES AND ACCIDENT POTENTIAL ZONES

# APPENDIX B

## CLEAR ZONES AND ACCIDENT POTENTIAL ZONES

### B.1 Guidelines for Accident Potential

Urban areas around airports are exposed to the possibility of aircraft accidents even with well-maintained aircraft and highly trained aircrews. Despite stringent maintenance requirements and countless hours of training, history makes it clear that accidents are going to occur.

When the Air Installation Compatible Use Zone (AICUZ) Program began there were no current comprehensive studies on accident potential. In support of the program, the United States Air Force (USAF) completed a study of USAF accidents that occurred between 1968 and 1972 within 10 nautical miles of airfields. The study of 369 accidents revealed that 75 percent of the accidents occurred on or adjacent to the runway (1,000 feet to each side of the runway centerline) and in a corridor 3,000 feet wide (1,500 feet on either side of the runway centerline), extending from the runway threshold along the extended runway centerline for a distance of 15,000 feet.

Three zones were established based on crash patterns: clear zone (CZ), accident potential zone (APZ) I, and APZ II. Each zone is 3,000 feet wide and extends outward from the end of all active runway surfaces. The CZ starts at the end of the runway and extends outward 3,000 feet. It has the highest accident potential of the three zones. The USAF has adopted a policy of acquiring property rights to areas designated as CZs because of the high accident potential. APZ I extends from the CZ an additional 5,000 feet. It includes an area of reduced accident potential. APZ II extends from APZ I an additional 7,000 feet to include an area of further reduced, although still significant, accident potential.

The USAF's research in accident potential was the first significant effort in this subject area since 1952 when the President's Airport Commission published *The Airport and Its Neighbors*, better known as the "Doolittle Report." The recommendations of this early report were influential in the formulation of the APZ concept.

The risk to people on the ground of being killed or injured by aircraft accidents is small. However, an aircraft accident is a high consequence event and when a crash does occur, the result is often catastrophic. Because of this, the USAF does not attempt to base its safety standards on accident probabilities. Instead, the USAF approaches this safety issue from a land use planning perspective.

## B.2 Accident Potential Analysis

Military aircraft accidents differ from commercial air carrier and general aviation accidents because of the variety of aircraft used, the type of missions, and the number of training flights. In 1973, the USAF performed a service wide aircraft accident hazard study to identify land near airfields with significant accident potential. Accidents studied occurred within 10 nautical miles of airfields and were airfield-related, in-flight mishaps.

The study reviewed the 369 major USAF accidents from 1968 to 1972, and found 61 percent of the accidents were related to landing operations and 39 percent were takeoff related. It also found that 70 percent occurred in daylight, and fighter and training aircraft accounted for 80 percent of the accidents.

Since the purpose of the study was to identify accident hazards, the study plotted each of the 369 accidents in relation to the airfield. This plotting found the accidents clustered along the runway and its extended centerline. To further refine this clustering, a tabulation was prepared that described the cumulative frequency of accidents as a function of distance from the runway centerline along the extended centerline. This analysis was done for areas with widths of 2,000, 3,000, and 4,000 total feet (see Table B-1).

**Table B-1. Accident Location Analysis**

| Length From both Ends of Runway (feet) | Width of Runway Extension (feet) 2,000 | 3,000 | 4,000 |
|---|---|---|---|
| **Percent of Accidents** | | | |
| On or adjacent to runway (1,000 feet to each side of runway centerline) | 23 | 23 | 23 |
| 0 to 3,000 | 35 | 39 | 39 |
| 3,000 to 8,000 | 8 | 8 | 8 |
| 8,000 to 15,000 | 5 | 5 | 7 |
| **Cumulative percent of accidents** | | | |
| On or adjacent to runway (1,000 feet to each side of runway centerline) | 23 | 23 | 23 |
| 0 to 3,000 | 58 | 62 | 62 |
| 3,000 to 8,000 | 66 | 70 | 70 |
| 8,000 to 15,000 | 71 | 75 | 77 |

Figure B-1 indicates that the cumulative number of accidents rises rapidly from the end of the runway to 3,000 feet, rises more gradually to 8,000 feet, then continues at about the same rate of increase to 15,000 feet, where it levels off rapidly. The location analysis also indicates that the optimum width of the safety zones, designed to include the maximum percentage of accidents in the smallest area, is 3,000 feet.

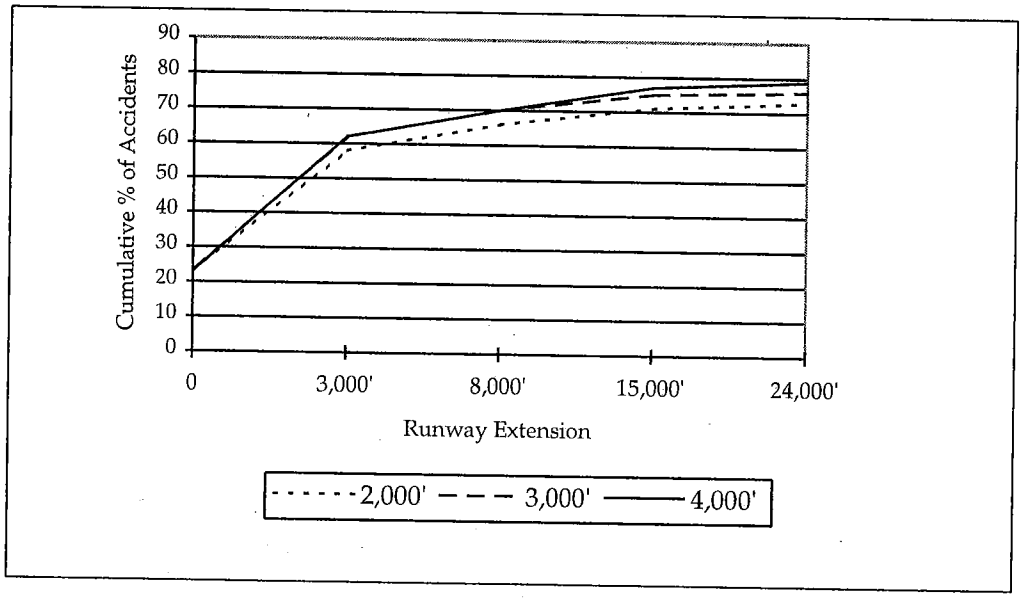


**Figure B-1. Distribution of USAF Aircraft Accidents (369 Accidents, 1968–1972)**

Using the optimum runway extension width (3,000 feet), and the cumulative distribution of accidents from the end of the runway, zones were established that minimized the land area included and maximized the percentage of accidents included. The zone dimensions and accidents statistics for the 1968–1972 study are shown in Figure B-2.

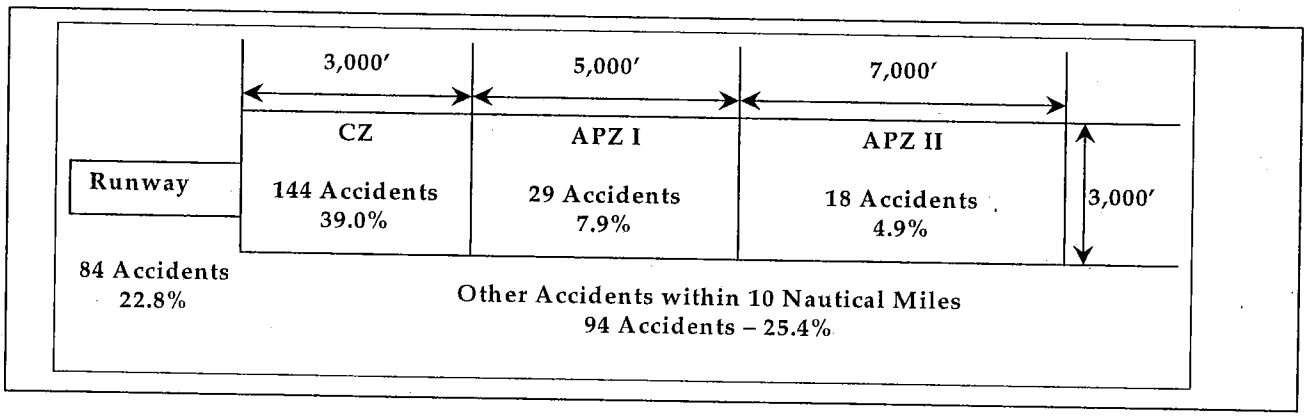


**Figure B-2. USAF Aircraft Accident Data (369 Accidents, 1968 - 1972)**

The original study has been updated to include accidents through July 1995. The updated study now includes 838 accidents during the 1968 - 1995 period. The accident statistics of the updated study are shown in Figure B-3.

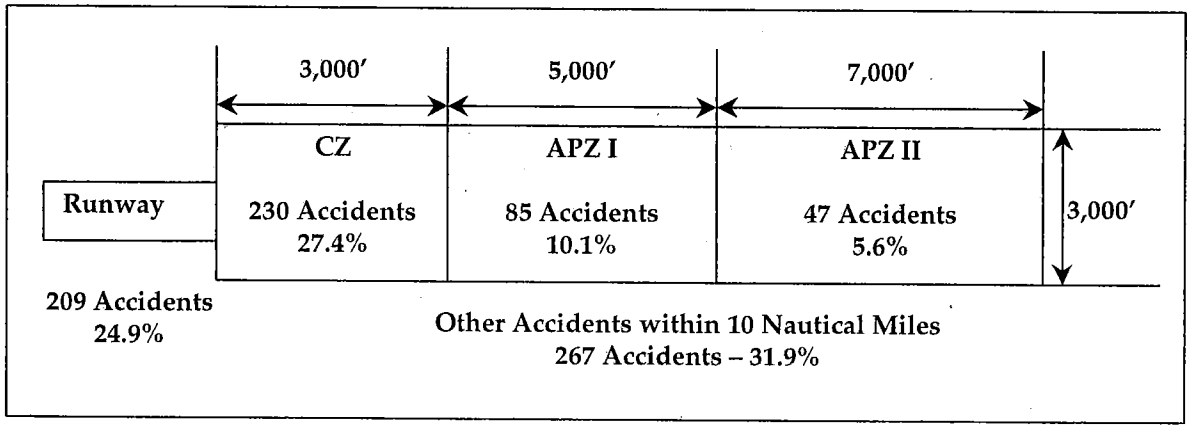


**Figure B-3. USAF Aircraft Accident Data (838 Accidents 1968–1995)**

Using the designated zones and accident data, it is possible to calculate a ratio of percentage of accidents to area. These ratios indicate the CZ, with the smallest area and the highest number of accidents, has the highest ratio, followed by the runway itself, APZ I, and then APZ II (Table B-2).

**Table B-2. Accident-to-Area Ratio**

| Ratio of Percentage of Accidents to Percentage of Area (Air Force Accident Data 1968–1995) | | | | | | |
|---|---|---|---|---|---|---|
| | Area (acres)[1] | Number of Accidents[2] | Accidents per Acre | % Total Area | % Total Accidents | Ratio: Accidents to Area[3] |
| Runway Area[4] | 487 | 209 | 1 per 2.3 | 0.183 | 24.9 | 136. |
| CZ | 413 | 230 | 1 per 1.8 | 0.155 | 27.4 | 177. |
| APZ I | 689 | 85 | 1 per 8.1 | 0.258 | 10.1 | 39. |
| APZ II | 964 | 47 | 1 per 20.5 | 0.362 | 5.6 | 16. |
| Other | 264,053 | 267 | 1 per 989. | 99.042 | 31.9 | 0.3 |

[1] Area includes land within 10 nautical miles of runway (266,606 acres).
[2] Total number of accidents is 838 (through 1995).
[3] Percent total accidents divided by percent total area.
[4] Runway dimension is 2,000' x 10,600'.

## B.3 Definable Debris Impact Areas

The USAF also determined which accidents had definable debris impact areas, and in what phase of flight the accident occurred. Overall, 75 percent of the accidents had definable debris impact areas, although they varied in size by type of accident.

The USAF study used weighted averages of impact areas, for accidents occurring only in the approach and departure phase, to determine the following average impact areas: the overall

average impact area is 5.06 acres; the fighter, trainer, and miscellaneous aircraft is 2.73 acres; and the heavy bomber and tanker aircraft is 8.73 acres.

## B.4 Findings

Designation of safety zones around the airfield and restriction of incompatible land uses can reduce the public's exposure to safety hazards.

USAF accident studies have found that aircraft accidents near USAF installations occurred in the following patterns:

- 61 percent were related to landing operations.
- 39 percent were related to takeoff operations.
- 70 percent occurred in daylight.
- 80 percent were related to fighter and training aircraft operations.
- 27 percent occurred on the runway or within an area extending 1,000 feet out from each side of the runway.
- 29 percent occurred in an area extending from the end of the runway to 3,000 feet along the extended centerline and 3,000 feet wide, centered on the extended centerline.
- 13 percent occurred in an area between 3,000 and 15,000 feet along the extended runway centerline and 3,000 feet wide, centered on the extended centerline.

USAF aircraft accident statistics found 75 percent of aircraft accidents resulted in definable impact areas:

- 5.1 acres overall average
- 2.7 acres for fighters and trainers
- 8.7 acres for heavy bombers and tankers

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# APPENDIX C

## DESCRIPTION OF THE NOISE ENVIRONMENT

# APPENDIX C

## DESCRIPTION OF THE NOISE ENVIRONMENT

### C.1 Noise Environment Descriptor

The noise contour methodology used herein is the Day-Night Average A-Weighted Sound Level (DNL) metric of describing the noise environment along with the Community Noise Equivalent Level (CNEL) used by the State of California. Efforts to provide a national uniform standard for noise assessment have resulted in adoption by the U.S. Environmental Protection Agency (USEPA) of DNL as the standard noise descriptor. The U.S. Air Force (USAF) uses the DNL descriptor in assessing the amount of aircraft noise exposure, and as a metric for community response to the various levels of exposure. The DNL values used for planning purposes are 65, 70, 75, and 80 decibels (dB). Land use guidelines are based on the compatibility of various land uses with these noise exposure levels.

***Day-Night Average A-weighted Sound Level.*** The DNL noise metric incorporates a "penalty" for evening and nighttime noise events to account for increased annoyance. DNL is the energy-averaged sound level measured over a 24-hour period, with a 10 dB penalty assigned to noise events occurring between 10:00 p.m. and 7:00 a.m. DNL values are obtained by averaging sound exposure level (SEL) values for a given 24-hour period. DNL is the preferred noise metric of Department of Housing and Urban Development (HUD), Federal Aviation Administration (FAA), USEPA, and Department of Defense (DOD) for modeling airport environs.

***Community Noise Equivalent Level (CNEL).*** The definition of CNEL is similar to DNL except that the daytime hours are defined from 7:00 a.m. to 7:00 p.m. and evening hours are introduced and defined from 7:00 p.m. to 10:00 p.m., with a 5-decibel adjustment added to those noise events which occur during the evening hours. The nighttime hours, 10:00 p.m. to 7:00 a.m., adjustment of 10 dB is identical to that of DNL.

It is generally recognized that a noise environment descriptor should consider, in addition to the annoyance of a single event, the effect of repetition of such events and the time of day in which these events occur. DNL begins with a single event descriptor and adds corrections for the number of events and the time of day. Since the primary development concern is residential, nighttime events are considered more annoying than daytime events and are weighted accordingly. DNL values are computed from the single event noise descriptor, plus corrections for number of flights and time of day (Figure C-1).

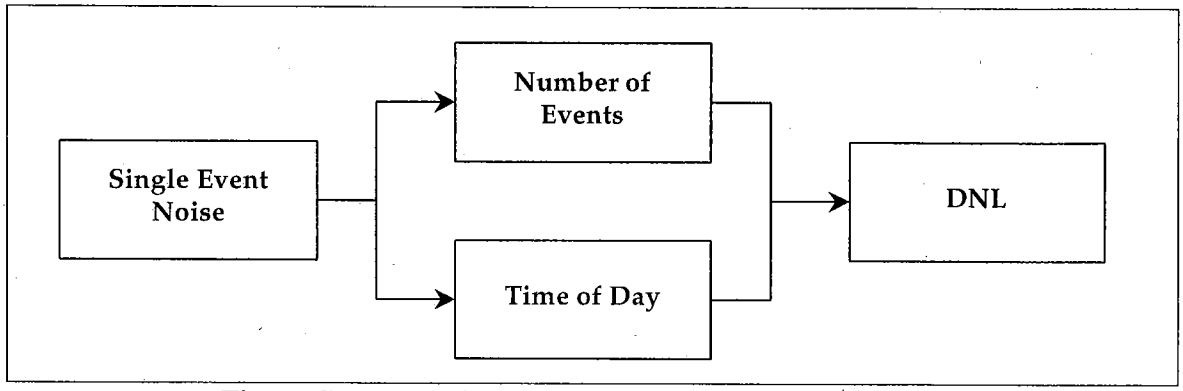


**Figure C-1. Day-Night Average A-Weighted Sound Level**

Noise is represented by a variety of quantities or "metrics." Each noise metric was developed to account for the type of noise and the nature of what might be exposed to the noise. Human hearing is more sensitive to medium and high frequencies than to low and very high frequencies, so it is common to use "A-weighted" metrics, which account for this.

As part of the extensive data collection process, detailed information is gathered on the type of aircraft, the number of operations, and time of day of flying operations for each flight track during a typical day. This information is used in conjunction with the single event noise descriptor to produce DNL values. These values are combined on an energy summation basis to provide single DNL values for the mix of aircraft operations at the base. Equal value points are connected to form contour lines that encompass and depict areas exposed to a range of noise levels.

## C.2 Noise Event Descriptor

The single event noise descriptor used in the DNL system is the SEL. The SEL measure is an integration of DNL over the period of a single event such as an aircraft flyover, measured in dB.

Frequency, magnitude, and duration vary according to aircraft type, engine type, and power setting. Therefore, individual aircraft noise data are collected for various types of aircraft/engines at different power settings and phases of flight. Figure C-2 shows the relationship of the single event noise descriptor to the source sound energy.

SEL versus slant-range values are derived from noise measurements made according to a source noise data acquisition plan developed by Bolt, Beranek, and Newman, Inc., in conjunction with the USAF's Armstrong Laboratory (AL) and carried out by AL. These standard day sea level

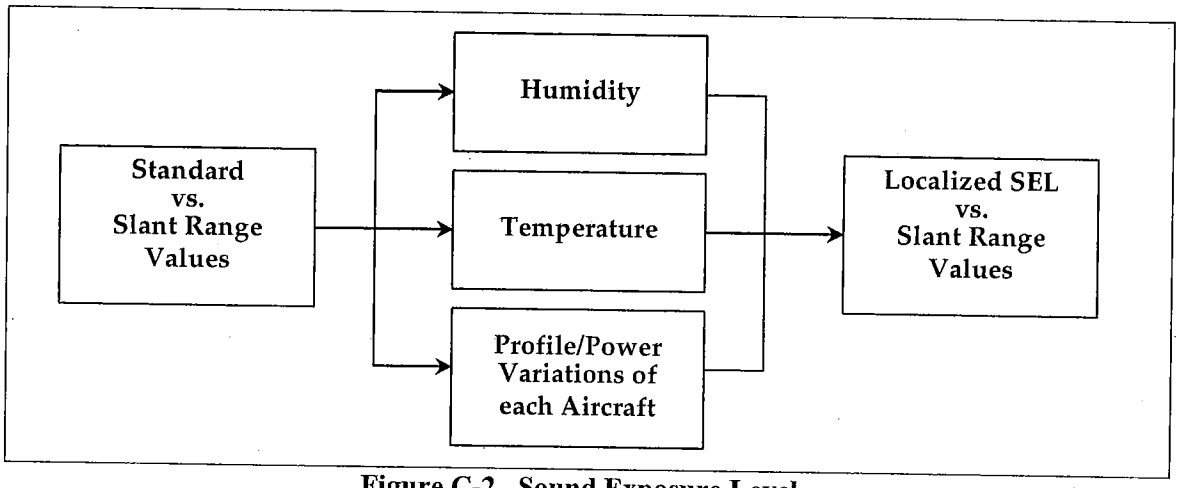


**Figure C-2. Sound Exposure Level**

values, form the basis for individual event noise descriptors at any location. These values are adjusted to the location by applying appropriate corrections for temperature, humidity, and variations from standard profiles and power settings of each aircraft.

Ground-to-ground sound propagation characteristics are used for altitudes up to 500 feet with linear transition between 500 and 700 feet and air-to-ground propagation characteristics above 700 feet.

In addition to the assessment of aircraft flight operations, the DNL system also incorporates noise resulting from engine/aircraft maintenance checks on the ground. Ground run-up or test position data concerning the orientation of the noise source, type of aircraft or engine, number of test runs on a typical day, power settings used and their duration, and use of suppression devices are collected. This information is processed and the noise contribution added (on an energy summation basis) to the noise generated by flying operations to produce noise contours reflecting the overall noise environment with respect to aircraft air and ground operations.

## C.3 Noise Contour Production

Each individual USAF base assembles data describing flight track distances and turns, altitudes, airspeeds, power settings, flight track operational utilization, maintenance locations, ground run-up engine power settings, and number and duration of runs by type of aircraft/engine. The data are screened by the Major Command (MAJCOM) and Air Force Center for Environment Excellence (AFCEE). Trained personnel process the data for input into a central computer. Flight tracks are generated for verification and approval by the Base/MAJCOM. After any required changes have been incorporated, DNL noise contours are generated by the computer

using the supplied data and standard source data corrected to local weather conditions. These contours are plotted and prepared for photographic reproduction. A set of these contours is provided in the body of the report.

## C.4 Technical Information

Additional technical information on the DNL procedures is available in the following publications:

- *Community Noise Exposure Resulting from Aircraft Operations: Applications Guide for Predictive Procedure.* AMRL-TR-73-105, November, 1974, from National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22151
- *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with Adequate Margin of Safety*, EPA Report 550/9-74-004, March, 1974, from Superintendent of Documents, US Government Printing Office, Washington, DC 20402.
- *Adopted Noise Regulations for California Airports,* Title 4, Register 70, No. 48-11-28-70, Subchapter 6, Noise Standards.

# APPENDIX D

## HEIGHT OBSTRUCTION CRITERIA

# APPENDIX D

## HEIGHT OBSTRUCTION CRITERIA

### D.1 Height Obstruction Criteria

#### D.1.1 General

This section establishes criteria for determining whether an object or structure is an obstruction to air navigation. Obstructions to air navigation are considered to be

- Natural objects or man-made structures that protrude above the planes or surfaces as defined in the following paragraphs.
- Man-made objects that extend more than 500 feet above the ground at the site of the structure.

#### D.1.2 Explanation of Terms

The following will apply (Figure D-1):

- Controlling Elevation. Whenever surfaces or planes within the obstruction criteria overlap, the controlling (or governing) elevation becomes that of the lowest surface or plane.
- Runway Length. March Air Reserve Base (ARB) has one runway, Runway 14/32, with a paved length of 13,300 feet designed and built for sustained aircraft landings and takeoffs.
- Established Airfield Elevation. The established elevation, in feet above mean sea level (MSL), for March ARB is 1,535 feet.
- Dimensions. All dimensions are measured horizontally unless otherwise noted.

For a more complete description of airspace and control surfaces for Class A and Class B runways, refer to Federal Aviation Regulation (FAR) Part 77, Subpart C, or Air Force Instruction 32-1026.

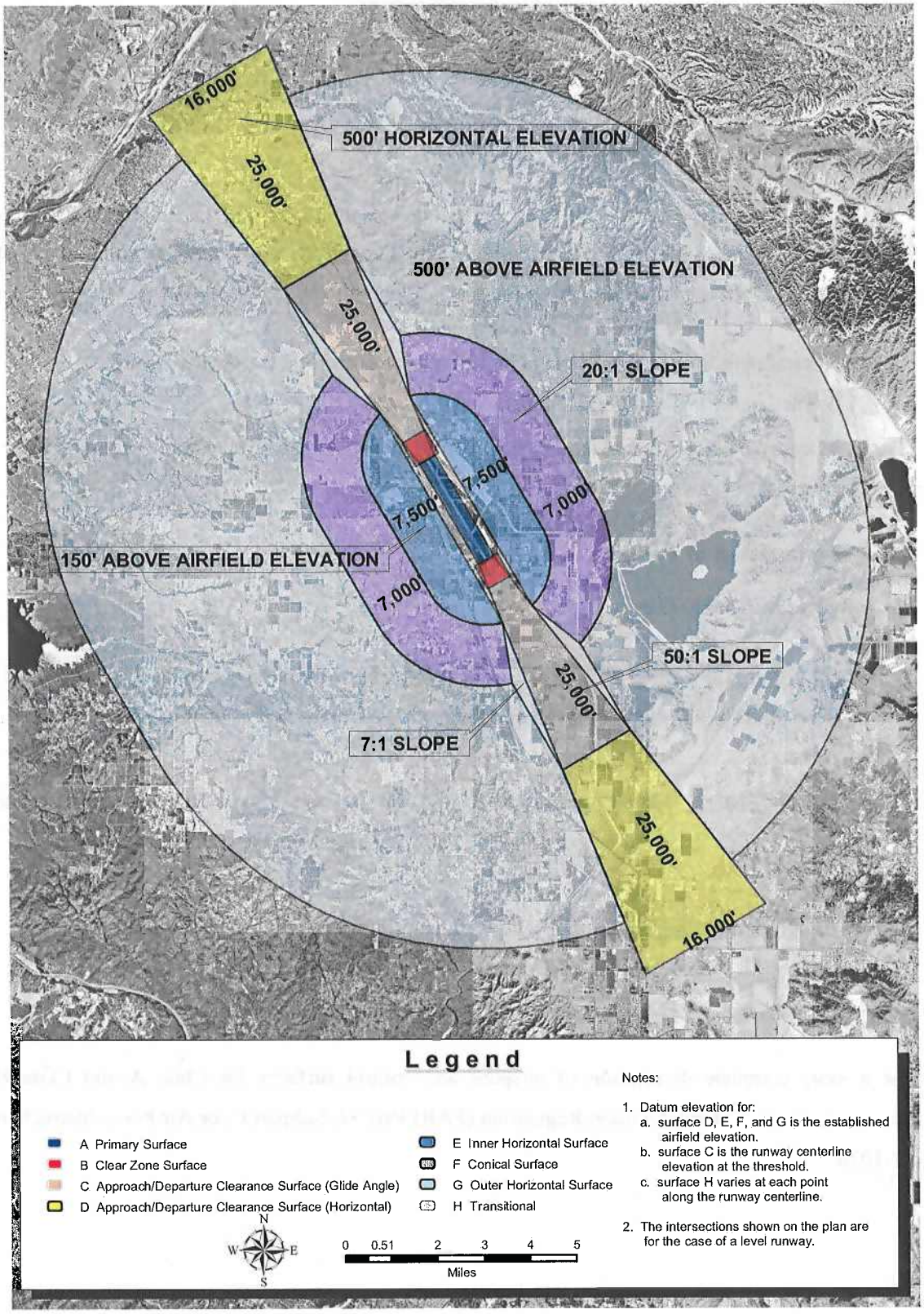


**Figure D-1. March ARB Airspace Class B Control Surface Plan**

### D.1.3 Planes and Surfaces

Definitions are as follows:

#### Primary Surface

- Defines the limits of the obstruction clearance requirements in the immediate vicinity of the landing area.
- Comprises surfaces of the runway, runway shoulders, and lateral safety zones, and extends 200 feet beyond the runway end.
- For a single class "B" runway, is 2,000 feet wide, or 1,000 feet on each side of the runway centerline.

#### Clear Zone (CZ) Surface

- This surface defines the limits of the obstruction clearance requirements in the vicinity contiguous to the end of the primary surface.
- For a single runway end, measures 3,000 feet by 3,000 feet.

#### Approach-Departure Clearance Surface

- This surface is symmetrical from the extended runway centerline, it begins as an inclined plane (glide angle) 200 feet beyond each runway end, and extends for 50,000 feet; it begins with the centerline elevation of the runway end.
- The slope of the approach-departure clearance surface is 50:1 along the extended runway (glide angle) centerline until it reaches an elevation of 500 feet above the established airfield elevation.
- It then continues horizontally at this elevation to a point 50,000 feet from the start of the glide angle.
- The width of this surface at the runway end is 2,000 feet; it flares uniformly, and the width at 50,000 feet is 16,000 feet.

#### Inner Horizontal Surface

- This surface is a plane, oval in shape, at a height of 150 feet above the established airfield elevation.
- This surface is constructed by scribing an arc with a radius of 7,500 feet above the centerline at the end of the runway and interconnecting these arcs with tangents.

### Conical Surface

- This is an inclined surface extending outward and upward from the outer periphery of the inner horizontal surface for a horizontal distance of 7,000 feet to a height of 500 feet above the established airfield elevation.The slope of the conical surface is 20:1.

### Outer Horizontal Surface

- This surface is a plane 500 feet above the established airfield elevation.
- It extends for a horizontal distance of 30,000 feet from the outer periphery of the conical surface.

### Transitional Surfaces

- These surfaces connect the primary surfaces, CZ surfaces, and approach-departure clearance surfaces to the outer horizontal surface, conical surface, other horizontal surface, or other transitional surfaces.
- The slope of the transitional surface is 7:1 outward and upward to an altitude of 150 feet above airfield elevation at right angles to the runway centerline.
- To determine the elevation for the beginning of the transitional surface slope at any point along the lateral boundary of the primary surface, including the CZ, draw a line from this point to the runway centerline.
- This line will be at right angles to the runway axis.
- The elevation at the runway centerline is the elevation for the beginning of the 7:1 slope.

The land areas outlined by these criteria should be regulated to prevent uses that might otherwise be hazardous to aircraft operations. The following uses should be restricted or prohibited:

- Release any substance into the air which would impair visibility or otherwise interfere with the operation of aircraft (e.g., steam, dust, or smoke).
- Produce light emissions, either direct or indirect (reflective), that would interfere with pilot vision.
- Produce electrical emissions that would interfere with aircraft communications systems or navigational equipment.
- Uses that would attract birds or waterfowl, including operation of sanitary landfills, maintenance of feeding stations, sand and gravel dredging operations, storm water retention ponds, created wetland areas, or the growing of certain vegetation.

- Uses that provide for structures within 10 feet of aircraft approach-departure or transitional surfaces.

## D.2 Height Restrictions

City, County, and Township agencies involved with approvals of permits for construction should require developers to submit calculations that show that projects meet the height restriction criteria of FAR Part 77. These criteria are described, in part, by the information contained in this section. Airfield elevation and runway coordinates for the March ARB are listed below.

March ARB, California

Airfield Coordinates

Airfield Elevation: 1,535 feet above MSL
Runway 14/32 Coordinates:

| | |
|---|---|
| 33-53-47.06 | North Latitude |
| 117-16-14.14 | West Longitude |
| 33-51-52.06 | North Latitude |
| 117-14-56.14 | West Longitude |

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