

# **AIR INSTALLATION COMPATIBLE USE ZONE STUDY**

## **CHARLESTON AIR FORCE BASE, SOUTH CAROLINA**

**2004**



**AIR INSTALLATION  
COMPATIBLE USE ZONE STUDY**

**CHARLESTON AIR FORCE BASE,  
SOUTH CAROLINA**

**2004**

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## **ACRONYMS**

437AW	437 <sup>th</sup> Airlift Wing
AFB	Air Force base
AFI	Air Force Instruction
AFM	Air Force manual
AGL	Above ground level
AICUZ	Air Installation compatible use zone
APZ	Accident potential zone
BCDCOG	Berkeley-Charleston-Dorchester Council of Governments
CHATS	Charleston Area Transportation Study
CZ	Clear zone
dB	Decibel
DNL	Day-night average a-weighted sound level
DoD	Department of Defense
FAA	Federal Aviation Administration
INM	Integrated noise model
JLUS	Joint land use study
MSA	Charleston-North Charleston Metropolitan Statistical Area
NLR	Noise level reduction
SLUCM	Standard Land Use Coding Manual
The Base	Charleston Air Force Base
UFC	Unified facilities criteria
USEPA	United States Environmental Protection Agency
VFR	Visual flight rules

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## **SECTION 1 PURPOSE AND NEED**

### **1.1 INTRODUCTION**

This study is an update of the 1992 Charleston Air Force Base (AFB) (the Base) Air Installation Compatible Use Zone (AICUZ) Study. The update presents and documents changes to the AICUZ amendment for the period 1993-2002 and is based on the 2002 aircraft operations condition, to include anticipated future operations and aircraft maintenance activity. This AICUZ Study reaffirms Air Force policy of promoting public health, safety, and general welfare in the areas surrounding Charleston AFB. Specifically, the report documents changes in aircraft operations since the last study, as well as projected operations, and provides noise contours and compatible use guidelines for land areas surrounding the installation based on a combination of the June 2002 operations and the anticipated future aircraft flight and maintenance runup operations. This information is provided to assist local communities and to serve as a tool for future planning and zoning activities. Changes that occurred since the 1992 Charleston AFB AICUZ Study are:

- Increase in the number of C-17 aircraft;
- Increase in the number of nighttime (10:00 p.m. to 7:00 a.m.) aircraft operations;
- Addition, elimination, and modification of aircraft flight tracks to correspond to flying operations changes; and
- Technical improvements to the NOISEMAP computer modeling program.

### **1.2 PURPOSE AND NEED**

The purpose of the long-standing AICUZ program is to promote compatible land development in areas subject to aircraft noise and accident potential. As the cities of North Charleston, Charleston, and Hanahan prepare and modify land use development plans, recommendations from this updated AICUZ Study should be included in the planning process to prevent incompatible land use that could compromise the ability of Charleston AFB to fulfill its mission. Accident potential and aircraft noise should be major considerations in the planning process.

Air Force AICUZ guidelines reflect land use recommendations for the clear zones (CZ), accident potential zones (APZ) I and II, and the four noise zones (Day-Night Average A-Weighted Sound Level [DNL] 65-69 decibel [dB], DNL 70-74 dB, DNL 75-79 dB, and DNL 80 dB and greater). These guidelines were established on the basis of studies prepared and sponsored by several federal agencies, including the United States Department of Housing and Urban Development, United States Environmental Protection Agency (USEPA), United States Air Force, and state and local agencies. The guidelines recommend land uses that are compatible with airfield operations while allowing maximum beneficial use of adjacent properties. The Air Force has no desire to recommend land use regulations that render property economically useless. It does, however, have an obligation to the inhabitants of the

Charleston AFB area of influence and the citizens of the United States to point out ways to protect the public investment in the installation as well as people living in areas adjacent to the installation. The AICUZ area of influence includes the area within the DNL 65 dB and greater noise exposure area and the area within the CZs and APZs.

The AICUZ program uses the latest technology to define noise levels in areas near Air Force installations with a flying mission. An analysis of Charleston AFB's flying operations was performed, including types of aircraft, flight patterns utilized, variations in altitude, power settings, number of operations, and hours of operations. This information was used to develop the noise contours contained in this study. The Department of Defense (DoD) NOISEMAP (Version 6.5) computer modeling program and the DNL metric were used to define the noise zones for Charleston AFB.

### **1.3 PROCESS, PROCEDURE, AND NOISE METRICS**

Preparation and presentation of this update to Charleston AFB's AICUZ Study is part of the continuing Air Force participation in the local planning process. Guidance for the Air Force AICUZ program is contained in Air Force Instruction (AFI) 32-7063, *Air Installation Compatible Use Zone Program*, which implements DoD Instruction 4165.57, *Air Installations Compatible Use Zones*.

As local communities prepare land use plans and zoning ordinances, it is recognized that the Air Force has the responsibility to provide input on its activities relating to the community. This study is presented in the spirit of mutual cooperation and assistance by Charleston AFB to aid in the local land use planning process. Noise contours depicted on the AICUZ maps in this study are based on 2002 levels of flying and aircraft maintenance activities plus anticipated future aircraft operations and maintenance runup activity.

Aircraft operational and maintenance data used in this study, as well as anticipated future aircraft operations and maintenance runup activity, were collected at Charleston AFB in June 2002. The Air Force reviewed and validated the data in September 2002. Aircraft flight and maintenance operational data were obtained to derive average daily operations by runway and type of aircraft. These data were supplemented by flight track information (where we fly), flight profile information (how we fly), and ground runup information. After verification for accuracy, the data were input into the NOISEMAP Version 6.5 computer program to produce DNL noise contours. The noise contours for Charleston AFB were plotted on an area map and overlaid with the CZ and APZ areas for the installation.

### **1.4 COMPUTERIZED NOISE EXPOSURE MODELS**

The Air Force adopted the NOISEMAP computer program to describe noise impacts created by aircraft operations. NOISEMAP is one of two USEPA-approved computer programs; the other is the Integrated Noise Model (INM) used by the Federal Aviation Administration (FAA) for noise analysis at civil airports. The NOISEMAP and INM programs are similar; however, INM does not contain noise data for all military aircraft.

## **SECTION 2 INSTALLATION DESCRIPTION**

### **2.1 DESCRIPTION OF CHARLESTON AFB**

Charleston AFB is located near the center of the City of North Charleston, which is 10 miles northwest of the City of Charleston, Charleston County, South Carolina. The City of Hanahan is adjacent to the northeast of the Base. Berkeley County is located to the north and east of the Base, and Dorchester County lies to the west of the Base. Interstate Highway 26 is located about one-half mile northeast of the airfield. Charleston AFB has 3,733 acres of property and two active runways, respectively designated as Runways 03/21 and 15/33. Figure 2.1 shows the location of Charleston AFB and the surrounding area.

The Charleston County Aviation Authority operates the Charleston International Airport through a joint-use agreement with Charleston AFB. The airport is located to the southeast and south of the airfield and offers scheduled air passenger service. It has a terminal, a general aviation apron, and taxiways to support commercial and general aviation activities.

### **2.2 MISSION**

The 437th Airlift Wing (437AW) is the host unit at Charleston AFB and reports to the Air Mobility Command headquartered at Scott AFB, Illinois. The mission of the 437AW is to provide rapid mobility for America's armed forces to any problem area in the world through airlift of troops and equipment. During wartime, the 437AW is responsible for deployment and resupply of major combat units of the United States. It also provides administrative, logistical, and medical support to 437AW units, tenant agencies, and the Charleston AFB community, including retirees and their families. The organizational structure of the 437AW consists primarily of an operations group, a medical group, a support group, and a logistics group.

There are several tenant units at Charleston AFB, one of which is a flying unit. An Air Force Reserve Command unit, the 315th Airlift Wing, augments the 437AW in its airlift mission. On a day-to-day basis, reserve flight crews join active duty counterparts in the 437AW to complete airlift missions.

### **2.3 ECONOMIC IMPACT**

The Economic Impact Region for Charleston AFB is the geographic area subject to significant Base-generated economic impacts, and is defined as the Charleston – North Charleston Metropolitan Statistical Area (MSA). This area consists of the three adjacent South Carolina counties (Charleston, Dorchester, and Berkeley).

**2.3.1 Local Economic Characteristics**

As shown in Table 2.1, the MSA had a population of nearly 507,000 in 1990. In 2000, it was estimated that the population of the MSA increased to approximately 549,000 persons, which is an 8 percent increase in population growth from 1990 to 2000. The MSA is expected to grow to a population of over 637,000 by 2010 (U.S. Census Bureau).

<b>Table 2.1 Historic and Projected Population</b>			
<b>Area</b>	<b>1990</b>	<b>2000 estimate</b>	<b>2010 projection</b>
Charleston – North Charleston MSA	506,875	549,033	637,900
North Charleston	70,161	79,641	n/a
<i>Sources: US Census Bureau, 2000</i>			

In 1997, employment in the MSA was estimated to be over 162,000 persons with an annual payroll of over \$3.6 billion. The largest employer was the services sector with over 81,000 employees (50 percent of total) which contributed nearly \$1.7 billion (47 percent of total) in payroll (U.S. Census Bureau). Table 2.2 presents the MSA employment by sector.

<b>Table 2.2 Charleston – North Charleston MSA Employment Estimates by Sector, 1997</b>		
<b>Sector</b>	<b>Employees</b>	<b>Payroll (mill.)</b>
Manufacturing	20,595	\$688
Transportation, Warehousing	8,412	\$192
Wholesale Trade	6,644	\$209
Retail Trade	29,095	\$441
Finance, Insurance, Real Estate	9,846	\$278
Services	81,317	\$1,684
Other	6,630	\$122
<b>Total</b>	<b>162,539</b>	<b>\$3,614</b>
<i>Source: US Census Bureau, Economic Census 1997</i>		



**Charleston Air Force Base**

**LEGEND**

-  Runway
-  Roadway
-  Charleston AFB



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**Charleston AFB  
Location Map**

Figure 2.1

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### 2.3.2 Base Impact

As reflected in Table 2.3, Charleston AFB had an estimated total economic impact of over \$452 million in 2001. The majority of this economic impact (\$383 million, or 85 percent of the total) was due to the payroll, retirement benefits, and contracts provided by Charleston AFB. The Base directly employs over 6,900 personnel with an annual payroll of approximately \$164 million. In addition to direct benefits, the Base had an additional economic impact of \$69 million related to an estimated 2,424 indirect jobs in the region.

<b>Classification</b>	<b>Personnel</b>	<b>Economic Impact (millions)</b>
Active Duty Military	3,156	\$88.2
Traditional Guardsmen/Reserve	2,441	\$21.2
Active Duty Military Dependents	2,193	n/a
APF Civilians	884	\$45.7
NAF Contract Civilians & Private Businesses	460	\$8.6
Other (Service & Supply Contracts)	n/a	\$219.4
<b>Total Direct</b>	<b>9,134</b>	<b>\$383.1</b>
<b>Indirect</b>	<b>2,424</b>	<b>\$69.3</b>
<b>Grand Total</b>	<b>11,558</b>	<b>\$452.4</b>

*Source: 437<sup>th</sup> Airlift Wing, Economic Impact Analysis, FY 2001*

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## **SECTION 3 AIRCRAFT OPERATIONS**

### **3.1 INTRODUCTION**

To describe the relationship between aircraft operations and land use at and around the Base, it is necessary to fully evaluate the exact nature of flying activities. The June and September 2002 inventories of Base aircraft operations included where aircraft fly, how high they fly, how many times they fly over a given area, and the time of day they operate.

Section 3.2 discusses aircraft operations at Charleston AFB. Section 3.3 discusses runway and flight track utilization for all operations by aircraft type. Section 3.4 describes aircraft maintenance runup operations, Section 3.5 discusses aircraft flight profiles, and Section 3.6 presents climatological data.

### **3.2 AIRCRAFT OPERATIONS**

The most recent amendment to the Charleston AFB AICUZ Study was accomplished in 1992 to reflect the Base's conversion from C-141 to C-17 aircraft. This change required the addition, elimination, and modification of flight tracks and profiles to correspond to the different operating characteristics between the two aircraft types. Since initiation of the conversion, the Base's aircrews have become more experienced with the C-17 aircraft and have modified how, where, and when they fly. Additionally, the number of daily aircraft operations has increased and is expected to remain above the number reported in the 1992 AICUZ Study. Likewise, the number of operations occurring between 10:00 p.m. and 7:00 a.m. has increased and is expected to remain above the number identified in 1992. Therefore, this AICUZ Study reflects the changes in flight operations that have occurred since 1992, and considers the current and projected Charleston AFB aircraft operations as of September 2002.

It is estimated that about 121,114 annual aircraft operations occurred at Charleston AFB between June 2001 and May 2002 based on aircraft operations data collected in June 2002. An aircraft operation is defined as one takeoff/departure, one approach/landing, or half a closed pattern. A closed pattern consists of two portions, a takeoff/departure and an approach/landing, *i.e.*, two operations. A sortie is a single military aircraft flight from the initial takeoff through the termination landing. The minimum number of aircraft operations for one sortie is two operations, one takeoff (departure) and one landing (approach).

Table 3.1 summarizes the projected average busy-day aircraft operations for Charleston AFB based on information provided by Charleston AFB staff, flying organization, air traffic control tower, Charleston International Airport, and general aviation facility personnel. Aircraft types operating at the Base consist of both military and civil aircraft. In addition to Charleston AFB C-17 and aero club aircraft, numerous types of transient military aircraft conduct operations at the Base. Fourteen transient military aircraft were selected to represent the numerous types for noise modeling purposes, with selection preference based on the uniqueness of a particular aircraft or those with the greatest number of operations. Operations for the other transient military aircraft types were combined with the selected aircraft based

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on similar characteristics (e.g., number and type of engines, size of aircraft, airspeed, etc.). The same methodology was used for general aviation aircraft. The aircraft listed for Charleston International Airport reflect the types that operated at the airport in June 2002. The table reflects a total of 359.61 average busy-day aircraft operations based on projected aircraft operations data. Percents of operations by category are: based aircraft, 27 percent; transient military aircraft, 11 percent; Charleston International Airport aircraft, 33 percent; and general aviation aircraft, 29 percent. About 12 percent of the total daily operations occur at night (10:00 p.m.-7:00 a.m.).

**Table 3.1 Average Busy Day Aircraft Operations for 2002**

Category/ Aircraft Type	Daily Arrival/ Departure Operations	Daily Closed Pattern Operations	Total Daily Operations
<b>Based Aircraft</b>			
C-17	29.34	62.59	91.93
Aero Club	4.93	0.00	4.93
Subtotal	34.27	62.59	96.86
<b>Transient Military Aircraft</b>			
AV-8	1.08	12.82	13.90
A-10	0.35	0.00	0.35
C-5	0.72	0.00	0.72
C-9	0.29	0.00	0.29
C-17	0.55	0.00	0.55
C-130	2.83	0.00	2.83
KC-135	1.12	0.00	1.12
C-141	1.40	0.00	1.40
F-16	2.26	12.82	15.08
H-60	0.71	0.00	0.71
T-1	1.17	1.13	2.30
T-6	0.98	0.94	1.92
T-37	0.85	0.82	1.67
T-38	0.67	0.64	1.31
Subtotal	14.98	29.17	44.15
<b>Charleston International Airport Aircraft</b>			
Regional Jet	68.38	0.00	68.38
B-737	10.00	0.00	10.00
B-757	6.00	0.00	6.00
MD-80	6.00	0.00	6.00
Dornier 38	16.00	0.00	16.00
A-319/320	4.00	0.00	4.00
Beech 1900	4.86	0.00	4.86
Subtotal	115.24	0.00	115.24
<b>General Aviation</b>			
Single Engine	18.22	29.90	48.12
Twin Engine	12.24	20.10	32.34
Turboprop	16.98	0.00	16.98
Jet	5.92	0.00	5.92
Subtotal	53.36	50.00	103.36
<b>Total</b>	<b>217.85</b>	<b>141.76</b>	<b>359.61</b>
Note: An operation is one takeoff/departure or one arrival/landing. A closed pattern consists of two operations, one takeoff and one landing.			

Source: Charleston AFB, 2002; Charleston International Airport, 2002.

Although the number of military and civil aircraft operations at an installation usually varies from day to day, NOISEMAP requires input of the specific numbers of daily flight and aircraft maintenance engine runup operations. The Air Force does not follow the FAA's use of the "average annual day" in which annual operations are averaged over an entire 365-day year. Neither does the Air Force use the "worst-case day" since it typically does not represent the typical noise exposure. Instead, the Air Force uses the "average busy day" concept in which annual operations for an aircraft type are averaged over the number of flying days per year by that aircraft type. Non-flying days (*e.g.*, weekends or holidays) are not used in computing the "average busy day" operations.

### **3.3 RUNWAY AND FLIGHT TRACK UTILIZATION**

The Base has two runways: one is oriented 031°–211° (03/21); the second is oriented 154°–334° (15/33). Runway 03/21 is 7,000 feet long and 150 feet wide, and does not have overruns at either end. Runway 15/31 is about 9,000 feet long and is 200 feet wide, and has overruns at the runway ends. The airfield elevation is 46 feet above mean sea level. Overhead traffic patterns accomplished by fighter and trainer type aircraft are flown at an altitude of approximately 1,700 feet above ground level (AGL). Rectangular patterns for large, heavy aircraft are accomplished at 1,200 feet AGL, except for C-5 patterns which are flown at 2,000 feet AGL. Light aircraft such as aero club aircraft fly patterns at 700 feet AGL.

Other airports within the area surrounding Charleston AFB influence aircraft arrival and departure flight tracks at the Base. The East Cooper Airport is about 13 miles east of Charleston AFB, while the Charleston Executive Airport is approximately 14 miles south, the Summerville Airport is about 15 miles northwest, and the Moncks Corner Airport is approximately 16 miles north.

Considering the above limitations, aircraft operating at Charleston AFB use the following basic flight patterns:

- Straight out departures;
- Straight-in approaches;
- Visual Flight Rules (VFR) overhead and rectangular closed patterns to the southeast and northwest of Runway 03/21 as well as to the northeast and southwest of Runway 15/33;
- Instrument Flight Rules or radar closed patterns to the northeast and west of the airfield; and
- Re-entry VFR patterns.

Flight patterns specific to Charleston AFB result from several considerations, including:

- Takeoff patterns routed to avoid noise-sensitive areas as much as possible;
- Criteria governing the speed, rate of climb, and turning radius for each type of aircraft;

- Efforts to control and schedule missions to keep noise levels low, especially at night; and
- Coordination with the FAA to minimize conflict with civil aircraft operations.

Planning for the areas surrounding an airfield considers three primary aircraft operational/land-use determinants: (1) aircraft accident potential to land users; (2) aircraft noise; and (3) hazards to operations from land uses (*e.g.*, height of structures). 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 flight tracks depicted in Figures 3.1 through 3.3 are the result of such planning and depict the modeled average busy-day flight tracks for the operations listed in Table 3.1. Runways 03 and 21 are used about 33 percent of the time, and Runways 15 and 33 are used about 67 percent of the time.

### **3.4 AIRCRAFT MAINTENANCE RUNUP OPERATIONS**

To the maximum extent possible, aircraft maintenance engine runup locations have been established in areas to minimize noise for people on Base, as well as for those in the surrounding communities. Aircraft maintenance engine runup operations are accomplished by based flying units and their associated maintenance functions, as well as by general aviation aircraft on the north side of Runway 15/33.

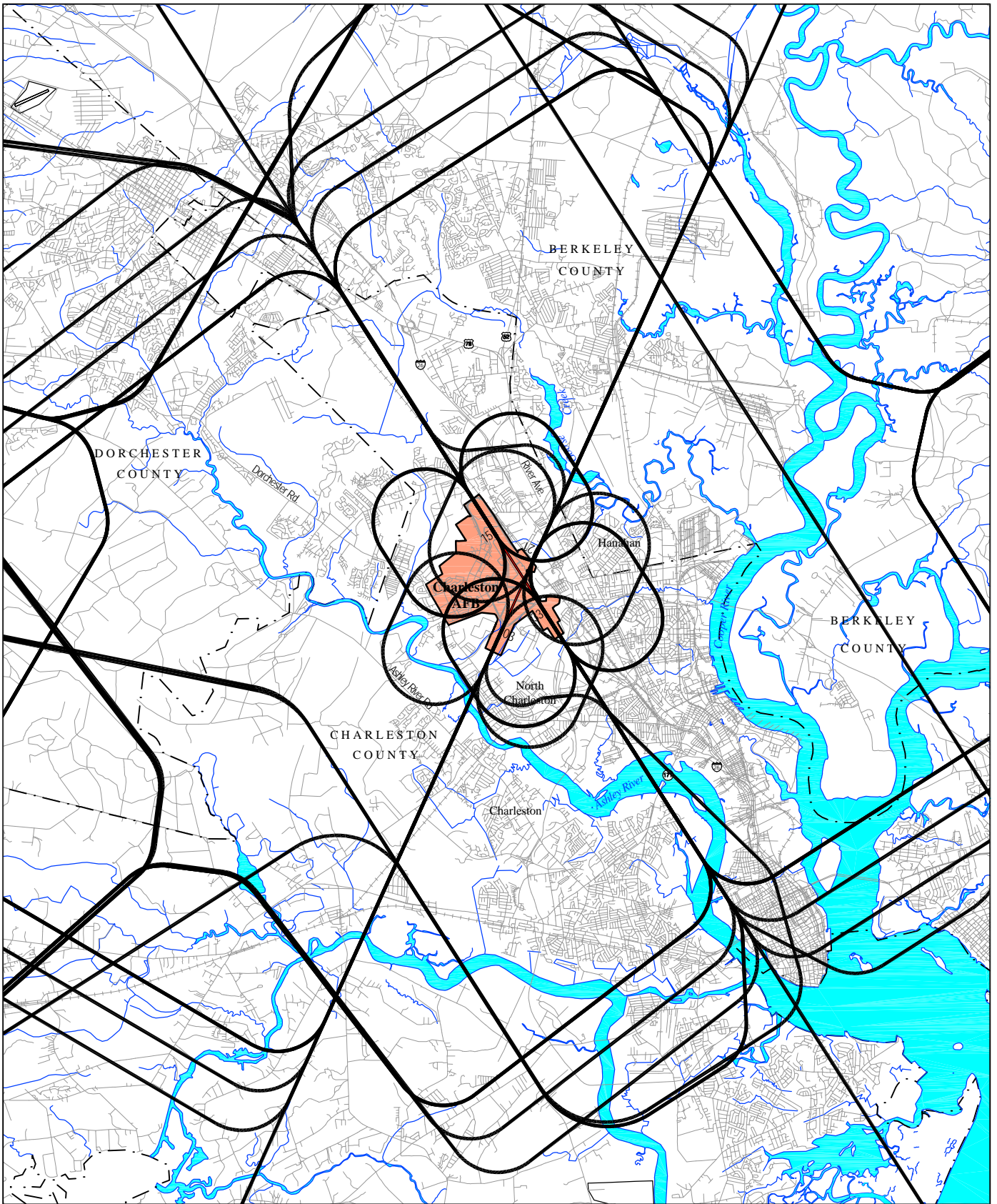
Average busy-day aircraft maintenance runup operations were calculated similarly to flight operations described in Section 3.1. Weekly, monthly, or annual estimates of runups provided by aircraft maintenance personnel from both Charleston AFB and the general aviation facility were divided by the typical number of days runups were performed over the respective period. Approximately 20 percent of aircraft maintenance runup time at Charleston AFB occurs during the night (10:00 p.m. to 7:00 a.m.). None of the engine runup operations at the general aviation facility occur during the night.

### **3.5 AIRCRAFT FLIGHT PROFILES**

For purposes of this AICUZ Study, aircraft “flight profiles” denote the aircraft power settings, altitudes above runway level, and airspeeds along each flight track. Aircraft flight profiles for C-17 aircraft were obtained from the organizations that operate the aircraft. Flight profiles from the BASEOPS database were used to model operations for the other military and civil aircraft types. Noise data from the NOISEFILE database were used to model operations for all aircraft types.

### **3.6 CLIMATOLOGICAL DATA**

Weather, measured by temperature and relative humidity, is an important factor in the propagation of noise. Temperature and relative humidity affect sound absorption. NOISEMAP uses the average daily temperature and relative humidity for each month to determine the appropriate values to represent the given year. Table 3.2 lists the historical climatological information in terms of average temperature and average relative humidity for Charleston AFB.

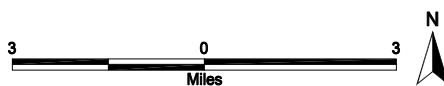


**Charleston Air Force Base**

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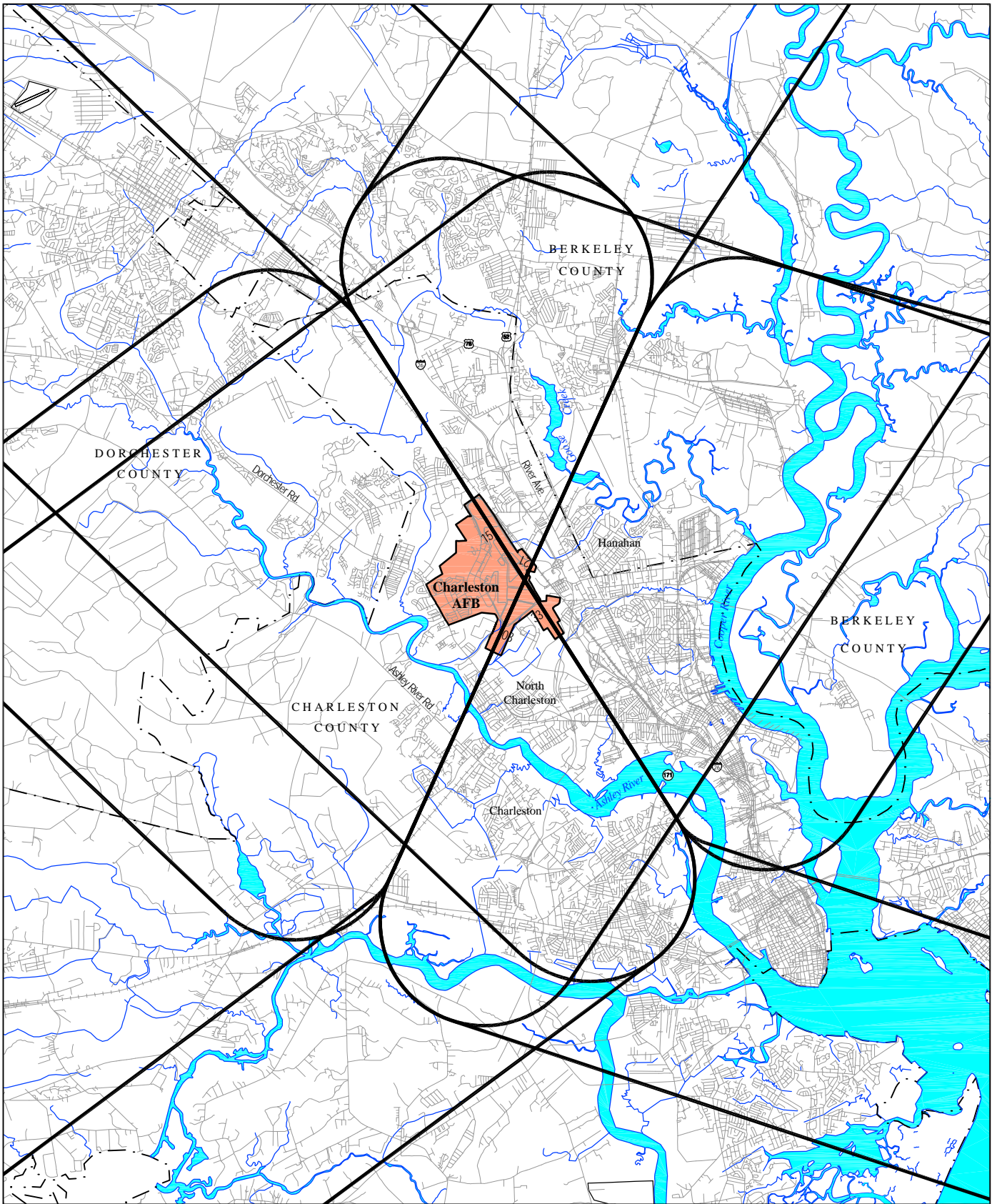
- Flight Track
- Runway
- Charleston AFB
- Roadway



**Arrival Flight Tracks**

Figure 3.1

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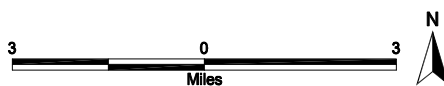


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**LEGEND**

- Flight Track
- Runway
- Charleston AFB
- Roadway

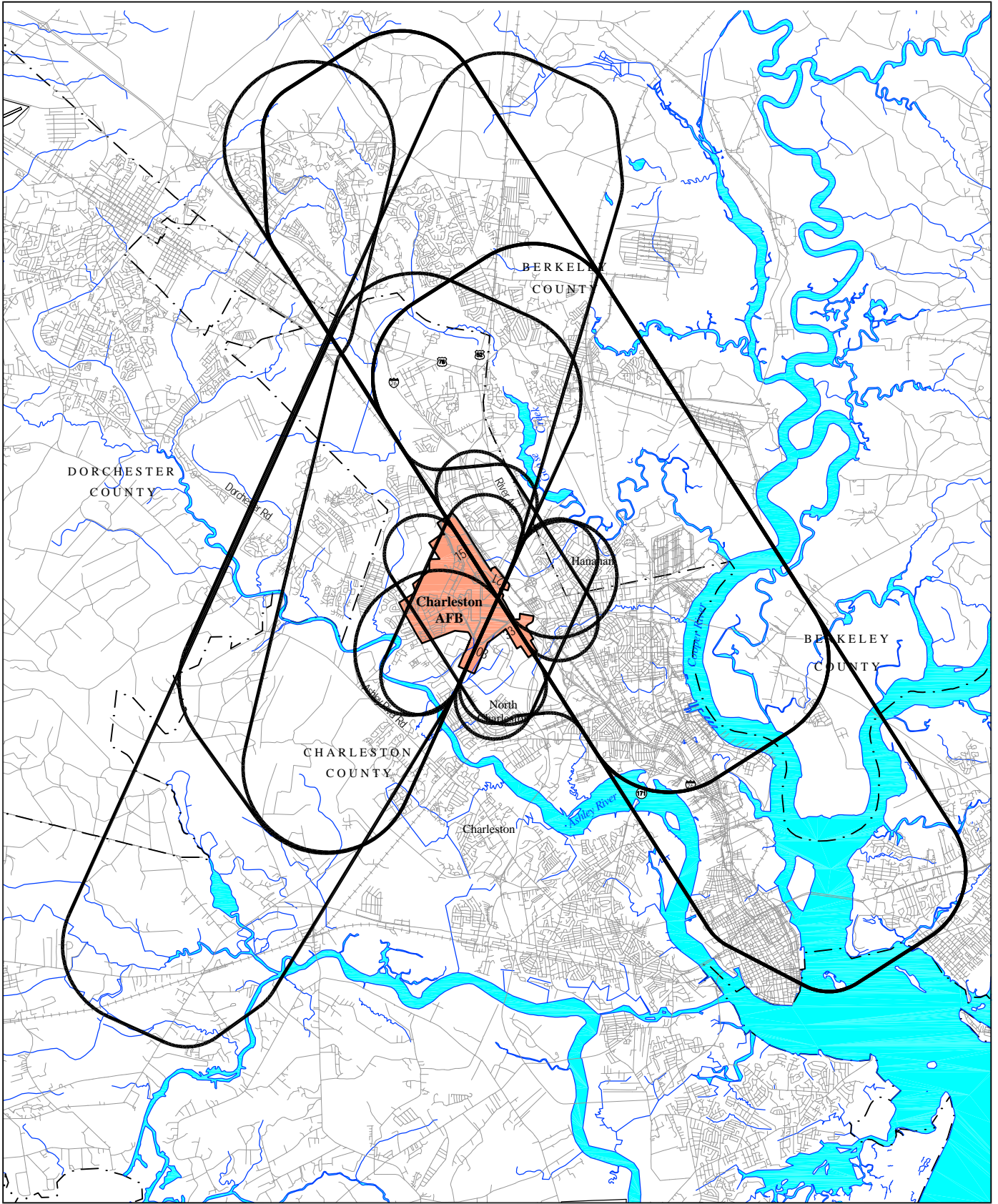


**Departure Flight Tracks**

Figure 3.2

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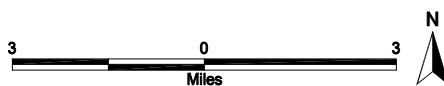


**Charleston Air Force Base**

**2004 AICUZ Study**

**LEGEND**

- Flight Track
- Runway
- Charleston AFB
- Roadway



**Closed Pattern Flight Tracks**

**Figure 3.3**

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**Table 3.2      Climatological Data**

<b>Month</b>	<b>Average Temperature (°F)</b>	<b>Average Relative Humidity (%)</b>
January	47	67
February	50	66
March	58	66
April	64	66
May	72	71
June	78	74
July	81	75
August	80	76
September	75	76
October	66	71
November	58	69
December	50	69
Standard Temperature	66	--
Standard Relative Humidity	--	71

Source: AFCCC/DON.

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## **SECTION 4 EFFECTS OF AIRCRAFT OPERATIONS**

### **4.1 INTRODUCTION**

This section has two purposes. The first is to describe effects of the existing aircraft operations in terms of imaginary surfaces associated with obstructions to air navigation, noise exposure, CZs, and APZs. The second purpose is to present applicable land-use compatibility guidelines and extent of the Air Force's participation in the land-use planning process.

### **4.2 RUNWAY AIRSPACE IMAGINARY SURFACES**

Runway airspace imaginary surfaces, in graphical form, are the result of the application of obstruction height criteria to the Charleston AFB airfield. Imaginary surfaces are surfaces in space around airfields in relation to runways. The surfaces are designed to define the obstacle-free airspace around the airfield. Refer to Unified Facilities Criteria (UFC) 3-260-01, *Airfield and Heliport Planning and Design*, for a more complete description of runway airspace imaginary surfaces. Figure 4.1 depicts the runway airspace imaginary surfaces for Charleston AFB. Air Force obstruction criteria in UFC 3-260-01 are based on those contained in Federal Aviation Regulation Part 77, *Objects Affecting Navigable Airspace*, Subpart C.

Obstructions to air navigation are considered to be:

- Natural objects or man-made structures that protrude above the planes or imaginary surfaces, and/or;
- Man-made objects that extend more than 500 feet AGL at the site of the structure.

#### **4.2.1 Explanation of Terms**

The following elevation, runway length, and dimensional criteria apply:

- 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—Charleston AFB has two Class B runways designed and built for sustained aircraft landings and take-offs.
- Established Airfield Elevation—The established elevation for the Charleston AFB airfield is 46 feet above mean sea level.
- Dimensions—All dimensions are measured horizontally unless otherwise noted.

#### **4.2.2 Runway Airspace Imaginary Surfaces**

The following paragraphs contain definitions of the runway airspace imaginary surfaces for Air Force class “B” runways:

- **Primary Surface**—An imaginary surface symmetrically centered on the runway, extending 200 feet beyond each runway end, that defines the limits of the obstruction clearance requirements in the vicinity of the landing area. The width of the primary surface is 2,000 feet, or 1,000 feet on each side of the runway centerline.
- **Clear Zone Surface**—An obstruction-free surface on the ground (except for features essential for aircraft operations) symmetrically centered on the extended runway centerline beginning at the end of the runway and extending outward 3,000 feet. The CZ width is 3,000 feet (1,500 feet to either side of runway centerline).
- **Accident Potential Zone Surfaces**—APZ I begins at the outer end of the CZ and is 5,000 feet long and 3,000 feet wide. APZ II begins at the outer end of APZ I and is 7,000 feet long and 3,000 feet wide.
- **Approach-Departure Clearance Surface**—This imaginary surface is symmetrically centered on the extended runway centerline, beginning as an inclined plane (glide angle) 200 feet beyond each end of the primary surface, and extending for 50,000 feet. The slope of the approach-departure clearance surface is 50:1 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 starting point. The width of this surface at the runway end is 2,000 feet, flaring uniformly to a width of 16,000 feet at the end point.
- **Transitional Surface**—This imaginary surface extends outward and upward at right angles to the runway centerline and extended runway centerline at a slope of 7:1. The transitional surface connects the primary and the approach-departure clearance surfaces to the inner horizontal, the conical, and the outer horizontal surfaces.
- **Inner Horizontal Surface**—This imaginary surface is an oval plane at a height of 150 feet above the established airfield elevation. The inner boundary intersects with the approach-departure clearance surface and the transitional surface. The outer boundary is formed by scribing arcs with a radius 7,500 feet from the centerline of each runway end and interconnecting these arcs with tangents.
- **Conical Surface**—This is an inclined imaginary 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. The conical surface connects the inner and outer horizontal surfaces.
- **Outer Horizontal Surface**—This imaginary surface is located 500 feet above the established airfield elevation and extends outward from the outer periphery of the conical surface for a horizontal distance of 30,000 feet.

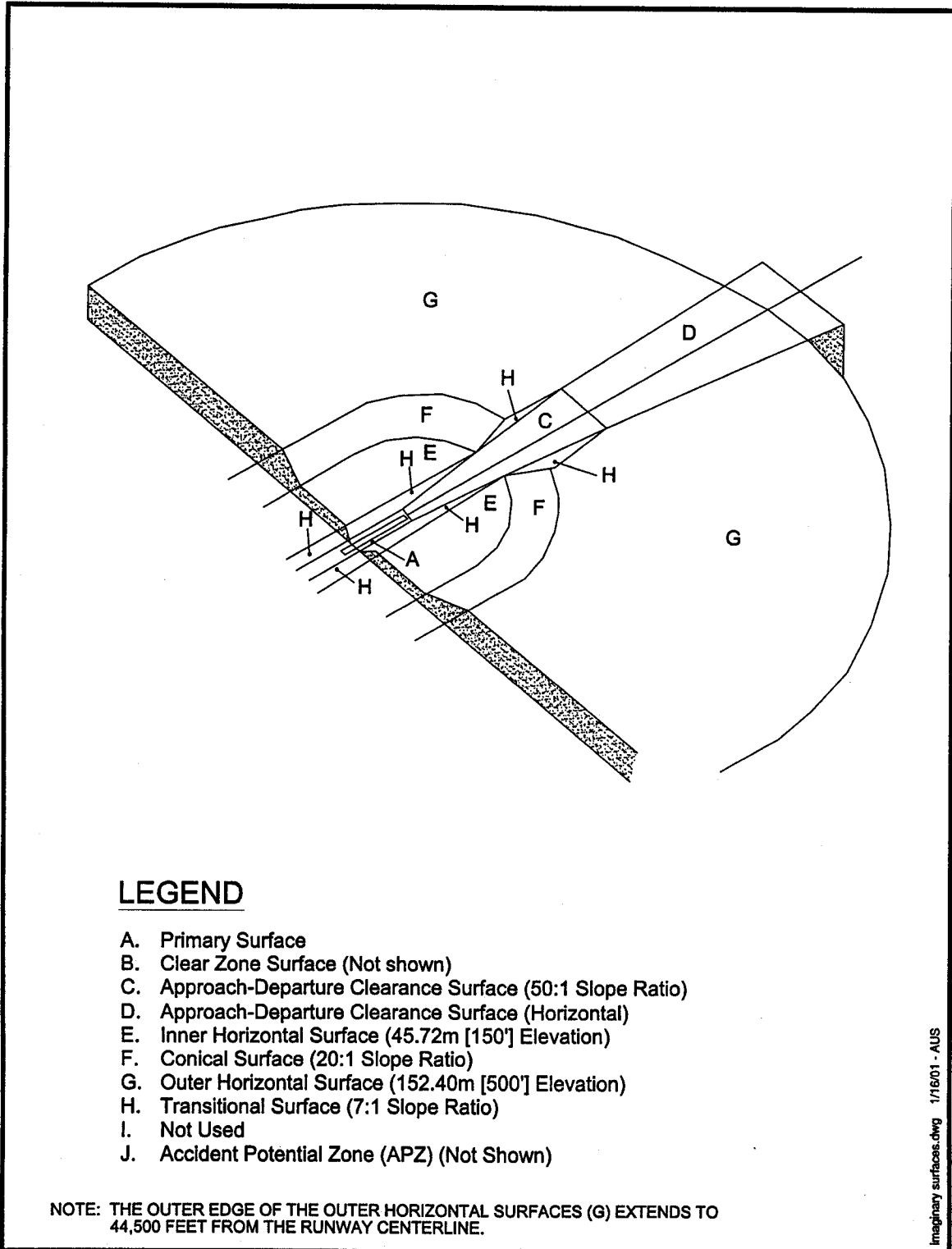


Figure 4.1 Class B Air Force Runway Airspace Imaginary Surfaces

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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 and/or prohibited:

- Releases into the air of any substance that would impair visibility or otherwise interfere with the operation of aircraft (e.g., steam, dust, or smoke);
- Light emissions, either direct or indirect (reflective), that would interfere with pilot vision;
- Electrical emissions that would interfere with aircraft communications systems or navigational equipment;
- Uses that would attract birds or waterfowl, including but not limited to, 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; and
- Structures within 10 feet of aircraft approach-departure and/or transitional surfaces.

### **4.3 NOISE EXPOSURE**

NOISEMAP Version 6.5 was used to calculate and plot the DNL 65 dB through 80 dB noise contours based on the average busy day aircraft operations data collected in 2002 and described in Sections 3.1 through 3.6. Figure 4.2 shows the noise contours. The contours represent the composite noise resulting from the aircraft operations described in Table 3.1 and the flight tracks depicted in Figures 3.1 through 3.3.

Different sounds have different frequency content. When describing sound and its effect on a human population, A-weighted (dB) sound levels are typically used to account for the response of the human ear. The term “A-weighted” refers to a filtering of the sound signal to emphasize frequencies in the middle of the audible spectrum and to de-emphasize low and high frequencies in a manner corresponding to the way the human ear perceives sound. This filtering network has been established by the American National Standards. The A-weighted noise level has been found to correlate well with people’s judgments of the noisiness of different sounds and has been in use for many years as a measure of community noise. Figure 4.3 depicts the typical A-weighted sound pressure levels for various sources. For example, 65 dB is equivalent to normal speech at a distance of 3 feet.

Table 4.1 shows the off-Base noise exposure within the DNL 65 dB and greater noise exposure area for aircraft operations at Charleston AFB in terms of acreage and estimated affected population. Population data used in preparing this estimate were obtained from the United States Census Bureau 2000 census. To estimate affected population, it was assumed that population was equally distributed within a census tract area. Using this assumption, the total acreage and population in each census tract surrounding Charleston AFB was collected and assessed. Using the noise contour information, the number of acres of land in each noise zone (i.e., DNL 65-69 dB, 70-74 dB, 75-79 dB, and 80 dB and greater) was divided by the number of acres of land in each census tract to determine what portion of the census tract was

contained within each noise zone. The population total in each block-group was then multiplied by this ratio to estimate affected population within each zone.

**Table 4.1 Areas and Population Within DNL 65 dB and Greater Noise Exposure Area (Off-Base)**

DNL Noise Zone	Acres	Population
65–69	4,625	10,632
70–74	1,447	3,193
75–79	277	504
80+	30	33
<b>Total</b>	<b>6,379</b>	<b>14,362</b>

From Table 4.1, a total of 6,379 acres and 14,362 persons are expected to be in the off-Base area within the DNL 65 dB and greater noise exposure area. The largest affected population is anticipated to be within the DNL 65–69 dB noise zone. This area is estimated to contain 4,625 acres in off-Base land area (72 percent of the total) and an estimated population of 10,632 persons (74 percent of the total) based on the calculated population densities for the area.

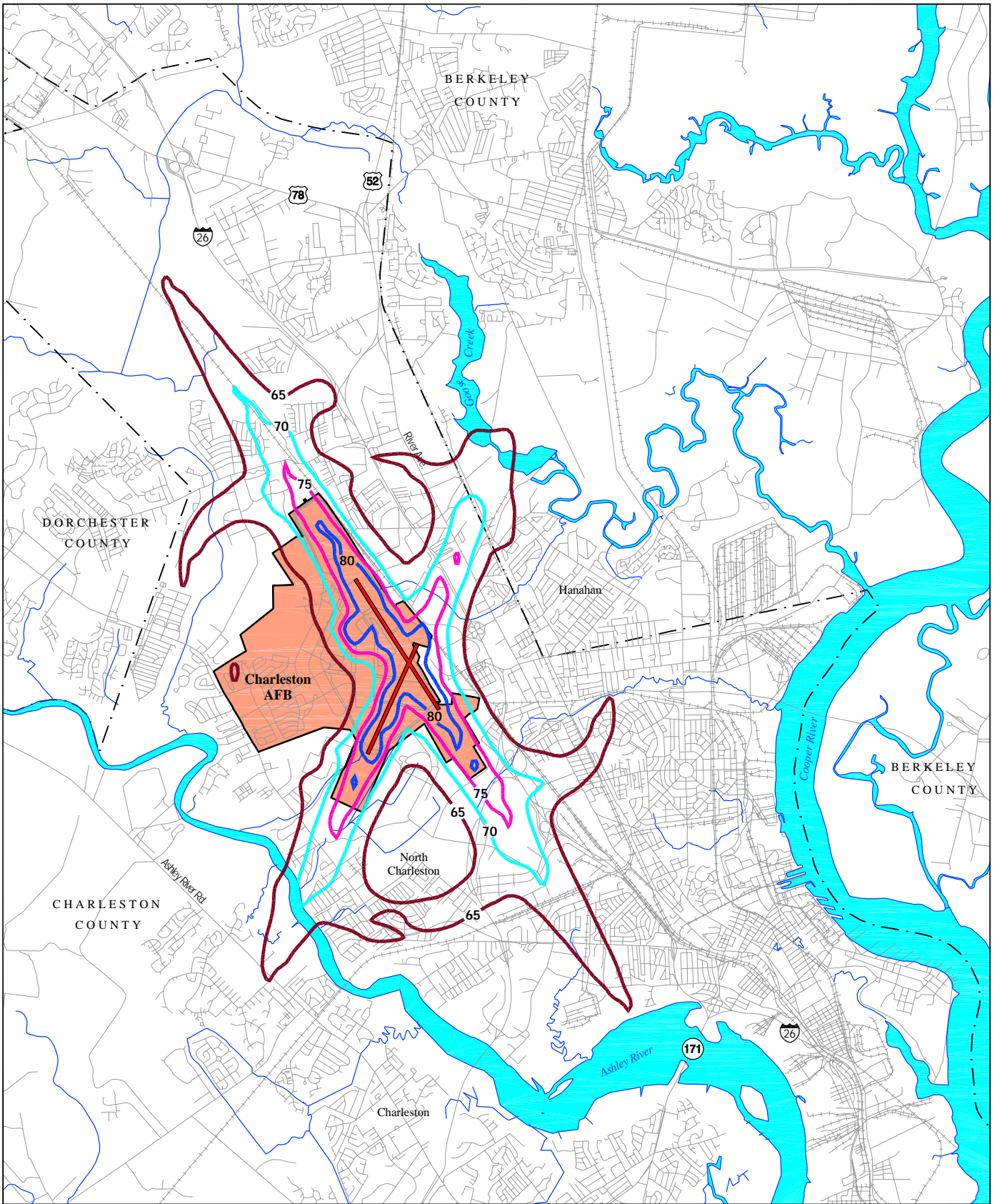
#### **4.4 COMPARISON WITH 1992 AICUZ STUDY**

Noise contours presented in this study differ somewhat in both shape and extent from the noise contours in the 1992 AICUZ Study. Figure 4.4 depicts the 1992 AICUZ Study contours, and Figure 4.5 compares the 2004 and 1992 contours.

Although there are areas that experience increased noise exposure, the overall exposure for this AICUZ Study is about 327 acres less than the 1992 AICUZ Study. Table 4.2 lists the total on and off Base noise exposure for the four noise zones in each study. As depicted on Figure 4.6, noise exposure is less at the ends of the contours along the extended runway centerline to the south and north of the airfield. Noise exposure increases in areas north, southeast, south, and northwest of the airfield are due to increased use of the closed pattern tracks that overfly these areas, as well as the additional nighttime operations.

**Table 4.2 Acres Within the 2002 and 1992 Noise Zones**

DNL Noise Zone	Acres	
	2002 Study	1992 Study
65–69	4,927	4,906
70–74	1,837	1,980
75–79	876	878
80+	590	793
<b>Total</b>	<b>8,230</b>	<b>8,557</b>



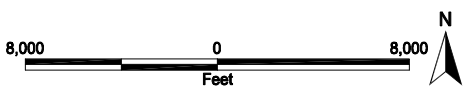
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**Charleston Air Force Base**

**LEGEND**

- 65 dBA Contour
- 70 dBA Contour
- 75 dBA Contour
- 80 dBA Contour
- Runway
- Roadway
- Charleston AFB

**2004 AICUZ Study**

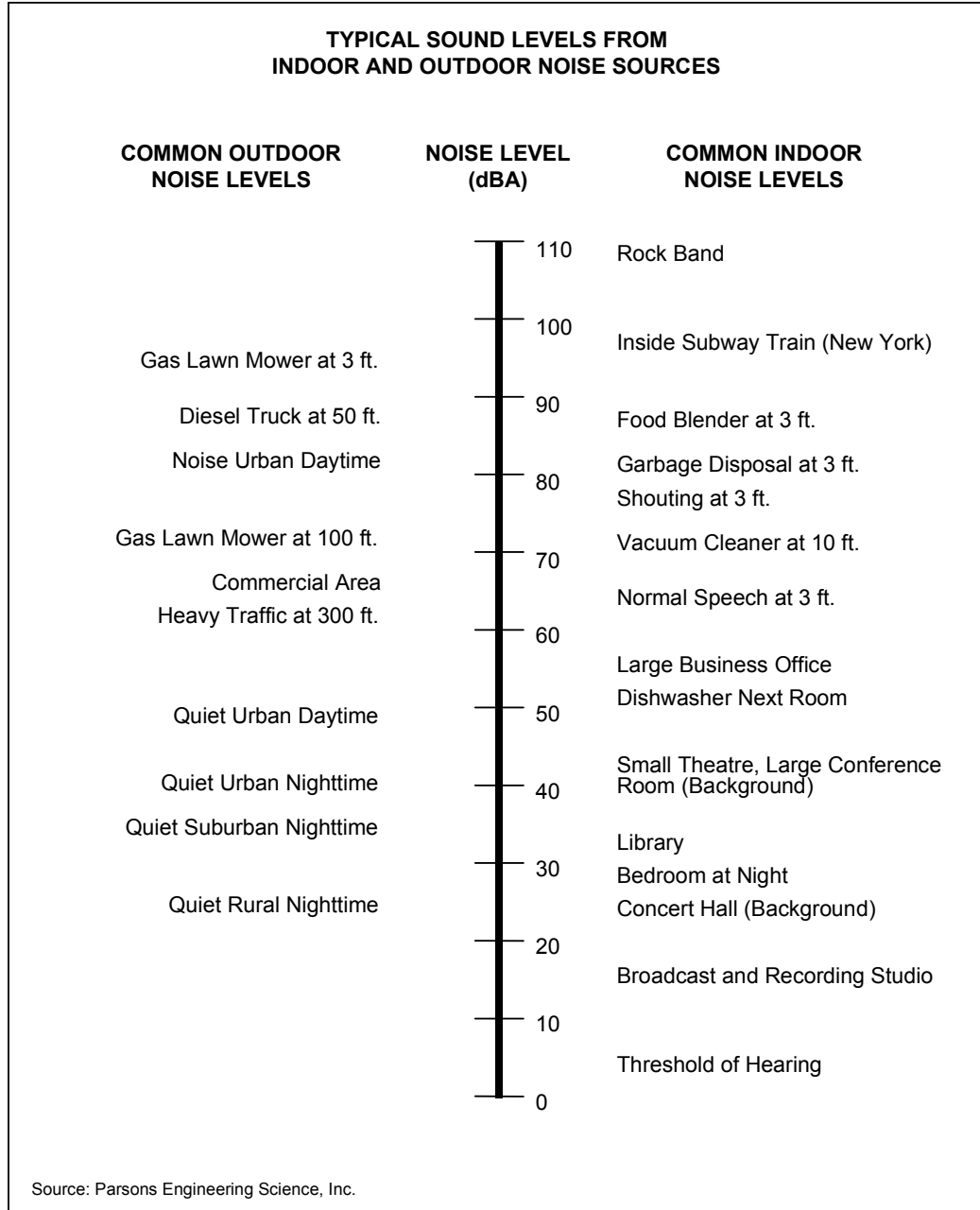


**Average Busy Day  
Noise Contours for 2004**

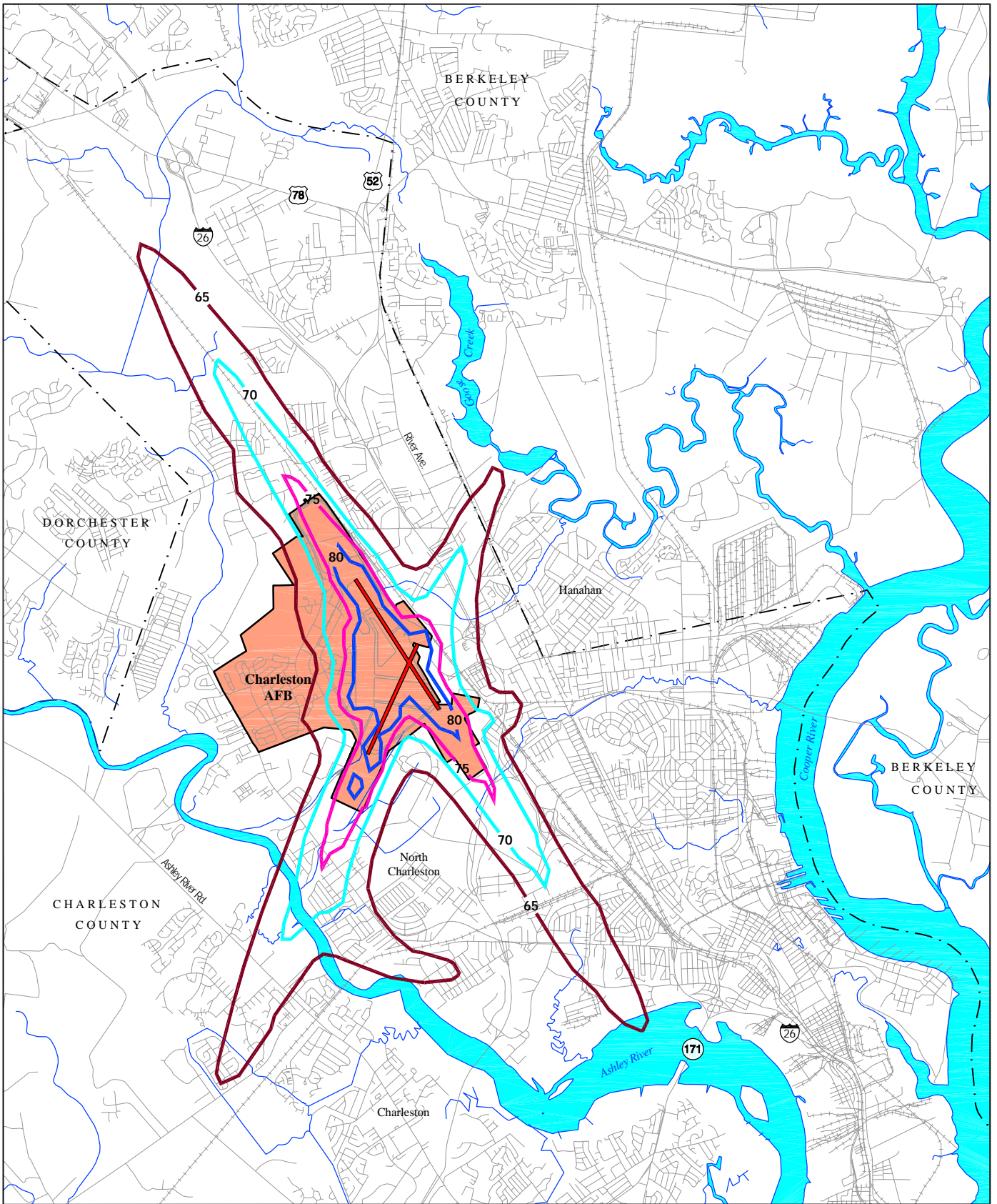
Figure 4.2

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**Figure 4.3 Typical A-Weighted Noise Comparisons**



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**Charleston Air Force Base**

**LEGEND**

- 65 dBA Contour
- 70 dBA Contour
- 75 dBA Contour
- 80 dBA Contour
- 85 dBA Contour
- Runway
- Roadway
- Charleston AFB

**2004 AICUZ Study**

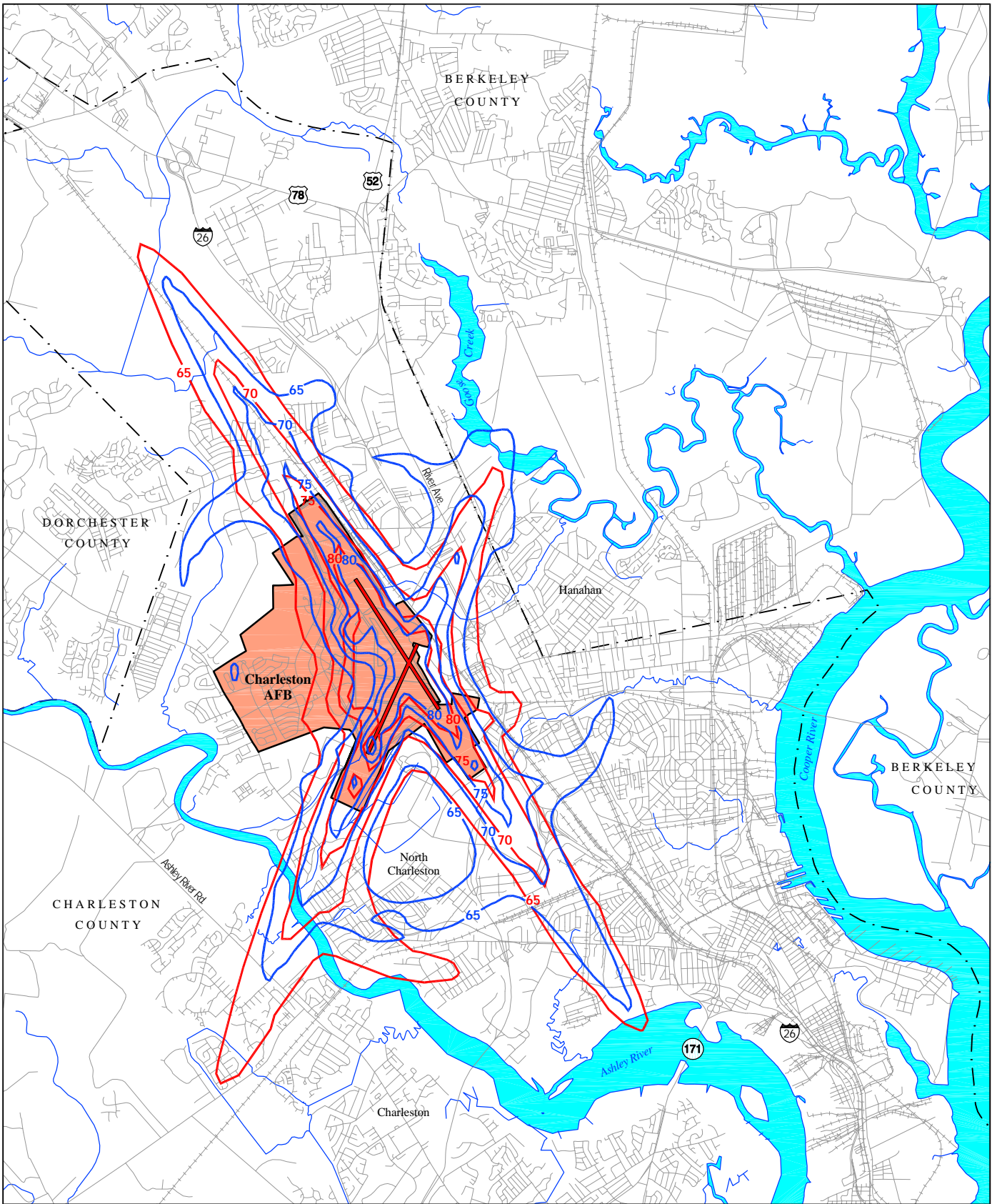
**1992 AICUZ Study  
Noise Contours**



Figure 4.4

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**Charleston Air Force Base**

**LEGEND**

- 2004 Noise Contour
- 1992 Noise Countour
- Runway
- Roadway
- Charleston AFB

**2004 AICUZ Study**



**Comparison of 2004 and 1992 AICUZ Study Contours**

Figure 4.5

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**4.5 CLEAR ZONES AND ACCIDENT POTENTIAL ZONES**

The purpose of this section is to describe the basis for CZs and APZs and apply the zones to Charleston AFB.

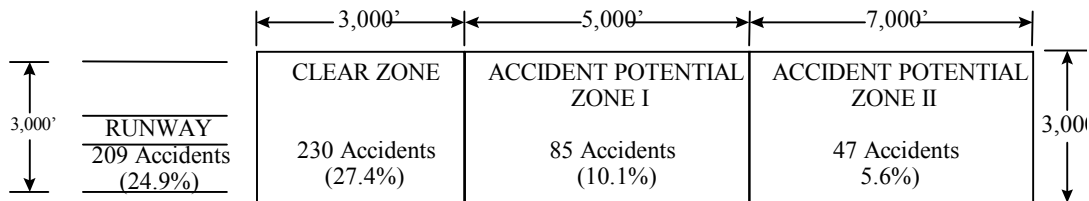
**4.5.1 Basis for Clear Zones and Accident Potential Zones**

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, past history makes it clear that accidents are going to occur.

The risk of people on the ground being killed or injured by aircraft accidents is miniscule. However, an aircraft accident is a high-consequence event and, when a crash does occur, the result is often catastrophic. Because of this, the Air Force does not attempt to base its safety standards on accident probabilities. Instead it approaches this safety issue from a land-use-planning perspective. Designation of safety zones around the airfield and restriction of incompatible land uses can reduce the public’s exposure to safety hazards.

The AICUZ program includes three safety zones: the CZ, APZ I, and APZ II. These zones were developed from analysis of over 800 major Air Force accidents that occurred within 10 miles of an Air Force installation between 1968 and 1995. Figure 4.6 summarizes the location of these accidents.

**Figure 4.6 Air Force Aircraft Accident Data  
(838 Accidents - 1968-1995)**



Other Accidents Within 10 Nautical Miles: 267 Accidents, 32.0%

The CZ has the highest accident potential of the three zones, as 27 percent of accidents studied occurred in this area. Due to the relatively high accident potential, the Air Force adopted a policy of acquiring real estate interests in the CZ through purchase or easement when feasible.

APZ I is an area that possesses somewhat less accident potential than the CZ, with 10 percent of the accidents studied occurring in this zone. APZ II has less accident potential than APZ I, with 6 percent of the accidents studied occurring in this zone. While the potential for aircraft accidents in APZs I and II does not warrant land acquisition by the Air Force, land-use planning and controls are strongly encouraged in these areas for the protection of the public.

#### **4.5.2 Clear Zones and Accident Potential Zones for Charleston AFB**

Figure 4.7 depicts the CZs and APZs for the two runways at Charleston AFB. Each runway end at Charleston AFB has a 3,000 foot by 3,000 foot CZ and two APZs. 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 Air Force policy to request that Congress authorize and appropriate funds for the necessary real property interests in this area to prevent incompatible land uses.

Accident potential zone 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 acceptable.

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

High people densities 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.

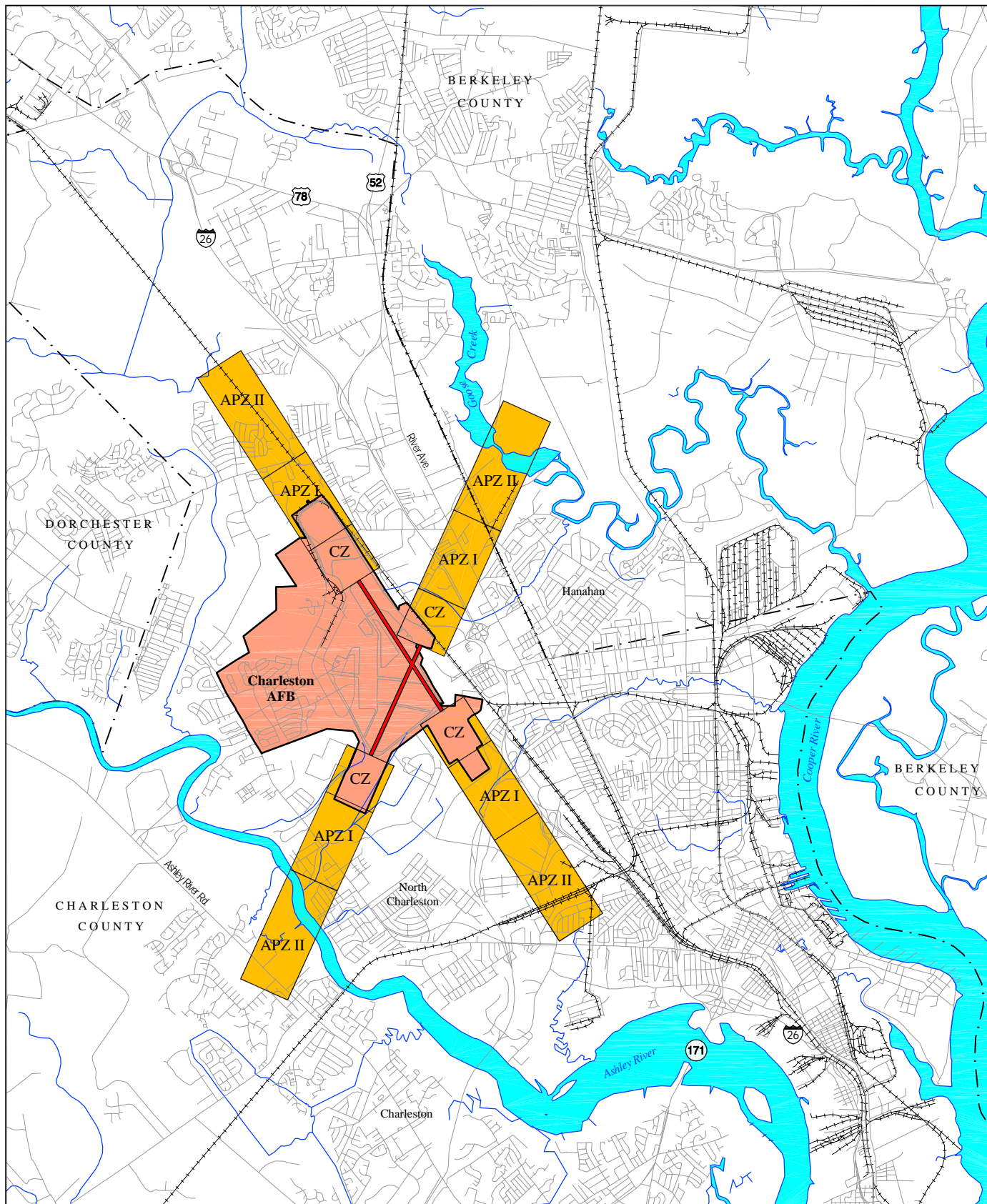
#### **4.5.3 Land Use Compatibility Guidelines**

Section 4.5.4 introduces the AICUZ concept and Section 4.5.5 presents the land-use compatibility guidelines applicable to Charleston AFB.

#### **4.5.4 Introduction**

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

AICUZ reports describe three basic types of constraints that affect, or result from, flight operations. The first constraint involves areas that the FAA and the DoD identified for height limitations (see Section 4.2).






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**Charleston Air Force Base**

**2004 AICUZ Study**

**LEGEND**

- |        |                            |   |         |   |                |
|--------|----------------------------|---|---------|---|----------------|
| CZ     | Clear Zone                 |  | Runway  |  | Charleston AFB |
| APZ I  | Accident Potential Zone I  |  | Roadway |   |                |
| APZ II | Accident Potential Zone II |   |         |   |                |



**Clear Zones and Accident Potential Zones**

Figure 4.7

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The second constraint involves noise zones based on the DNL metric and the DoD NOISEMAP methodology. Using the NOISEMAP program, which is similar to FAA's INM, the Air Force produces noise contours showing the noise levels generated by aircraft operations. The AICUZ report contains noise contours plotted in 5 dB increments, ranging from DNL 65 dB to 80+ dB.

The third constraint involves CZs and APZs based on statistical analysis of past DoD aircraft accidents. DoD analysis has determined that areas immediately beyond the ends of runways and along the approach and departure flight paths have greater potential for aircraft accidents (see Figure 4.7).

#### **4.5.5 Land-Use Compatibility Guidelines**

Each AICUZ Study contains land-use guidelines. Table 4.3 identifies land uses and possible noise exposure and accident potential combinations for Charleston AFB. These 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 and Control*. The U.S. Department of Transportation publication, *Standard Land Use Coding Manual (SLUCM)*, has been used to identify and code land-use activities. The designations are a combination of criteria listed in the Legend and Notes at the end of the table. For example, Y1 means land use and related structures are compatible without restriction at a suggested maximum density of 1-2 dwelling units per acre, possibly increased under a Planned Unit Development where lot coverage is less than 20 percent.

#### **4.6 PARTICIPATION IN THE PLANNING PROCESS**

The Air Force provides the AICUZ Study to local communities to assist them in preparing their local land use plans. This section discusses how the Base participates in the community planning process. Section 6.3 addresses the role played by the local community in enhancing compatible land use.

Airspace obstructions, construction in the APZs, residential development, and construction of other noise-sensitive uses near the Base are of great concern. Incompatible land use is discussed in Section 5. The Air Force is very interested in minimizing increases in incompatible usage and in encouraging voluntary conversion of non-compatible usage to compatible usage. Applying the categories for compatible land use described in Table 4.3, the Base evaluates the impact aircraft operations have on surrounding properties and the effect new development or changes in land use might have on Base operational capabilities. Participation in land-use planning can take many forms. The simplest of these is straightforward, consistent two-way discussion and information sharing with both professionals and neighbors. Copies of the AICUZ Study, including maps, will be provided to regional planning departments and zoning administrators. Through this communication process, the Base reviews applications for development or changed use of properties within the noise impact and safety areas, as well as other nearby parcels. The Base coordinates closely with surrounding communities and counties on zoning and land-use issues.

**Table 4.3 Land Use Compatibility Guidelines**

Land Use		Accident Potential Zones			Noise Zones			
SLUCM No.	Name	Clear Zone	APZ I	APZ II	65-69	70-74	75-79	80+
10	<b>Residential</b>							
11	Household units							
11.11	Single units; detached	N	N	Y <sup>1</sup>	A <sup>11</sup>	B <sup>11</sup>	N	N
11.12	Single units; semidetached	N	N	N	A <sup>11</sup>	B <sup>11</sup>	N	N
11.13	Single units; attached row	N	N	N	A <sup>11</sup>	B <sup>11</sup>	N	N
11.21	Two units; side-by-side	N	N	N	A <sup>11</sup>	B <sup>11</sup>	N	N
11.22	Two units; one above the other	N	N	N	A <sup>11</sup>	B <sup>11</sup>	N	N
11.31	Apartments; walk up	N	N	N	A <sup>11</sup>	B <sup>11</sup>	N	N
11.32	Apartments; elevator	N	N	N	A <sup>11</sup>	B <sup>11</sup>	N	N
12	Group quarters	N	N	N	A <sup>11</sup>	B <sup>11</sup>	N	N
13	Residential hotels	N	N	N	A <sup>11</sup>	B <sup>11</sup>	N	N
14	Mobile home parks or courts	N	N	N	N	N	N	N
15	Transient lodgings	N	N	N	A <sup>11</sup>	B <sup>11</sup>	C <sup>11</sup>	N
16	Other residential	N	N	N <sup>1</sup>	A <sup>11</sup>	B <sup>11</sup>	N	N
20	<b>Manufacturing</b>							
21	Food & kindred products; manufacturing	N	N <sup>2</sup>	Y	Y	Y <sup>12</sup>	Y <sup>13</sup>	Y <sup>14</sup>
22	Textile mill products; manufacturing	N	N <sup>2</sup>	Y	Y	Y <sup>12</sup>	Y <sup>13</sup>	Y <sup>14</sup>
23	Apparel and other finished products made from fabrics, leather, and similar materials; manufacturing	N	N	N <sup>2</sup>	Y	Y <sup>12</sup>	Y <sup>13</sup>	Y <sup>14</sup>
24	Lumber and wood products (except furniture); manufacturing	N	Y <sup>2</sup>	Y	Y	Y <sup>12</sup>	Y <sup>13</sup>	Y <sup>14</sup>
25	Furniture and fixtures; manufacturing	N	Y <sup>2</sup>	Y	Y	Y <sup>12</sup>	Y <sup>13</sup>	Y <sup>14</sup>
26	Paper & allied products; manufacturing	N	Y <sup>2</sup>	Y	Y	Y <sup>12</sup>	Y <sup>13</sup>	Y <sup>14</sup>
27	Printing, publishing, and allied industries	N	Y <sup>2</sup>	Y	Y	Y <sup>12</sup>	Y <sup>13</sup>	Y <sup>14</sup>
28	Chemicals and allied products; manufacturing	N	N	N <sup>2</sup>	Y	Y <sup>12</sup>	Y <sup>13</sup>	Y <sup>14</sup>
29	Petroleum refining and related industries	N	N	Y	Y	Y <sup>12</sup>	Y <sup>13</sup>	Y <sup>14</sup>
30	<b>Manufacturing</b>							
31	Rubber and misc. plastic products, manufacturing	N	N <sup>2</sup>	N <sup>2</sup>	Y	Y <sup>12</sup>	Y <sup>13</sup>	Y <sup>14</sup>
32	Stone, clay and glass products manufacturing	N	N <sup>2</sup>	Y	Y	Y <sup>12</sup>	Y <sup>13</sup>	Y <sup>14</sup>
33	Primary metal industries	N	N <sup>2</sup>	Y	Y	Y <sup>12</sup>	Y <sup>13</sup>	Y <sup>14</sup>



*Charleston Air Force Base, South Carolina*

Land Use		Accident Potential Zones			Noise Zones			
SLUCM No.	Name	Clear Zone	APZ I	APZ II	65-69	70-74	75-79	80+
34	Fabricated metal products; manufacturing	N	N <sup>2</sup>	Y	Y	Y <sup>12</sup>	Y <sup>13</sup>	Y <sup>14</sup>
35	Professional, scientific, and controlling instruments; photographic and optical goods; watches and clocks manufacturing	N	N	N <sup>2</sup>	Y	A	B	N
39	Miscellaneous manufacturing	N	Y <sup>2</sup>	Y <sup>2</sup>	Y	Y <sup>12</sup>	Y <sup>13</sup>	Y <sup>14</sup>
40	<b>Transportation, communications and utilities</b>							
41	Railroad, rapid rail transit and street railroad transportation	N <sup>3</sup>	Y <sup>4</sup>	Y	Y	Y <sup>12</sup>	Y <sup>13</sup>	Y <sup>14</sup>
42	Motor vehicle transportation	N <sup>3</sup>	Y	Y	Y	Y <sup>12</sup>	Y <sup>13</sup>	Y <sup>14</sup>
43	Aircraft transportation	N <sup>3</sup>	Y <sup>4</sup>	Y	Y	Y <sup>12</sup>	Y <sup>13</sup>	Y <sup>14</sup>
44	Marine craft transportation	N <sup>3</sup>	Y <sup>4</sup>	Y	Y	Y <sup>12</sup>	Y <sup>13</sup>	Y <sup>14</sup>
45	Highway & street right-of-way	N <sup>3</sup>	Y	Y	Y	Y <sup>12</sup>	Y <sup>13</sup>	Y <sup>14</sup>
46	Automobile parking	N <sup>3</sup>	Y <sup>4</sup>	Y	Y	Y <sup>12</sup>	Y <sup>13</sup>	Y <sup>14</sup>
47	Communications	N <sup>3</sup>	Y <sup>4</sup>	Y	Y	A <sup>15</sup>	B <sup>15</sup>	N
48	Utilities	N <sup>3</sup>	Y <sup>4</sup>	Y	Y	Y	Y <sup>12</sup>	Y <sup>13</sup>
49	Other transportation communications and utilities	N <sup>3</sup>	Y <sup>4</sup>	Y	Y	A <sup>15</sup>	B <sup>15</sup>	N
50	<b>Trade</b>							
51	Wholesale trade	N	Y <sup>2</sup>	Y	Y	Y <sup>12</sup>	Y <sup>13</sup>	Y <sup>14</sup>
52	Retail trade-building materials, hardware and farm equipment	N	Y <sup>2</sup>	Y	Y	Y <sup>12</sup>	Y <sup>13</sup>	Y <sup>14</sup>
53	Retail trade-general merchandise	N	N <sup>2</sup>	Y <sup>2</sup>	Y	A	B	N
54	Retail trade-food	N	N <sup>2</sup>	Y <sup>2</sup>	Y	A	B	N
55	Retail trade-automotive, marine craft, aircraft and accessories	N	Y <sup>2</sup>	Y <sup>2</sup>	Y	A	B	N
56	Retail trade-apparel and accessories	N	N <sup>2</sup>	Y <sup>2</sup>	Y	A	B	N
57	Retail trade-furniture, home furnishings and equipment	N	N <sup>2</sup>	Y <sup>2</sup>	Y	A	B	N
58	Retail trade-eating and drinking establishments	N	N	N <sup>2</sup>	Y	A	B	N

*Charleston Air Force Base, South Carolina*

Land Use		Accident Potential Zones			Noise Zones			
SLUCM No.	Name	Clear Zone	APZ I	APZ II	65-69	70-74	75-79	80+
59	Other retail trade	N	N <sup>2</sup>	Y <sup>2</sup>	Y	A	B	N
60	<b>Services</b>							
61	Finance, insurance and real estate services	N	N	Y <sup>6</sup>	Y	A	B	N
62	Personal services	N	N	Y <sup>6</sup>	Y	A	B	N
62.4	Cemeteries	N	Y <sup>7</sup>	Y <sup>7</sup>	Y	Y <sup>12</sup>	Y <sup>13</sup>	Y <sup>14,21</sup>
63	Business services	N	Y <sup>8</sup>	Y <sup>8</sup>	Y	A	B	N
64	Repair services	N	Y <sup>2</sup>	Y	Y	Y <sup>12</sup>	Y <sup>13</sup>	Y <sup>14</sup>
65	Professional services	N	N	Y <sup>6</sup>	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 <sup>6</sup>	Y	Y	A	B	N
67	Governmental services	N	N	Y <sup>6</sup>	Y*	A*	B*	N
68	Educational services	N	N	N	A*	B*	N	N
69	Miscellaneous services	N	N <sup>2</sup>	Y <sup>2</sup>	Y	A	B	N
70	<b>Cultural, entertainment and recreational</b>							
71	Cultural activities (including churches)	N	N	N <sup>2</sup>	A*	B*	N	N
71.2	Nature exhibits	N	Y <sup>2</sup>	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 <sup>17</sup>	Y <sup>17</sup>	N	N
73	Amusements	N	N	Y <sup>8</sup>	Y	Y	N	N
74	Recreational activities (including golf courses, riding stables, water recreation)	N	Y <sup>8,9,10</sup>	Y	Y*	A*	B*	N
75	Resorts and group camps	N	N	N	Y*	Y*	N	N
76	Parks	N	Y <sup>8</sup>	Y <sup>8</sup>	Y*	Y*	N	N
79	Other cultural, entertainment and recreation	N	Y <sup>9</sup>	Y <sup>9</sup>	Y*	Y*	N	N
80	<b>Resources production and extraction</b>							
81	Agriculture (except livestock)	Y <sup>16</sup>	Y	Y	Y <sup>18</sup>	Y <sup>19</sup>	Y <sup>20</sup>	Y <sup>20,21</sup>
81.5 to 81.7	Livestock farming and animal breeding	N	Y	Y	Y <sup>18</sup>	Y <sup>19</sup>	Y <sup>20</sup>	Y <sup>20,21</sup>
82	Agricultural related activities	N	Y <sup>5</sup>	Y	Y <sup>18</sup>	Y <sup>19</sup>	N	N

***Charleston Air Force Base, South Carolina***

Land Use		Accident Potential Zones			Noise Zones			
SLUCM No.	Name	Clear Zone	APZ I	APZ II	65-69	70-74	75-79	80+
83	Forestry activities and related services	N <sup>5</sup>	Y	Y	Y <sup>18</sup>	Y <sup>19</sup>	Y <sup>20</sup>	Y <sup>20,21</sup>
84	Fishing activities and related services	N <sup>5</sup>	Y <sup>5</sup>	Y	Y	Y	Y	Y
85	Mining activities and related services	N	Y <sup>5</sup>	Y	Y	Y	Y	Y
89	Other resources production and extraction	N	Y <sup>5</sup>	Y	Y	Y	Y	Y

**LEGEND**

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

**Y** - (Yes) - Land use and related structures are compatible without restriction.

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

**Y<sup>x</sup>** - (yes with restrictions) - Land use and related structures generally compatible; see notes 1-21.

**N<sup>x</sup>** - (no with exceptions) - See notes 1-21.

**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 of A (DNL 25 dB), B (DNL 30 dB), or C (DNL 35 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 footnotes.

\* - The designation of these uses as “compatible” in this zone reflects individual federal agency and program consideration 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, may 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 definition may be needed due to the variation of densities in people and structures. Shopping malls and shopping centers are considered incompatible in any accident potential zone (CZ, APZ I, or APZ II).
3. The placing of structures, buildings, or aboveground utility lines in the clear zone is subject to severe restrictions. In a majority of the clear zones, these items are prohibited. See AFI 32-7063 and AFM 32-1123 (I) 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.
- 11a. Although local conditions may require residential use, it is discouraged in DNL 65-69 dB and strongly discouraged in DNL 70-74 dB. An evaluation should be conducted prior to approvals, indicating a demonstrated community need for residential use would not be met if development were prohibited in these zones, and there are no viable alternative locations.

- 11b. Where the community determines the residential uses must be allowed, measures to achieve outdoor to indoor NLR for DNL 65-69 dB and DNL 70-74 dB should be incorporated into building codes and considered in individual approvals.
- 11c. 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 the 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 the 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 the 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 required for facilities in the DNL 65-69 dB range.
19. Residential buildings require the same NLR required for facilities in the 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.

In addition to working with local governing entities and planning professionals, the Base Public Affairs Office works to address complaints and concerns expressed by off-Base neighbors.

The Base conducts active outreach to the community by meeting with various community groups and speaking with individuals as needed. The Civil Engineer, along with the Operations Group and Public Affairs Offices, work together providing public meetings and informational workshops to disseminate information about Base operations, forecasts, plans, and mitigation strategies.

## SECTION 5 LAND USE ANALYSIS

### 5.1 INTRODUCTION

Land use planning and control is a dynamic, rather than a static process. The specific characteristics of land use determinants will always reflect, to some degree, the changing conditions of the economic, social, and physical environment of a community, as well as changing public concern. The planning process accommodates this fluidity in which decisions are normally not based on boundary lines, but rather on more generalized area designations.

The area around Charleston AFB was utilized for agricultural purposes beginning well before the Civil War. Phosphate strip mining became common in the area for several decades beginning in the late 1800s. A civilian airfield was established in 1931 which, along with the northward expansion of the City of Charleston, spurred development throughout the surrounding area. Steady growth and development have continued around the Base throughout the past several decades.

Computer technology has enabled Charleston AFB to more precisely display its flight tracks and noise contours for land use planning purposes. Computer technology has revealed the extent of the Charleston AFB region of impact into the counties and surrounding nearby cities and towns.

For the purpose of this Study, existing land uses have been classified into one of the following six categories:

Residential: Includes all types of residential activity, such as single and multi-family residences and mobile homes, at a density greater than one dwelling unit per acre.

Commercial: Includes offices, retail, restaurants and other types of commercial establishments.

Industrial: Includes manufacturing, warehousing, and other similar uses.

Public/Quasi-Public: Includes publicly owned lands and/or land to which the public has access, including military reservations and training grounds, public buildings, schools, churches, cemeteries, and hospitals.

Open/Agricultural/Low Density: Includes land areas designated for recreational activity including parks, wilderness areas and reservations, conservation areas, and areas designated for trails, hikes, camping, *etc.*; undeveloped land areas; agricultural areas and grazing lands; and areas with residential activity at densities less than or equal to one dwelling unit per acre.

## **5.2 EXISTING LAND USE**

Existing land uses in the vicinity of Charleston AFB are shown in Figure 5.1. The City of North Charleston, located in Charleston County, surrounds Charleston AFB on all sides. Small pockets of land under the jurisdiction of Charleston County are interspersed in the area surrounding the Base, but the majority of the land within the Base environs is located within the City of North Charleston. Two other counties are also located within the Charleston AFB area of influence, Dorchester County to the northwest, and Berkeley County to the northeast. The City of Hanahan is located northeast of the Base, within Berkeley County.

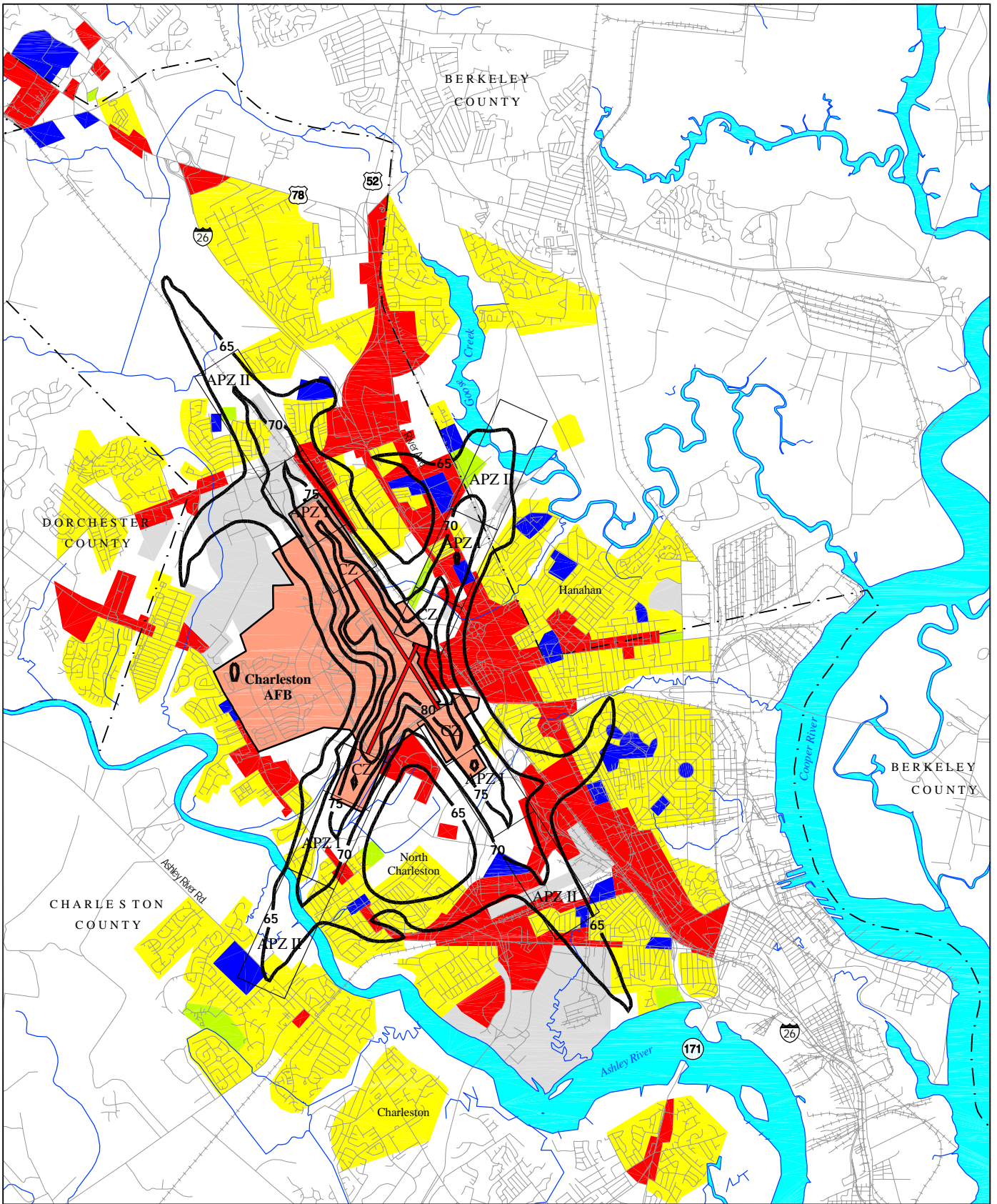
The area surrounding Charleston AFB is known as “low country,” characterized by low elevation, flat topography, and numerous wetlands. Agriculture was the predominant land use until the mid-1900s. The area north of the City of Charleston, including the Base, was developed piecemeal fashion without a comprehensive plan. Much of this development occurred prior to incorporation of North Charleston in 1972 and Hanahan in 1973, resulting in a lack of “downtowns” or planned urban cores in either city. The majority of land surrounding the Base can be characterized as low-density urban developed, with only small sections of less desirable areas remaining undeveloped, generally to the north of the Base. The most predominant existing development patterns are strip commercial development along Rivers Road, Ashley Phosphate Road, Interstate 26, and Dorchester Road.

### **5.2.1 North Charleston**

The City of North Charleston is bounded by the Ashley River to the south and west, Hanahan to the east, and Ladson Road to the north. North Charleston was incorporated in 1972 and has grown steadily from an initial population of around 21,000 to over 79,000 in the year 2000. A significant amount of this population growth is a result of the city’s aggressive annexation activities.








Land to the east of the Base, along the Interstate 26 and Rivers Avenue corridors, is almost exclusively highway commercial development with a few large commercial centers, including Northwoods Mall, interspersed along the corridors. The residential areas east of the Base are composed largely of single family residences and multi-family units that occur behind the principal commercial uses along Rivers Avenue.

To the west of the Base, the Dorchester Road corridor parallels the Ashley River and is developed with a mix of commercial and residential uses, mostly suburban in character. Commercial development is composed of neighborhood commercial and small offices along Dorchester Road. Small pockets of residential subdivisions are interspersed behind the commercial uses along the corridor.





**Charleston Air Force Base**

**LEGEND**

- |  |   |
|--|---|
|  Air Force Installation       |  Industrial                        |
|  Residential                  |  Public/Quasi Public/Institutional |
|  Commercial                   |  Recreation                        |
|  Open/Agriculture/Low Density |   |

**2004 AICUZ Study**

- |   |
|---|
|  DNL Contours  |
|  Base Boundary |



**Generalized Existing Land Use**

Figure 5.1

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Land uses to the south of the Base are a mixture of industrial, residential, and commercial, with commercial uses prevalent along the Dorchester Road corridor. Residential development south of the Base is generally located in isolated pockets paralleling Dorchester Road. The Charleston International Airport facilities are located directly south of the Base. A significant amount of open space exists directly off the approach end of Runway 33, but the recently completed North Charleston Coliseum and Convention and Visitors Center development is planned as a centerpiece for commercial expansion in the area and development is gradually increasing. The Mark Clark Expressway runs northeast/southwest just south of the Base and intersects Interstate 26 adjacent to APZ I at the approach end of Runway 33. A large area of industrial uses is located between Dorchester Road and the Ashley River, anchored by the Stark Industrial Park.

The area north of the Base contains heavy concentrations of commercial uses along Ashley Phosphate Road and significant light industrial uses along Cross Country Road. The lack of an adequate roadway network has limited development north of the Ashley Phosphate Road corridor, and much of the land remains undeveloped.

### **5.2.2 Hanahan**

The City of Hanahan is located east of Charleston AFB in Berkeley County, bounded by Remount Road to the south and the Atlantic Coast railroad tracks to the west. Hanahan's population dropped slightly from 3,176 to 12,937 between 1990 and 2000. Hanahan is comprised primarily of residential uses with some scattered commercial uses near Remount Road in the southwest corner of the city. Much of the city is occupied by wetlands and other low areas along Goose Creek and the Goose Creek Reservoir. Most of the land east of Goose Creek remains undeveloped, primarily due to a lack of adequate transportation access.

### **5.2.3 Charleston**

A small portion of land under the jurisdiction of the City of Charleston lies south of the Base, southwest of the Ashley River, adjacent to the Runway 03 APZ II. This part of Charleston, referred to as the West Ashley subarea, experienced significant development throughout the 1980s and 1990s. Residential uses are the predominant land use in West Ashley. The land closest to the Charleston AFB area of influence is located north of Church Creek and south of the Ashley River. The majority of the land in this area is developed for residential use or is undeveloped and constrained by wetlands or low areas along the Ashley River. Live Oak Memorial Gardens Cemetery is located in the southwest corner of APZ II, and the Shadowmoss Plantation Golf Course and subdivision are located partially in APZ II, south of Ashley River Road. A small subdivision, Schieveling Plantation, is currently under development within APZ II north of Ashley River Road, across from Live Oak Memorial Gardens Cemetery. The Ashley River Road corridor above Church Creek is recognized for its collection of archaeological features dating to the 1670s, and the road itself is on the National Register of Historic Places and is also designated a South Carolina Scenic Byway.

### 5.2.4 Charleston County

The majority of unincorporated land in Charleston County exists in small pockets surrounded by local municipalities. Charleston County land is typically comprised of low density residential, some light industrial uses, and highway commercial development.

### 5.2.5 Summary

Figure 5.1 presents existing land uses for the area that surrounds Charleston AFB and within the DNL 65 dB and greater noise exposure area for the Base. Table 5.1 summarizes the acreage by land use category exposed to noise levels of DNL 65 dB and greater. Note that these acreages represent only the area outside the Base boundary.

**Table 5.1 Generalized Existing Land Use Within DNL 65 dB and Greater Noise Exposure Area (Off Base)**

<b>Category</b>	<b>Acreage</b>
Residential	1,274
Commercial	1,324
Industrial	676
Public/Quasi-public	225
Recreational/Open/Agricultural/ Low Density	2,880
<b>Total</b>	<b>6,379</b>

Source: Parsons 2002

The analysis also includes land use within the Charleston AFB CZs and APZs. Inclusion of the CZs and APZs in the evaluation shows 476 acres of residential land within the Charleston AFB CZs and APZs. Table 5.2 reflects the land use (off-Base areas only) within the Charleston AFB CZs and APZs.

**Table 5.2 Generalized Existing Land Use Within the Charleston AFB Accident Potential Zones (Off-Base)**

<b>Category</b>	<b>Acreage</b>
Residential	476
Commercial	402
Industrial	352
Public/Quasi-public	98
Recreational/Open/Agricultural/ Low Density	2,027
<b>Total</b>	<b>3,355</b>

Source: Parsons 2002

### **5.3 CURRENT ZONING**

Figure 5.2 overlays the 2002 noise contours and CZs and APZs on a map displaying the current generalized zoning in the vicinity of Charleston AFB. As described in the preceding existing land use section, the area of influence includes the communities of North Charleston, Hanahan, Charleston, and unincorporated land within Charleston County.

The entire AICUZ area of influence is zoned. The Cities of North Charleston, Hanahan, Charleston, and unincorporated lands within Charleston County have adopted standard zoning ordinances and zoning maps to guide and control development. The zoning classifications identified on Figure 5.2 have been generalized for AICUZ planning purposes. Zoning within the Charleston AFB environs generally follows existing land use patterns.

Following the release of the 1992 AICUZ study, The Berkeley-Charleston-Dorchester Council of Governments (BCDCOG) spearheaded an effort to encourage local jurisdictions to revise zoning regulations for compatibility with AICUZ land use policy. The BCDCOG is a Regional Planning Council established to assist local governments in developing local and regional plans within the tri-county region. The BCDCOG served as the lead agency for development of the Charleston AFB Joint Land Use Study (JLUS) which was published in December 1993.

As a result of JLUS recommendations, the City of Charleston rezoned over 20 acres of undeveloped land adjacent to Ashley River Road from nine units per acre to two units per acre. The zoning revision also prohibited building of schools, churches, and other public meeting places on incompatible areas. The cities' building codes were also amended to require additional insulation in the high noise area. Hanahan amended its zoning ordinance to incorporate JLUS recommendations in 1994. North Charleston approved the JLUS for information purposes only, and the city's zoning does not include restrictions or overlay zoning requirements specifically intended to protect the installation from encroachment. Since the majority of land influenced by AICUZ impacts is located within North Charleston, a significant amount of land area is not protected from incompatible future development.

Analysis of the current zoning maps for these jurisdictions was performed to determine the acreage of each zoning designation within the DNL 65 dB and greater noise area. For this analysis, zoning designations in each jurisdiction were generalized into residential, commercial, industrial, public/quasi-public, and recreational/open/agricultural/low density categories. Figure 5.2 shows results of the compilation, and Table 5.3 provides a breakdown of the generalized zoning (off-Base areas only and outside APZs) within the DNL 65 dB and greater noise area.

**Table 5.3 Current Zoning Within DNL 65 dB and Greater Noise Exposure Area (Off-Base outside APZs)**

<b>Category</b>	<b>Acreage</b>
Residential	1,110
Commercial	1,206
Industrial	944
Public/Quasi-public	0
Recreational/Open/Agricultural/Low Density	70
<b>Total</b>	<b>3,330</b>

Sources: City of North Charleston Zoning Map  
City of Hanahan Zoning Map

A similar analysis was performed to determine the acreage of each generalized zoning category within the Charleston AFB CZs and APZs and is shown on Table 5.4.

**Table 5.4 Current Zoning Within the Charleston AFB Accident Potential Zones (Off-Base)**

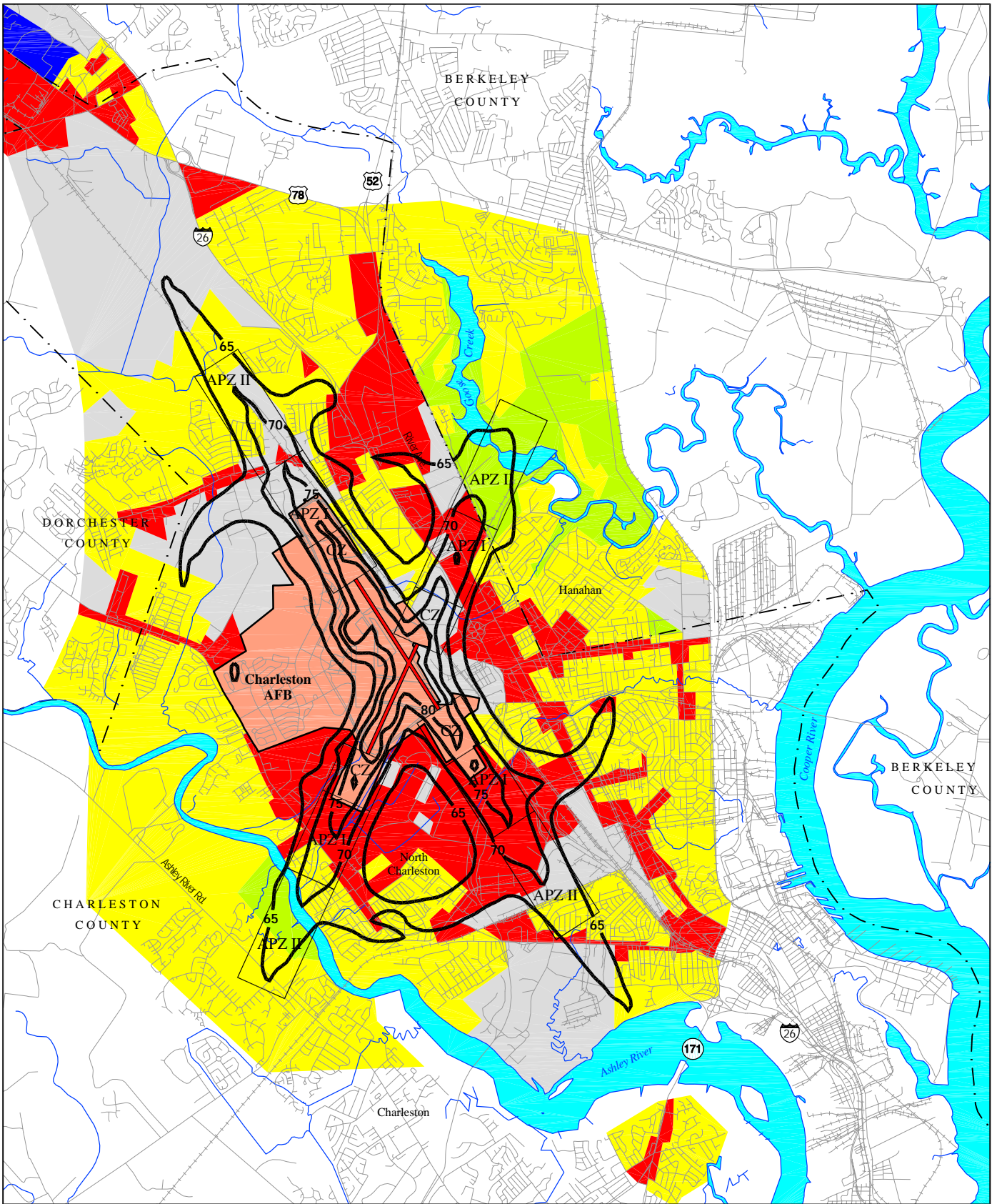
<b>Category</b>	<b>Acreage</b>
Residential	950
Commercial	1,066
Industrial	797
Public/Quasi-public	0
Recreational/Open/Agricultural/Low Density	542
<b>Total</b>	<b>3,355</b>

Sources: City of North Charleston Zoning Map  
City of Hanahan Zoning Map

## **5.4 FUTURE LAND USE**

The area surrounding Charleston AFB is expected to experience continued moderate growth in the coming decades. The 1999 County of Charleston Comprehensive Plan indicates that residential and commercial uses are expected to consume nearly 6 percent of remaining vacant land through 2015 in the North Charleston/Lincolville area. Most of this growth is projected in the areas north of Remount Road and north of Ashley Phosphate Road.

Figure 5.3 shows generalized future land use predicted for the Charleston AFB environs based on local zoning maps, comprehensive plans, and local development proposals. The following paragraphs discuss the anticipated future land use patterns.



**Charleston Air Force Base**

**LEGEND**

- Air Force Installation
- Residential
- Commercial
- Industrial
- Public/Quasi Public/Institutional
- Recreation

**2004 AICUZ Study**

- DNL Contours
- Base Boundary

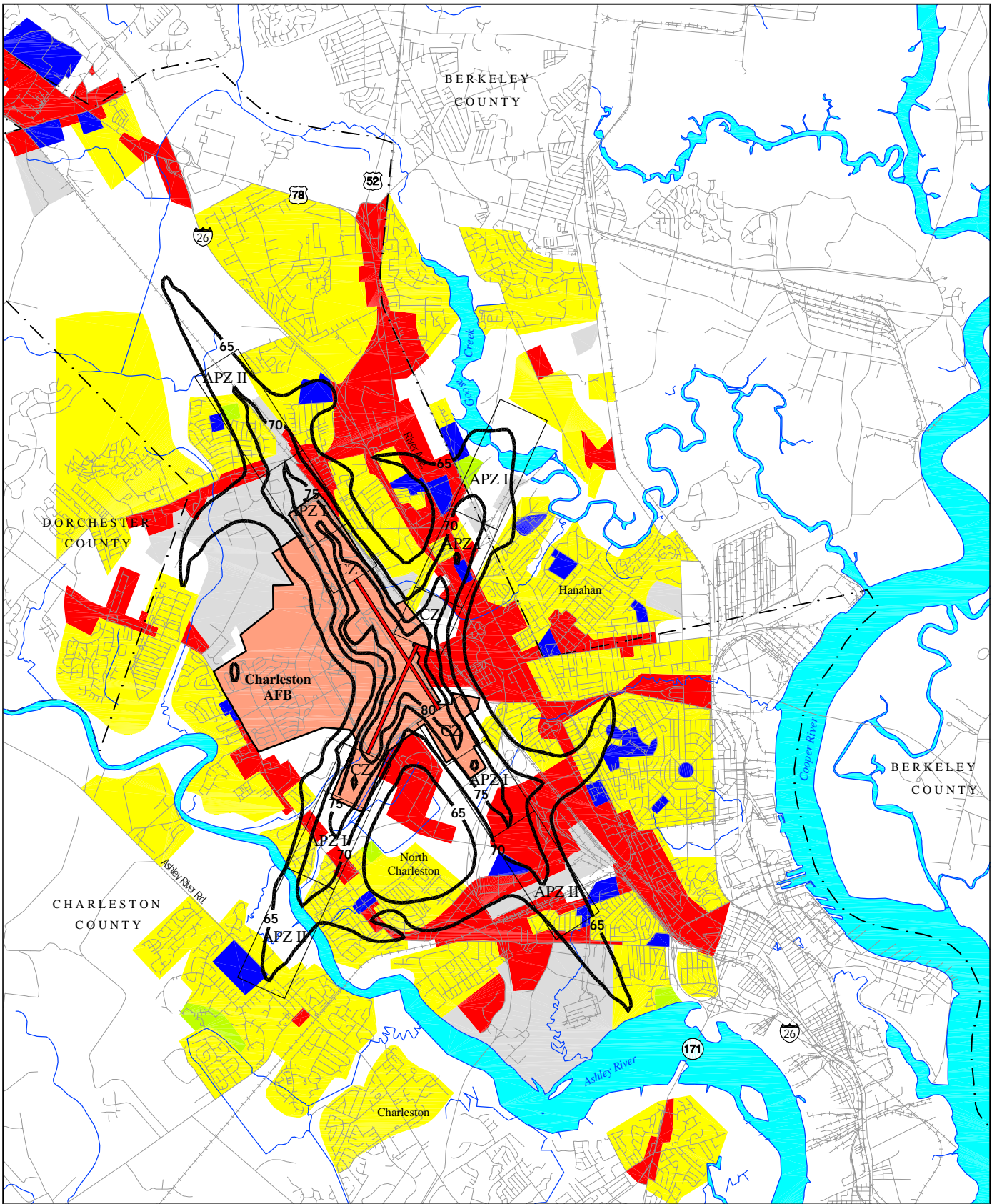


**Generalized Zoning**

Figure 5.2

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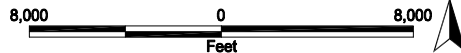
**Charleston Air Force Base**

**LEGEND**

- Air Force Installation
- Residential
- Commercial
- Open/Agriculture/Low Density
- Industrial
- Public/Quasi Public/Institutional
- Recreation

**2004 AICUZ Study**

- DNL Contours
- Base Boundary



**Future Land Use**

**Figure 5.3**

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#### **5.4.1 North Charleston**

The 1996 Comprehensive Plan for the City of North Charleston serves as a guide to the future growth and development of the community. A significant amount of future growth will occur as infill development on small pockets of currently undeveloped land. Two large areas of undeveloped land exist between Ashley Phosphate Road and Ladson Road to the north of the Base and a large redevelopment site south of the Base surrounding the North Charleston Coliseum. North Charleston's City Center Redevelopment Plan includes a proposal for a major development near APZ I and APZ II at the approach end of Runway 33, anchored by the North Charleston Coliseum. The plan includes proposals for a mixed use development that could involve over 1,000 acres of land in addition to new roads and transportation upgrades. Significant retail and industrial growth could also occur on undeveloped land between Ashley Phosphate and Ladson Roads. However, the area is somewhat isolated from existing transportation networks and development is largely dependent on improved access. The Charleston Area Transportation Study (CHATS Plan) identifies a proposed project to build a new roadway to connect Ashley Phosphate Road to Ladson Road. The implementation of this connector would open a large area of the predominantly undeveloped land to future development. However, this project has not been funded and will likely not occur for several years.

A number of smaller development projects around the Base are either in the planning stages or under construction. These proposals include a new industrial asphalt plant currently planned on a portion of land in the Runway 21 CZ. The majority of the remaining undeveloped land in North Charleston's urbanized area is low and wet and not suitable for development.

#### **5.4.2 Hanahan**

A mostly undeveloped tract of land surrounding Foster Creek Road, northeast of Goose Creek, presents the most significant opportunity for growth in Hanahan. A planned unit development, Tanner Plantation, is proposed for this area and will include mostly single family residential development with smaller areas of commercial and office space. Land southwest of Goose Creek is predominantly built out with very limited amounts of land available for development. A significant amount of land in the city, mostly along Goose Creek, has limited development potential due to the proliferation of wetlands and other low areas. The majority of this land will be reserved for conservation uses.

#### **5.4.3 Charleston**

Most of the new development in the West Ashley subarea of Charleston is expected to occur along Ashley River Road south of Bees Ferry Road, with smaller pockets of low-density residential development in the areas north of Bees Ferry Road. However, due to the significant scenic and historic resources existing on land north of Bees Ferry Road, these areas are identified in local planning documents for protection from negative future development impacts.

**5.5 INCOMPATIBLE LAND USES**

Table 4.3 shows land use compatibility as it is applied to existing land use within the Charleston AFB area of influence. For a land use area to be considered compatible, it must meet criteria for its category for both noise and accident potential as shown in Table 4.3. The compatibility guidelines shown in Table 4.3 were combined with the existing land use data presented on Figure 5.1 to determine land use compatibility associated with aircraft operations at Charleston AFB. Results of this analysis are shown numerically in Table 5.5 and graphically on Figure 5.4. There are land uses in several locations around Charleston AFB that are considered to be incompatible with Base operations. In addition to the existing incompatible uses, several land development proposals are planned which will add to the encroachment problem on Charleston AFB.

**Table 5.5 Incompatible Land Use for Charleston AFB**

Category	Acreage Within APZs			Acreage Within Noise Zones, Not Included in APZs				Total
	CLEAR ZONE	APZ I	APZ II	65-69	70-74	75-79	80+	
Residential	28	166	325	874	3	0	0	0
Commercial	25	230	125	•	0	0	0	0
Industrial	0	•	•	•	•	•	0	0
Public/Quasi-public	0	25	37	•	0	0	0	0
Recreation/Open/Agricultural/Low Density	•	•	•	•	•	•	•	0
<b>Total</b>	<b>53</b>	<b>421</b>	<b>487</b>	<b>874</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>1,838</b>
• Represents compatible land use								

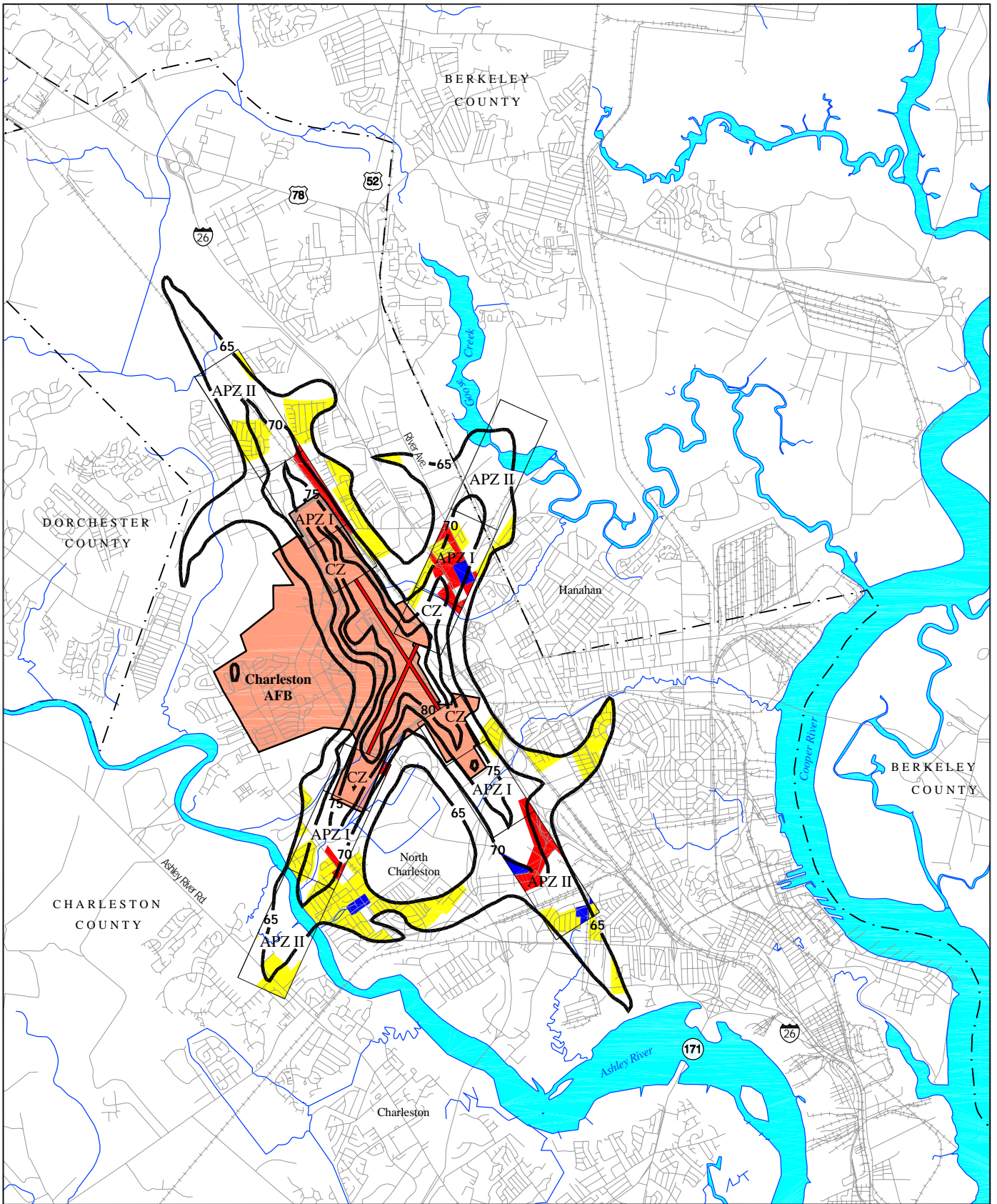
**5.5.1 Runway 03 Clear Zone and Accident Potential Zones (Southwest of the Airfield)**

**5.5.1.1 Runway 03 Clear Zone**

Approximately 75 acres of the Runway 03 CZ is off-Base and owned by the Charleston County Airport District. A small portion of incompatible commercial land is located in the CZ on land leased by Porsche Cars of North America. All remaining land within the CZ is open space compatible with Air Force planning criteria.



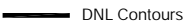





**5.5.1.2 Runway 03 Accident Potential Zone I**

Incompatible medium density residential development exists in APZ I between Dorchester Road and the Ashley River. Incompatible commercial uses also exist along the Dorchester Road corridor.



**Charleston Air Force Base**

**LEGEND**

- |  |   |   |
|--|---|---|
|  Air Force Installation |  Industrial                        |  DNL Contours  |
|  Residential            |  Public/Quasi Public/Institutional |  Base Boundary |
|  Commercial             |  Recreation                        |   |

**2004 AICUZ Study**



**Incompatible Land Uses**

Figure 5.4

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### **5.5.1.3 Runway 03 Accident Potential Zone II**

Most categories of land use are compatible with the safety criteria established for APZ II with the exception of public/quasi-public and some densities of residential. If residential densities are greater than one dwelling unit per acre, these land uses would be incompatible. Medium density residential development exists in the northeast corner of APZ II in North Charleston and in the subdivisions along Ashley River Road in Charleston.

## **5.5.2 Runway 21 Clear Zone and Accident Potential Zones (Northeast of the Airfield)**

### **5.5.2.1 Runway 21 Clear Zone**

Approximately 122 acres of land are on off-Base property in the Runway 21 CZ. The Wildwood Subdivision contains medium density residential units in the northwest corner of the CZ. The South Carolina Department of Highways and Public Transportation recently built a transportation facility in the northeast corner of the CZ.

### **5.5.2.2 Runway 21 Accident Potential Zone I**

In general, industrial, recreational, vacant, and agricultural/open land uses are compatible with the safety criteria established for APZ I. Compatibility of commercial uses within APZ I is dependent on densities and intensity of uses. Large areas of commercial development exist in APZ I predominantly between Interstate 26 and Rivers Avenue including the Wildwood Office Park. A United States Postal Service facility is located in the eastern portion of APZ I. Small areas of incompatible residential development exist south of Rivers Avenue.

### **5.5.2.3 Runway 21 Accident Potential Zone II**

Most categories of land use are compatible with the safety criteria established for APZ II with the exception of public/quasi-public and some densities of residential. Land uses in this APZ area are considered to be compatible land uses.

## **5.5.3 Runway 15 Clear Zone and Accident Potential Zones (Northwest of the Airfield)**

### **5.5.3.1 Runway 15 Clear Zone**

Approximately 6 acres of off-Base land exists in the CZ northeast of the railroad tracks, containing a mixture of commercial and residential land uses.

### **5.5.3.2 Runway 15 Accident Potential Zone I**

In general, industrial, recreational, vacant, and agricultural/open land uses are compatible with the safety criteria established for APZ I. Compatibility of commercial uses within APZ I is dependent on densities and intensity of uses. Land uses within Runway 15

APZ I are predominantly light industrial with some low intensity commercial uses. Small areas of incompatible commercial uses exist in APZ I.

### **5.5.3.3 Runway 15 Accident Potential Zone II**

Most categories of land use are compatible with the safety criteria established for APZ II with the exception of public/quasi-public and some densities of residential. If residential densities are greater than one dwelling unit per acre (as is the case in the areas shown on Figure 5.4), these land uses would be incompatible. The Runway 15 APZ II contains a residential subdivision north of Ashley Phosphate Road that exceeds the recommended density limits and is considered to be incompatible.

## **5.5.4 Runway 33 Clear Zone and Accident Potential Zones (Southeast of the Airfield)**

### **5.5.4.1 Runway 33 Clear Zone**

Only a very small portion of the Runway 33 CZ is located on off-Base property. All the land within the CZ is open space compatible with Air Force planning criteria.

### **5.5.4.2 Runway 33 Accident Potential Zone I**

A small area of residential development exists in the northeast corner of APZ I. A hotel is an incompatible commercial use located in the southeast corner of APZ I. Remaining land uses in APZ I are open/agricultural/low density and are considered to be compatible land uses.

### **5.5.4.3 Runway 33 Accident Potential Zone II**

Most land use categories are compatible with the established safety criteria for APZ II with the exception of public/quasi-public and some densities of residential. Commercial uses, including several hotels, are clustered along the Interstate 26 and Montague Avenue interchange. Portions of the Green Grove and Brentwood subdivisions are located in the extreme south end of APZ II. Brentwood Middle School is also located in the south end of APZ II.

## **5.6 NOISE ZONES**

At noise levels between DNL 65-69 dB, the only incompatible land use type is residential without noise level reduction (NLR) materials. Medium and high density residential development exists in the DNL 65-69 dB and 70-74 dB noise contours in several areas surrounding the Base to the north, south, and east.

At noise levels between DNL 70-74 dB, residential, public/quasi-public, and high intensity commercial areas without NLR materials are considered to be incompatible land uses. Several hotels clustered along the Interstate 26 and Montague Avenue interchange are incompatibly located within the DNL 70-74 dB noise contour.

## **5.7 PLANNING CONSIDERATIONS**

AICUZ noise contours describe the noise characteristics of a specific operational environment, and as such, will change if a significant operational change is made. An AICUZ Study will usually be revised if the noise exposure map changes by DNL 2 dB or more in noise sensitive areas from the noise contour map in the last publicly released AICUZ Study. With this in mind, this AICUZ Study updates the 1992 AICUZ Study and provides flight track, accident potential, zone and noise zone information in this report which reflects the most accurate picture of the installation's aircraft activities as of September 2002.

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## **SECTION 6 IMPLEMENTATION**

### **6.1 INTRODUCTION**

Implementation of the AICUZ Study must be a joint effort between the Air Force and adjacent communities. The role of the Air Force is to minimize impact on the local communities by Charleston AFB aircraft operations. The role of the communities is to ensure that development in the surrounding area is compatible with accepted planning and development principles and practices.

### **6.2 AIR FORCE RESPONSIBILITIES**

In general, the Air Force 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 a great deal to assure the avoidance aircraft accidents. Despite the best aircrew training and aircraft maintenance intentions, however, history clearly shows that accidents do occur. It is imperative flights be routed over sparsely populated areas as regularly as possible to reduce the exposure of lives and property to a potential accident.

Commanders are required by AFI to periodically review existing traffic patterns, instrument approaches, weather minima, and operating practices, and evaluate these factors in relationship to populated areas and other local situations. This requirement is a direct result and expression of Air Force policy that 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. Noise is generated from aircraft both in the air and on the ground. In an effort to reduce the noise effects of Charleston AFB operations on surrounding communities, the installation routes flight tracks to avoid populated areas.

Preparation and presentation of this Charleston AFB AICUZ Study is one phase of continuing Air Force participation in the local planning process. It is recognized that as the local community updates its land use plans, the Air Force must be ready to provide additional input when needed.

It is also recognized that the AICUZ program is 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 may affect, or may be affected by Charleston AFB. Base personnel also are available to provide information, criteria, and guidelines to state, regional, and local planning bodies, civic associations, and similar groups.

### **6.3 LOCAL COMMUNITY RESPONSIBILITIES**

Area residents and personnel of Charleston AFB have a long history of working together for mutual benefit. Adoption of the following recommendations will strengthen this relationship, increase the health and safety of the public, and help protect the integrity of the installation's flying mission:

- Incorporate AICUZ policies and guidelines into the comprehensive plans of North Charleston. Use overlay maps of the AICUZ noise contours and Air Force Land Use Compatibility Guidelines to evaluate existing and future land use proposals.
- Modify existing zoning ordinances and subdivision regulations to support the compatible land uses outlined in this study.
- Implement height and obstruction ordinances that reflect current Air Force and Federal Aviation Regulation, Part 77 requirements.
- Modify building codes to ensure new construction within the AICUZ area has the recommended NLR incorporated into its design and construction.
- Continue to inform Charleston AFB personnel of planning and zoning actions that have the potential of affecting Base operations.
- Continue to support working groups, such as the JLUS, that consist of city, county, and installation planners and that meet as needed to discuss AICUZ concerns and major development proposals that could affect airfield operations.