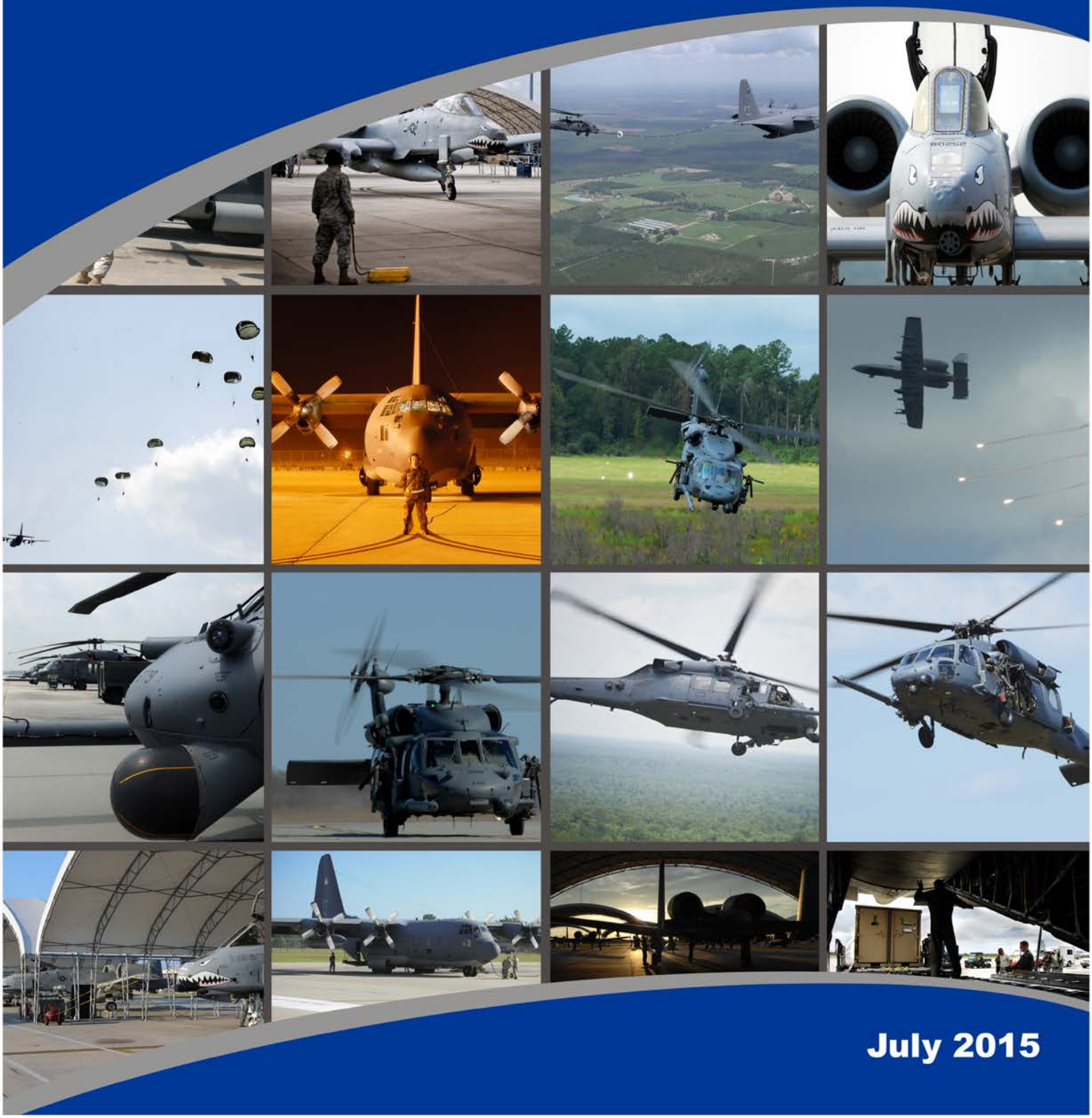
Moody Air Force Base

Air Installation Compatible Use Zone Study



July 2015

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 23D WING (ACC)
MOODY AIR FORCE BASE GEORGIA

JUN 0 9 2015

MEMORANDUM FOR AREA GOVERNMENTS

FROM: 23 WG/CC
23 Flying Tiger Way
Bldg 105 Suite 1
Moody AFB, Ga 31699

SUBJECT: Air Installation Compatible Use Zone Study

1. This Air Installation Compatible Use Zone (AICUZ) Study for Moody Air Force Base (AFB) is an update of the AICUZ Study from 1994. The update was initiated because of changes in aircraft operations and improvements to noise modeling methods since the last AICUZ Study was released. The update provides a reevaluation of aircraft noise and accident potential in relation to current and predicted future land uses in the installation vicinity. The goal of the AICUZ Program is to help protect the health, safety, and welfare of our neighbors while ensuring our flying mission by promoting land uses compatible with air operations.

2. The report states United States Air Force (USAF) recommendations for compatible land uses in runway Clear Zones (CZ), aircraft Accident Potential Zones (APZ), and Noise Zones. It is our hope that these recommendations will be incorporated into community plans, zoning ordinances, subdivision regulations, building codes, and other related documents.

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 promoting compatible development through local actions. Maintaining mission-compatible land uses near the installation minimizes the potential for negative effects of USAF operations on public health and welfare while also minimizing the potential for mission constraints that could reduce operational flexibility.

4. We greatly value the positive relationship Moody AFB 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 minimizing late night flying and avoiding flights over heavily populated areas. We solicit your cooperation in implementing the recommendations and guidelines presented in this AICUZ Study.

CHAD P. FRANKS, Colonel, USAF
Commander

Global Power for America

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ACRONYMS AND ABBREVIATIONS

AAD	average annual day
ACC	Air Combat Command
ADNL	A-weighted day–night average sound level
AF	Air Force
AFB	Air Force Base
AFI	Air Force Instruction
AGL	above ground level
AICUZ	Air Installation Compatible Use Zone
AL	Armstrong Laboratory
APZ	Accident Potential Zone
BDG	Base Defense Group
CAA	Commercial Agriculture Area
CDNL	C-weighted day–night average sound level
CFR	*Code of Federal Regulations*
CSAR	combat search and rescue
CZ	Clear Zone
dB	decibel
dBA	decibels A-weighted
DNL	day–night average A-weighted sound level
DoD	U.S. Department of Defense
EOD	explosive ordnance disposal
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FG	Fighter Group
FICUN	Federal Interagency Committee on Urban Noise
FS	Fighter Squadron
Grand Bay Range	Grand Bay Training and Gunnery Range
GSU	geographically separated unit
HUD	U.S. Department of Housing and Urban Development
Hz	Hertz
IFR	Instrument Flight Rules
JLUS	Joint Land Use Study
L_{max}	maximum noise level
LZ	Landing Zone
MAZ	Moody Activity Zoning District
MDG	Medical Group
MOA	Military Operations Area
MSG	Mission Support Group
MSL	mean sea level
MXG	Maintenance Group
NLR	noise-level reduction
RQG	Rescue Group
RQS	Rescue Squadron
RSA	Rural Service Area
SEL	sound exposure level
SGRDC	South Georgia Regional Development Center
SLUCM	Standard Land Use Coding Manual

SUA	Special Use Airspace
TRP	Tactical Recovery Procedures
ULDC	Unified Land Development Code
USAF	U.S. Air Force
VFR	Visual Flight Rule
WG	Wing

SECTION 1.0

PURPOSE AND NEED

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SECTION 1. PURPOSE AND NEED

1.1 INTRODUCTION

This study is an update of the 1994 Moody Air Force Base (AFB) Air Installation Compatible Use Zone (AICUZ) Study. The update presents and documents the changes to the AICUZ for the period of 1994 to 2013. It reaffirms the U.S. Air Force (USAF) policy of promoting public health, safety, and general welfare in areas surrounding Moody AFB. The report presents changes in flight operations since the last study, and provides current noise contours and compatible use guidelines for land areas surrounding the base. It is hoped this information will assist the local communities, and serve as a tool for future planning and zoning activities.

The changes in the AICUZ Study are attributed to the following:

- Changes in assigned and transient aircraft operations and profiles since the 1994 AICUZ Study (USAF 1994)
- Improvements to the computerized noise modeling suite of programs known as NOISEMAP
- Change in U.S. Department of Defense (DoD) policy to describe an average annual day
- Potential encroachment issues from development that has occurred since 1994

1.2 PURPOSE AND NEED

The purpose of the long-standing AICUZ Program is to promote compatible land development in areas subject to operational noise and accident potential. The program was initiated to protect the public's health, safety, and welfare, as well as to protect military airfields from encroachment by incompatible uses and structures.

As the cities of Valdosta and Lakeland, and Lowndes and Lanier counties prepare and modify their land use development plans, recommendations from this updated AICUZ Study should be included in their planning processes to prevent incompatibility that may compromise Moody AFB's ability to fulfill its mission requirements. Accident potential and aircraft noise should be major considerations in their planning processes. USAF AICUZ land use guidelines reflect land use recommendations for Clear Zones (CZs), Accident Potential Zones (APZs) I and II, and four noise zones. These guidelines have been established on the basis of studies prepared and sponsored by several Federal agencies, including the Department of Housing and Urban Development, Environmental Protection Agency, USAF, and state and local agencies.

The guidelines recommend land uses which are compatible with airfield operations while allowing maximum beneficial use of adjacent properties. The USAF has no desire to recommend land use regulations which render property economically useless. It does, however, have an obligation to the inhabitants of the Moody AFB area of influence and the citizens of the United States to point out ways to protect the public investment in the installation and the health, safety, and welfare of the people living in areas adjacent to the installation. The AICUZ area of influence includes the area within the noise zones and the area within the CZs and APZs.

The AICUZ Program uses the latest technology to define noise levels in areas near USAF installations. An analysis of Moody 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 DoD NOISEMAP methodology and the day–night average A-weighted sound level (DNL) metric was used to define the noise zones for Moody AFB.

1.3 PROCESS AND PROCEDURE

Preparation and presentation of this update to Moody AFB's AICUZ Study is part of the continuing USAF participation in the local planning process. It is recognized that, as local communities prepare land use plans and zoning ordinances, the USAF has the responsibility of providing inputs on its activities relating to the community. This study is presented in the spirit of mutual cooperation and assistance by Moody AFB to aid in the local land use planning process.

This study updates information on base flying activities since 1994. Noise contours portrayed on the AICUZ maps in this study are based on current mission plans.

Data collection was conducted at Moody AFB in November 2013. Aircraft operational and maintenance data was obtained to derive average daily operations by runway and type of aircraft. This data was supplemented by flight track information (where we fly), flight profile information (how we fly), and ground run-up

information. After verification for accuracy, data was input into the NOISEMAP program to produce DNL contours. Contours were plotted on an area map and overlaid with clear zone and APZ areas. All references to the current study throughout this document cite the year as 2013 because all the collected data was validated and processed in 2013.

SECTION 2.0

INSTALLATION AND RANGE DESCRIPTION

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SECTION 2. INSTALLATION AND RANGE DESCRIPTION

Moody Air Force Base (AFB) consists of approximately 10,843 acres in Lowndes and Lanier counties in southern Georgia (see Figure 2–1). The eastern portion of the installation is in western Lanier County, and the western portion of the installation is in Lowndes County. The installation is approximately 10 miles northeast of the city of Valdosta. Moody AFB has a primary airfield with two parallel runways (Runway 18L/36R to the east and Runway 18R/36L to the west), and a Landing Zone (LZ) on Bemiss Field, all with a north-south orientation. Runway 18L/36R is 9,300 feet long by 150 feet wide, and Runway 18R/36L is 8,000 feet long by 150 feet wide.

The Grand Bay Training and Gunnery Range (hereafter referred to as Grand Bay Range) and the Bemiss Field LZ are within the installation boundary east of the airfield (see Sections 2.3.3.1 and 2.3.3.2). These key areas of the installation are shown in Figure 2–2. There are also taxiways, an aircraft parking apron, and two test cells.

The Grand Bay area was created in 1968. The State of Georgia, Moody AFB, and several private landowners own the 18,000 acres that compose the whole Grand Bay area. Of that total, Lowndes County manages 5,000 acres called the Grand Bay Wildlife Management Area, and the Georgia Department of Natural Resources, Wildlife Resources Division, manages about 1,350 acres. The portion of the Grand Bay area managed by Moody AFB, the Grand Bay Range, is within the installation boundary directly east of the runways (see Figure 2–2).

2.1 MISSION

As an Air Combat Command (ACC) installation, Moody AFB fulfills the ACC's mission as the primary provider of combat air forces to America's unified combatant commands. The missions of the two major organizations at Moody AFB are described below.

2.1.1 23d Wing

Moody AFB is the headquarters for the 23d Wing (23 WG). In addition to the groups assigned to the 23 WG at Moody AFB, the 23 WG includes two geographically separated units (GSUs) at Davis-Monthan AFB, Arizona; and Nellis AFB, Nevada. The 23 WG is assigned to the 9th Air Force (9 AF), headquartered at Shaw AFB, South Carolina. The 23 WG is a component of ACC, headquartered at Langley AFB, Virginia.

The 23 WG is tasked to organize, train, and employ combat-ready A-10C (a fighter aircraft hereafter referred to as A-10), HC-130 (supports Combat Search and Rescue [CSAR] mission), HH-60 (a search and rescue helicopter), pararescuemen, and force protection assets and personnel. The 23 WG executes CSAR operations in support of humanitarian interests, U.S. national security, and Overseas Contingency Operations.

The 23 WG is composed of six groups: five at Moody AFB and one at Davis-Monthan AFB. The 23 Fighter Group (FG), 347th Rescue Group (347 RQG), 563 RQG, 23d Mission Support Group (23 MSG), 23d Medical Group (MDG), and 23d Maintenance Group (MXG) all operate under the 23 WG.

- The 23 FG Flying Tigers direct the flying and maintenance operations for the U.S. Air Force's (USAF) largest A-10 FG.
- The 347 RQG directs flying and maintenance of the oldest USAF active-duty operations group dedicated to CSAR. The mission of the 347 RQG is completed through the operation of HC-130 aircraft and HH-60 helicopters.
- The 563 RQG is a GSU of the 23 WG and its home station is at Davis-Monthan AFB. It has responsibility for rescue squadrons operating as GSU at Nellis AFB, Nevada. The group consists of one HC-130P squadron, two HH-60G squadrons, two Guardian Angel squadrons, and one Operational Support Squadron.
- The 23 MSG mission is to train, equip, and deploy personnel support forces to build, protect, and sustain air bases worldwide for combat air operations.
- The 23 MDG provides outpatient medical, dental, occupational, environmental, and preventive healthcare services in support of two combat-ready wings.
- The 23 MXG consists of seven maintenance squadrons located at three geographic locations. The 23 MXG is responsible for the operation and quality of organization and intermediate-level maintenance and repair supporting combat-ready HC-130s, HH-60Gs, and A-10Cs.

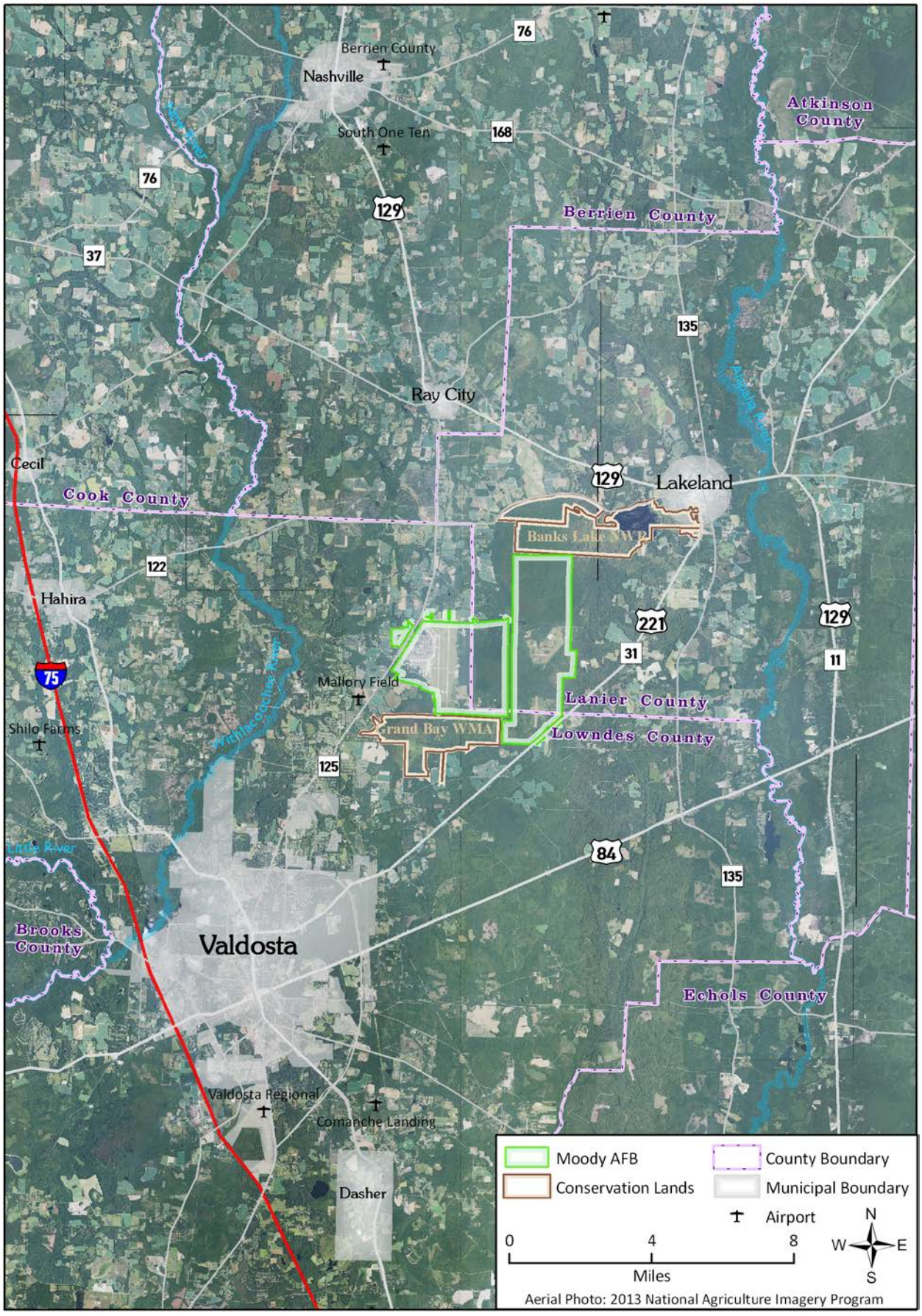

Figure 2–1 Regional Map

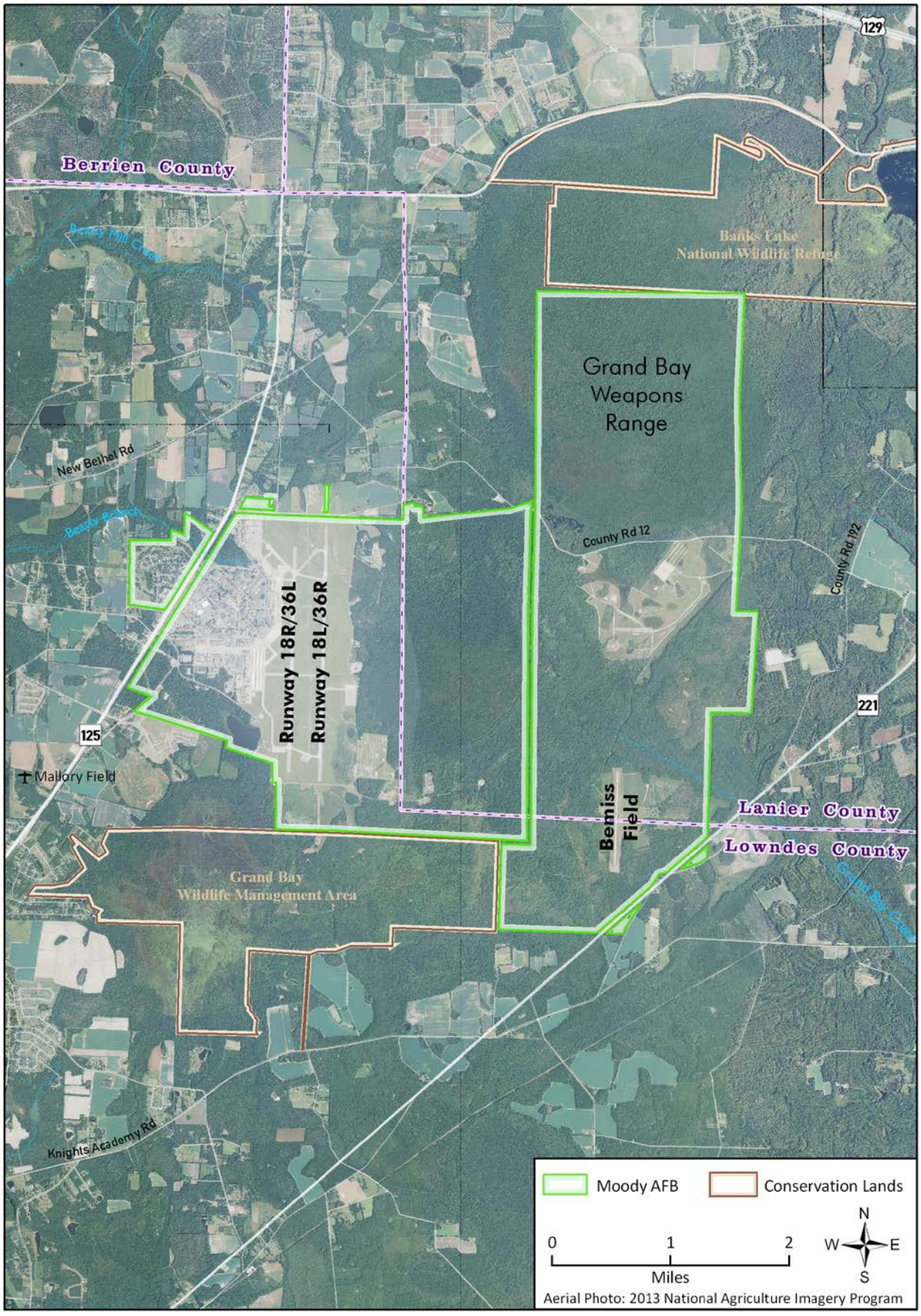

Figure 2–2 Installation Map

2.1.2 820th Base Defense Group

The 820th Base Defense Group (BDG) is also assigned to Moody AFB, but does not operate under the 23 WG. The 820 BDG mission is to provide fully integrated, highly capable, and responsive forces to protect Expeditionary Air Forces. There are no aircraft at Moody AFB assigned to the 820 BDG.

2.1.3 Supported Organizations

Moody AFB supports the following organizations:

- 23d Fighter Group
  - 74th Fighter Squadron
  - 75th Fighter Squadron
  - 23d Operations Support Squadron
- 347th Rescue Group
  - 38th Rescue Squadron
  - 41st Rescue Squadron
  - 71st Rescue Squadron
  - 347th Operations Support Squadron
- 23d Maintenance Group
  - 723d Aircraft Maintenance Squadron
  - 23d Aircraft Maintenance Squadron
  - 23d Component Maintenance Squadron
  - 23d Equipment Maintenance Squadron
- 23d Mission Support Group
  - 23d Civil Engineer Squadron
  - 23d Contracting Squadron
  - 23d Communications Squadron
  - 23d Logistics Readiness Squadron
  - 23d Security Forces Squadron
  - 23d Force Support Squadron
- 23d Medical Group
  - 23d Medical Support Squadron
  - 23d Aeromedical/Dental Squadron
  - 23d Medical Operations Squadron

Moody AFB supports the following tenant organizations:

- 93d Air Ground Operations Wing
- 820th Base Defense Group
- 476th Fighter Group
- 336th Recruiting Squadron
- 372nd Training Squadron, Det. 9
- Area Defense Counsel
- Air Force Office of Special Investigations, Det. 211

Table 2–1 lists the aircraft assigned to or consistently operating at Moody AFB.

Table 2–1 Aircraft Assigned to or Consistently Operating at Moody AFB

Unit	Aircraft Type	Number of Aircraft
23 FG	A-10	48
476 FG	A-10	N/A
347 RQG	HC-130	9
347 RQG	HH-60	12

FG=Fighter Group; RQG=Rescue Group.

2.2 ECONOMIC IMPACT

The economic impact region for Moody AFB is the geographic area subject to significant base-generated economic impacts, and is defined as the area within a 50-mile radius of Moody AFB. This area includes the Georgia counties of Lowndes and Lanier. The area most immediately impacted includes the following:

- Lowndes County:
  - City of Valdosta
- Lanier County:
  - City of Lakeland

2.2.1 Local Economic Characteristics

As shown in Table 2–2, the population of the city of Valdosta is considerably larger than the population of the city of Lakeland. Consequently, the greatest population density around Moody AFB is to the southwest. In the past several years, the populations of the city of Valdosta, the city of Lakeland, and Lanier County have grown at a faster pace than the rest of Georgia. The population of Lowndes County has grown at roughly the same pace as the rest of Georgia. Between 2000 and 2010, the population of the city of Valdosta grew by more than 10,794, a 24.7 percent increase, and the population of the city of Lakeland grew by 636, a 23.3 percent increase. The population of Lowndes County grew by 17,118, an 18.6 percent increase, while that of Lanier County grew by 2,837, a 39.2 percent increase. This growth was at a greater or equal pace than the rest of Georgia, which grew by more than 1.5 million, an 18.3 percent increase, in the same timeframe.

Table 2–2 Historic and 2010 Population Estimates

Area	2000 Census	2010 Census	Percentage Change
City of Valdosta	43,724	54,518	+24.7
City of Lakeland	2,730	3,366	+23.3
Lowndes County	92,115	109,233	+18.6
Lanier County	7,241	10,078	+39.2
State of Georgia	8,186,453	9,687,653	+18.3

Source: U.S. Census Bureau 2010.

2.2.2 Base Impact

The installation's economic impact includes the total gross payroll for Moody AFB personnel, the total actual annual expenditures of the installation, and the estimated annual value of jobs created by the base. Moody AFB directly employs over 5,230 personnel. As shown in Table 2–3, Moody AFB has a total population of 10,914, including military dependents. The annual payroll of the installation is over $300 million (see Table 2–4). As a result of payroll expenditures and the estimated value of indirect jobs in the local area, Moody AFB has an estimated total economic impact of nearly $448 million on the local economy.

Table 2–3 Personnel by Classification

Classification	Total
Military	
Active-Duty Military	5,195
Reservists/National Guard	35
Total Military	**5,230**
Civilian	
Military Dependents	4,848
Appropriated Fund Civilians	486
Nonappropriated Fund Civilians and Private Business	350
Total Civilian	**5,684**
Grand Total	**10,914**

Source: USAF 2010

Table 2–4 Annual Economic Impact

Category	($)
Payroll	
Active-Duty Military	$261,474,017
Nonappropriated Fund Civilian Employees	$7,512,907
Appropriated Fund Civilian Employees	$31,849,514
Total Payroll	**$300,476,438**
Expenditures	
Construction	$47,066,227
Materials, Equipment, and Procurement	$39,422,889
Total Expenditures	**$86,965,554**
Grand Total	**$386,965,554**

Source: USAF 2010

2.3 FLYING ACTIVITY

To describe the relationship between aircraft operations and land use in the vicinity of the airfield, it is necessary to fully describe the exact nature of the operations. The following section provides an overview of the aircraft operations currently ongoing at Moody AFB.

2.3.1 Flight Operations by Aircraft Type

Approximately 35,290 annual aircraft operations occurred at the Moody AFB airfield during calendar year 2013 based on aircraft operations data validated in January 2014. During the same time period, approximately 195,131 annual aircraft operations were conducted at Grand Bay Range. These operations include multiple approaches to the targets, as well as transiting to and from training airspace. An aircraft operation is defined as one takeoff/departure, one approach/landing, or half of 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). Training sorties can last several hours. For example, a typical training sortie to Grand Bay Range may consist of the following components:

- An aircraft makes an initial takeoff from the Moody AFB airfield (one airfield operation).
- The aircrew flies to Grand Bay Range and completes 10 passes over the target area or Drop Zone (10 operations at Grand Bay Range).

- The aircraft returns to the airfield and practices two approaches (two closed patterns within the airfield environment [four airfield operations]) before landing at Moody AFB (one airfield operation).
- The single training sortie generates 6 airfield operations and 10 operations at Grand Bay Range.

Table 2–5 summarizes the frequency of aircraft operations for Moody AFB based on information provided by base staff, flying organizations, and air traffic control personnel. Transient aircraft from other bases come to Moody AFB and Grand Bay Range as part of cross-country travel to conduct landing training at runways, or to conduct combat training at the range. Any aircraft type could theoretically come to Moody AFB/Grand Bay Range, but some types are more common than others due to proximity of other bases and other factors. For the purposes of noise modeling, 12 military and civilian aircraft were selected to represent the 52 different types/variants of transient aircraft that visited Moody AFB during the study period. Operations for the transient military and civilian aircraft types were combined with the selected aircraft based on similar characteristics (e.g., number and type of engines, size of aircraft, airspeed). The table reflects a total of about 97 average annual day (AAD) aircraft operations based on collected operations data. Approximately 12 percent of the operations occur during environmental nighttime (10:00 p.m. through 7:00 a.m.).

Table 2–6 summarizes the frequency of aircraft operations for Grand Bay Range. Approximately 535 AAD aircraft operations are conducted at Grand Bay Range. Approximately 19 percent of the operations occur during environmental nighttime (10:00 p.m. through 7:00 a.m.).

2.3.1.1 Based A-10 Aircraft Operations

The A-10 aircraft assigned to Moody AFB are flown by the 74th Fighter Squadron (74 FS) and 75 FS under the 23 FG. Each squadron is assigned 24 A-10 aircraft for a total of 48 A-10 aircraft assigned to Moody AFB. In addition, the 76 FS, a USAF Reserve unit assigned to the 476 FG, flies with the 23 FG at Moody AFB. The 76 FS use the 23 FG aircraft for training. As shown in Table 2–5, based A-10 aircraft conduct approximately 66.9 daily operations or approximately 24,420 annual operations at the Moody AFB airfield.

Based A-10 aircraft averaged approximately 27 arrival and 27 departure operations per day at the Moody AFB airfield. Day operations occur from 7:00 a.m. to 10:00 p.m. and night operations occur from 10:00 p.m. to 7:00 a.m. Approximately 96 percent of the A-10 arrival operations at the airfield occur during the day; therefore, approximately 4 percent occur at night. A-10 departures during environmental nighttime occur rarely.

In addition to operations conducted at the Moody AFB airfield, the 23 FG also trains at Grand Bay Range. As shown in Table 2–6, the based A-10 averaged approximately 302.71 operations per day at Grand Bay Range, or approximately 110,489 operations annually. Approximately 4 percent of the based A-10 operations at Grand Bay Range occur at night. The number of operations flown at Grand Bay Range is very high because range training typically involves multiple approaches to the target or objective. As noted previously, multiple approaches in this study are counted as including one approach operation and one departure operation for two operations total.

2.3.1.2 Based HC-130 Aircraft Operations

HC-130 aircraft assigned to Moody AFB are flown by the 71 Rescue Squadron (RQS) under the 347 RQG. Once an ongoing aircraft conversion is complete, the 71 RQS will have 9 primary HC-130J aircraft assigned. The 563 RQG, which also utilizes HC-130 aircraft, is a GSU of the 23 WG assigned to Davis-Monthan AFB, Arizona. Therefore, their operations are not included in the number of HC-130 operations flown out of Moody AFB. As shown in Table 2–5, based HC-130 aircraft conduct approximately 13.15 operations per day, or approximately 4,800 operations annually.

Based HC-130 aircraft averaged approximately 1.64 arrival, 1.64 departure, and 4.93 closed pattern operations per day at the Moody AFB airfield. Approximately 62 percent of arrival and 9 percent of departure operations occur between 10:00 p.m. and 7:00 a.m.

Table 2–5 Frequency of Aircraft Operations for Moody AFB

Squadron	Aircraft	Operations Per Year			Operations Per Average Annual Day		
		Day	Night	TOTAL	Day	Night	TOTAL
23 FG and 476 FG	A-10	23,839	581	24,420	65.31	1.59	66.90
347 RQG	HC-130J	1,614	3,186	4,800	4.42	8.73	13.15
347 RQG	HH-60	4,942	602	5,544	13.54	1.65	15.19
BASED SUBTOTAL		**30,395**	**4,369**	**34,764**	**83.27**	**11.97**	**95.24**
Transient	A-10	51	3	54	0.14	0.01	0.15
	C-12	76	4	80	0.21	0.01	0.22
	HC-130	9	1	10	0.03	<0.01	0.03
	C-17	95	5	100	0.26	0.01	0.27
	C-5	8	0	8	0.02	0.00	0.02
	F-16	25	1	26	0.07	<0.01	0.07
	F-22	38	2	40	0.10	0.01	0.11
	Single-Engine Variable Pitch Propeller	21	1	22	0.06	<0.01	0.06
	KC-10	32	2	34	0.09	0.01	0.09
	V-22	6	0	6	0.02	0.00	0.02
	T-38	63	3	66	0.17	0.01	0.18
	H-1	76	4	80	0.21	0.01	0.22
TRANSIENT SUBTOTAL		**500**	**26**	**526**	**1.36**	**0.08**	**1.44**
GRAND TOTAL		**30,895**	**4,395**	**35,290**	**84.64**	**12.05**	**96.69**

FG=Fighter Group; RQG=Rescue Group.

In addition to the operations flown at the airfield shown in Table 2–6, based HC-130 aircraft averaged 2.19 operations per day at Grand Bay Range. Approximately 66 percent of based HC-130 aircraft operations at Grand Bay Range occur at night.

2.3.1.3 Based HH-60 Aircraft Operations

The HH-60 helicopters assigned to Moody AFB are flown by the 41 RQS under the 347 RQG. The 347 RQG is assigned 12 HH-60 helicopters. The 563 RQG, a GSU HH-60 unit of the 23 WG, is assigned to Davis-Monthan AFB, Arizona. Operations flown by the 563 RQG are not included in the number of HH-60 operations flown out of Moody AFB. As shown in Table 2–5, based HH-60 helicopters conduct approximately 15.19 daily operations, or approximately 5,544 operations annually at Moody AFB airfield.

Based HH-60 helicopters averaged approximately 3.78 arrival, 3.78 departure, and 3.81 closed pattern operations per day at the Moody AFB airfield. Approximately 41 percent of HH-60 arrival and 3 percent of departure operations at the Moody AFB airfield occur at night.

In addition to the operations flown at the airfield as shown in Table 2–6, HH-60 helicopters averaged 223.47 operations per day at Grand Bay Range. Approximately 38 percent of the based HH-60 operations at Grand Bay Range occur at night.

Table 2–6 Frequency of Aircraft Operations for Grand Bay Range

Squadron	Aircraft	Operations Per Year			Operations Per Average Annual Day		
		Day	Night	TOTAL	Day	Night	TOTAL
23 FG and 476 FG	A-10	106,070	4,419	110,489	290.60	12.11	302.71
347 RQG	HC-130J	272	528	800	0.74	1.45	2.19
347 RQG	HH-60	50,720	30,847	81,567	138.96	84.51	223.47
BASED SUBTOTAL		**157,062**	**35,794**	**192,856**	**430.30**	**98.07**	**528.37**
Transient	C-12*	9	1	10	0.02	<0.01	0.03
	HC-130	350	147	497	0.96	0.40	1.36
	F-18	547	57	604	1.50	0.16	1.65
	V-22	38	12	50	0.10	0.03	0.14
	H-1	1,009	105	1,114	2.76	0.29	3.05
TRANSIENT SUBTOTAL		**1,953**	**322**	**2,275**	**5.36**	**0.88**	**6.23**
GRAND TOTAL		**159,015**	**36,116**	**195,131**	**435.66**	**98.95**	**534.61**

FG=Fighter Group; RQG=Rescue Group.
*C-12 total AAD nighttime operations are 0.0024, resulting in approximately 1 nighttime operation per year. Note: Included in these operations are multiple approaches to the targets, as well as ingress/egress to/from training airspace. Operations arriving or departing directly at/from the base are not included. Those operations are accounted for in Table 2–5.
For consistency, multiple approaches to the target area at Grand Bay Range were calculated in the same manner as they were at the airfield (i.e., closed pattern events were counted as two separate operations, an arrival operation and a departure operation).

2.3.1.4 Transient Aircraft Operations

Over the course of a year, numerous military transient aircraft arrive, depart, and perform closed pattern operations at Moody AFB. Since a large variety of transient aircraft frequent Moody AFB, the remaining aircraft that perform transient operations have been grouped with similar surrogate aircraft listed in Table 2–5. The UH-1 helicopter and the C-12, C-17, F-16, and KC-10 aircraft had the highest number of transient operations at Moody AFB airfield in 2013. There were an average of 0.70 arrivals, 0.70 departures, and 0.08 closed pattern transient operations per AAD during the study period. Approximately 5 percent of transient aircraft operations occurred at night.

As shown in Table 2–6, certain transient aircraft also perform operations at Grand Bay Range. Approximately 2,275 annual aircraft operations were conducted by transient aircraft at Grand Bay Range in 2013. Transient aircraft averaged 0.18 arrival, 0.18 departure, and 2.94 closed pattern operations per day at Grand Bay Range. Approximately 14 percent of transient aircraft operations at Grand Bay Range occur at night.

2.3.2 Flight Patterns

Moody AFB aircraft use the following basic flight patterns:

- Straight-in approaches
- Overhead break landing patterns
- High and low Tactical Recovery Procedures (TRP) arrivals
- Instrument Flight Rule (IFR) or radar closed patterns
- Visual Flight Rule (VFR) or closed patterns

Aircraft operating at Moody AFB utilize Runway 18L approximately 25 percent of the time (i.e., they depart to the south and arrive from the north), Runway 36R approximately 38 percent of the time (i.e., they depart to the north and arrive from the south), Runway 18R approximately 15 percent of the time (i.e., they depart to the south and arrive from the north), and Runway 36L approximately 22 percent of the time (i.e., they depart to the north and arrive from the south).

The approach to Runways 18L and 18R is on the northeastern side of the airfield and the approach to Runways 36L and 36R is on the southeastern side of the airfield. Aircraft arriving and departing at the airfield use Runways 18L and 18R approximately 40 percent of the time and use Runways 36L and 36R approximately 60 percent of the time. Runway use is driven by wind direction. Pilots prefer to take off and land facing into the wind.

Moody AFB flight patterns (Figures 2–3, 2–4, and 2–5) result from several considerations, including:

- Takeoff patterns routed to avoid heavily populated areas as much as possible.
- USAF 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.
- Coordination with the Federal Aviation Administration (FAA) to minimize conflict with civilian aircraft operations.

As shown in Figures 2–3 and 2–4, aircraft arrive and depart at Moody AFB from various directions. The majority of closed pattern operations are flown to the west of the airfield, so as to not interfere with operations at Grand Bay Range, which is immediately to the east of the airfield. Most of the flight tracks have been routed to correspond with wind direction, to avoid air traffic from Valdosta Regional Airport, and to minimize exposure to populated areas to the greatest extent possible. Aircraft crews try to minimize exposure to populated areas, but depending on the weather conditions and air traffic, these areas cannot always be avoided.

The location of each track is representative of the specific track and may vary due to air traffic control, weather, and other reasons (e.g., one pilot may fly the track on one side of the depicted track, while another pilot may fly the track slightly to the other side).

2.3.3 Regional Airspace

A Special Use Airspace (SUA), Restricted Area 3008 (R-3008), is present in the flying area around Grand Bay Range (see Section 2.3.3.1 for more information on Grand Bay Range and Figure 2–6 for a graphical representation of R-3008). As seen in Figures 2–3 and 2–4, east-west ingress and egress routes between R-3008 and Moody 2 North and South Military Operations Areas (MOAs) are heavily used. The lower and upper altitudes for the MOAs adjacent to Moody AFB include the following:

- Moody 1: the lower altitude is 8,000 feet above mean sea level (MSL) and the upper altitude is Flight Level 230.
- Moody 2 North: the lower altitude is 500 feet above ground level (AGL) and the upper altitude is 7,999 feet MSL.
- Moody 2 South: the lower altitude is 100 feet AGL and the upper altitude is 7,999 feet MSL.

The Class D airspace surrounding Moody AFB is from the surface to 2,700 feet MSL within 5 nautical miles of the geographic center of the Moody AFB airfield and includes the western portion of R-3008. The eastern portion of R-3008 is Class E airspace, which can be described as generally controlled airspace. R-3008 overlies Grand Bay Range, as well as certain areas surrounding the range (Figure 2–6). This restricted airspace separates non-participating aircraft from hazardous activities such as munitions training. In addition to R-3008, pilots also train in MOAs. MOAs adjacent to Moody AFB, shown in Figure 2–6, include Moody 1, Moody 2 North, and Moody 2 South. An MOA is a type of SUA with defined vertical and lateral dimensions where military aircraft can train.

2.3.3.1 Grand Bay Training and Gunnery Range

The range is used by all types of Moody AFB aircraft. The training at the range is predominantly air-to-ground and occasionally air-to-air. Pilots from the 23 FG use the airspace and Grand Bay Range to refine their skills in the core missions of the A-10 aircraft: close air support, rescue team efforts, and forward air control. The 347 RQG use the airspace and Grand Bay Range for CSAR operations and combat survival training. In addition to Moody AFB aircraft, the range is also used by aircraft from other bases.

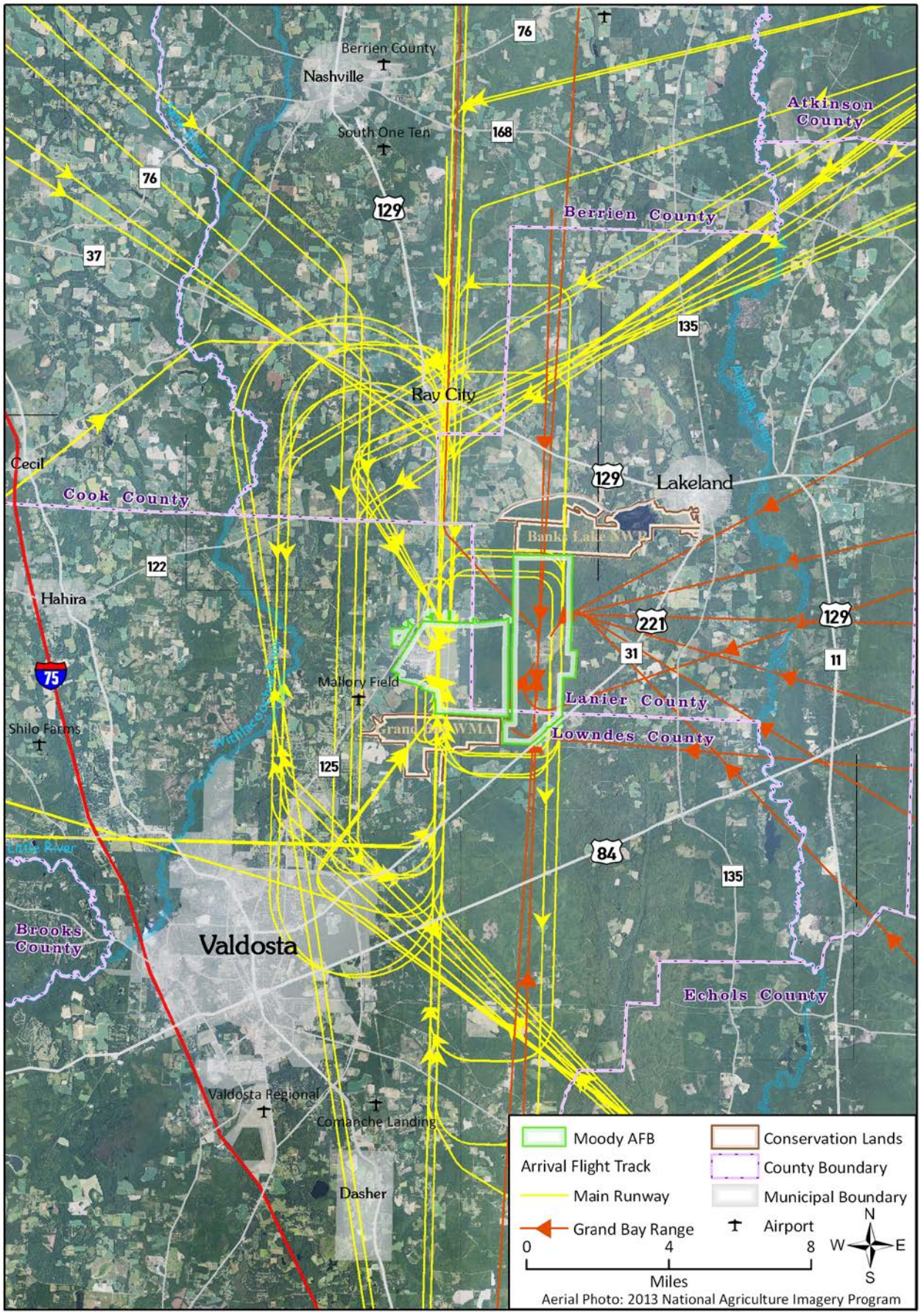

Figure 2–3 Moody AFB Arrival Flight Tracks

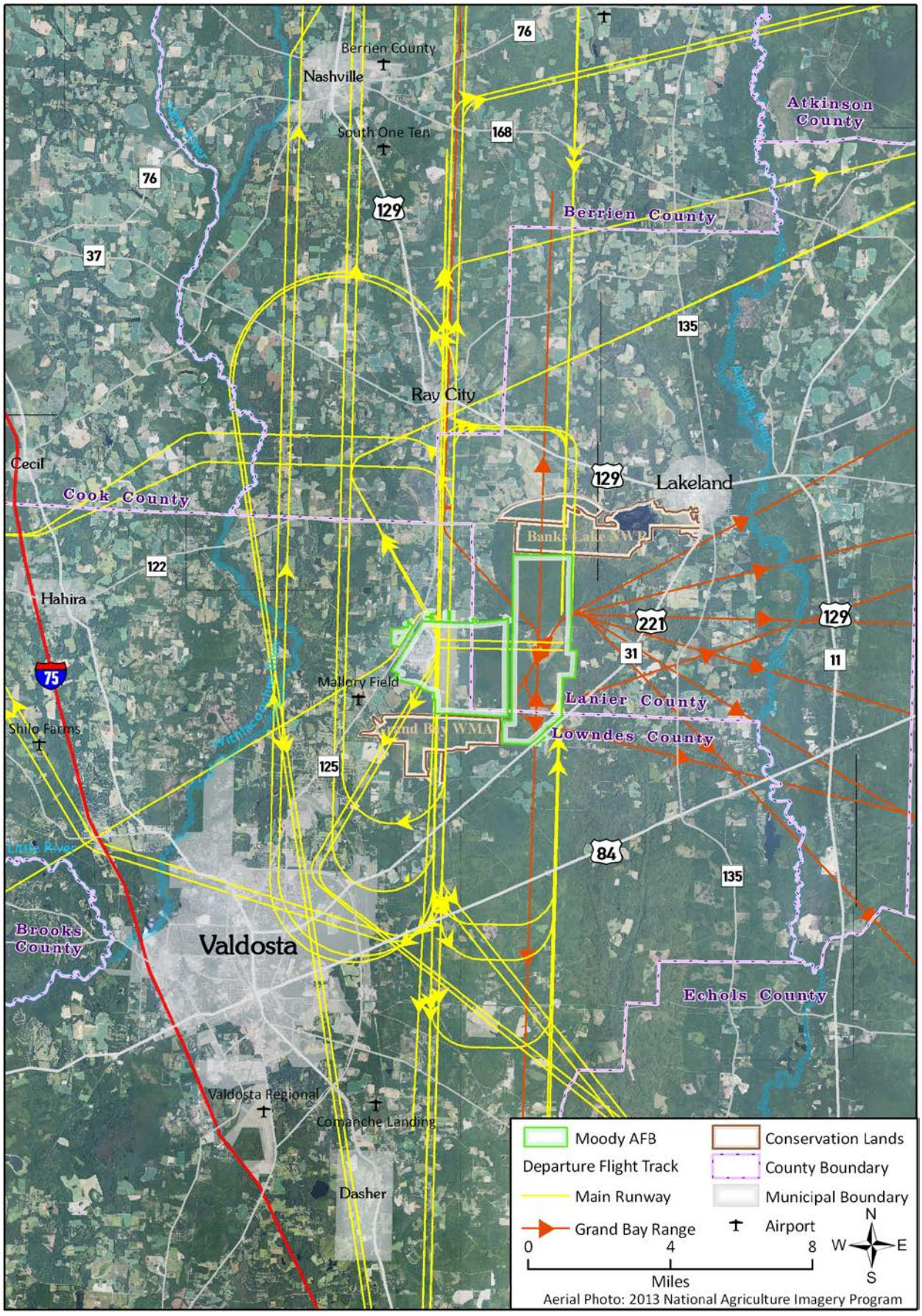

Figure 2–4 Moody AFB Departure Flight Tracks

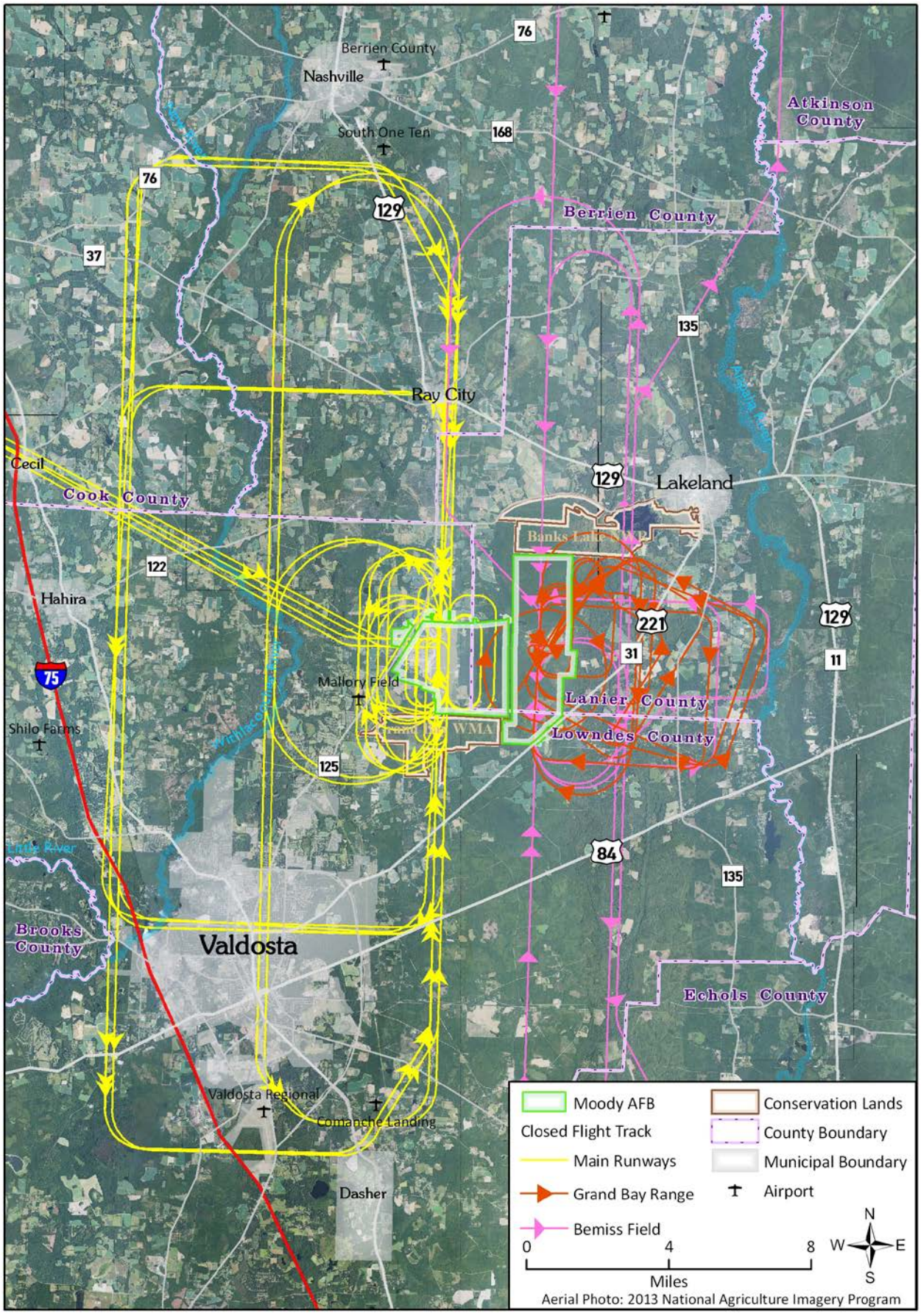

Figure 2–5 Moody AFB Closed Pattern Flight Tracks

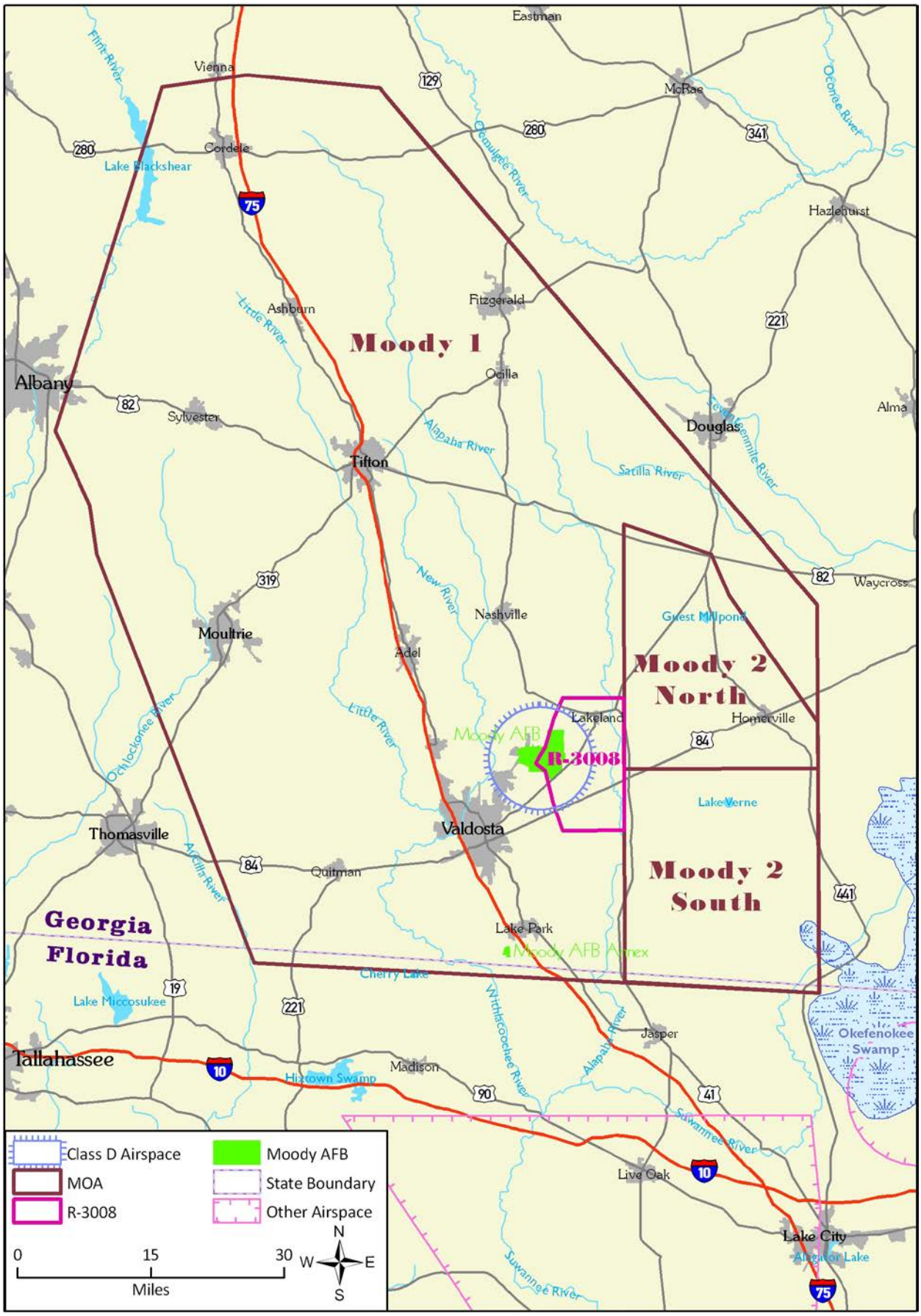

Figure 2–6 Military Operations Areas and Restricted Areas in the Vicinity of Moody AFB

Flying operations over the Grand Bay Range are carefully controlled to maximize safety, and when flying outside of the range, the minimum height complies with all applicable standards. The flight tracks for Grand Bay Range (including Bemiss Field) are included in Figures 2–3, 2–4, and 2–5.

An example of flying activities conducted during a local 4-hour training sortie at Moody AFB could be as follows: an aircraft departs Moody AFB to Grand Bay Range where the pilot conducts aerial gunnery training for 2 hours, the pilot then flies east to MOA 2 and trains in the airspace for 1.5 hours, then the pilot flies the aircraft back to Moody AFB airfield where the pilot conducts pilot proficiency training (i.e., closed patterns) for 0.5 hours before landing and completing the local training sortie. Some of the training operations that are performed within Grand Bay Range and the MOAs include closed patterns, run-ins to Drop Zones, and air refueling procedures. These procedures can involve low-altitude approaches and climb-outs that descend to 100 feet AGL in certain areas.

2.3.3.2 Bemiss Field

Bemiss Field is approximately 3 miles southeast of the Moody AFB airfield within Grand Bay Range (see Figure 2–2). Bemiss Field is a 95-acre reclaimed landing strip previously used during the 1940s as an auxiliary airstrip for Moody AFB. The previous asphalt cover was removed, the site was vegetated with grass, and the surrounding area was cleared of trees and obstructions. Bemiss Field is currently used for various military training activities by the 820 BDG and the 347 RQG. These activities include combat survival and threat scenario training, as well as an HH-60 LZ and C-130 Drop Zone.

2.3.4 Pre-Flight and Maintenance Run-Up Operations

To the maximum extent possible, aircraft maintenance engine run-up locations have been established in areas to minimize noise. Certain high-power A-10 maintenance engine runs are conducted in a “hush house.” These buildings are designed to accommodate engine maintenance runs, while allowing only minimal noise to escape the interior of the building. High-power engine runs are typically conducted after replacement or adjustment of a critically important component of the aircraft. These runs are conducted according to detailed technical orders to confirm that all systems are functional prior to flight.

Maintenance engine run-ups at Moody AFB are performed in parking spots, at the trim pad, or in the hush house. Approximately 35 percent of A-10 maintenance runs, 33 percent of HC-130 maintenance runs, and 50 percent of HH-60 maintenance runs at Moody AFB occur during acoustical night (10:00 p.m. through 7:00 a.m.). The types of maintenance performed on based aircraft vary for each unit.

SECTION 3.0

LAND USE COMPATIBILITY GUIDELINES

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SECTION 3. LAND USE COMPATIBILITY GUIDELINES

3.1 INTRODUCTION

The U.S. Department of Defense (DoD) developed the Air Installation Compatible Use Zone (AICUZ) Program for military airfields. Through this program, DoD strives to assist local governments in protecting the health, safety, and welfare of those citizens living and working near military airfields while protecting the defense flying missions. The goal of the AICUZ Program is to promote compatible land use development around military airfields by providing information on aircraft noise and accident potential, as well as recommendations for compatible development.

An AICUZ Study describes three basic types of constraints that affect, or result from, flight operations. The first constraint involves areas that the Federal Aviation Administration (FAA) and DoD have identified for height limitations (see Height and Obstruction Criteria in Appendix D). U.S. Air Force (USAF) obstruction criteria are based upon those contained in Federal Aviation Regulation (FAR) Part 77, Subpart C. These obstruction criteria are defined for all military airfields regardless of the current flying mission.

The second constraint involves noise zones associated with aircraft operations. Using the NOISEMAP program, DoD uses aircraft operations data to generate noise contours showing the noise exposure levels generated by these aircraft operations. The day–night average A-weighted sound level (DNL) around Moody AFB is depicted visually as noise contours created by connecting points of equal value. Noise contours connect the points of the same noise exposure level, in much the same way as ground contours on a topographic map visually represent lines of equal elevation. Noise contours are plotted in increments of 5 A-weighted decibels (dBA) from the airfield, ranging from a DNL of 65 dBA up to 80 dBA, and are overlaid on a map of the airport vicinity. The area encompassed by a noise contour is known as a noise zone. Additional information on the AICUZ methodology is presented in Appendix B.

The third constraint involves Accident Potential Zones (APZs) based on statistical analysis of past DoD aircraft accidents. APZs are not predictors of accidents; they are areas where a mishap is most likely to occur IF one occurs. DoD analyses have determined that the areas immediately beyond the ends of runways and along the approach and departure flight paths have significant potential for aircraft accidents. Based on this analysis, DoD developed three zones that have high relative potential for accidents: Clear Zones (CZs) and APZs I and II.

3.1.1 2013 Noise Zones

NOISEMAP Version 7 was used to calculate and plot the DNL noise contours based on the average annual day (AAD) aircraft operations data described in Section 2.3.1. Figure 3–1 shows the 2013 DNL noise contours plotted in 5-decibel (dB) increments, ranging from 65 dB DNL to greater than or equal to 80 dB DNL.

Current noise zones, based on 2013 data, extend north and south from the primary runway centerline. Much of the off-installation area exposed to noise levels above 65 dB DNL is within the Grand Bay Wildlife Management Area. Elevated noise levels also occur on and near the aircraft parking aprons where static engine runs are performed. The 2013 noise contours include helicopter static engine runs that will be conducted on a proposed parking apron to be constructed in the near future, as analyzed in the *Draft Environmental Assessment for the Proposed Personnel Recovery Campus at Moody Air Force Base, Georgia* (USAF 2014).

Aircraft noise levels also exceed 65 dB DNL at Grand Bay Training and Gunnery Range (hereafter referred to as Grand Bay Range). Levels at the range are highest in the vicinity of targets. Flying activities are concentrated to a lesser degree near several Landing Zones (LZs) and Drop Zones on the range, including the LZ/Drop Zone at Bemiss Field.

Noise resulting from training operations at Grand Bay Range is not limited to aircraft noise. Munitions use on the range includes aerial gunnery training, such as proficiency firing of the A-10 aircraft's primary weapon, a 30-millimeter seven-barrel Gatling gun, ground-based ordnance, and explosive ordnance disposal (EOD) detonations. High explosives are not permitted on the range; bombs and rockets delivered to targets on the range are inert, meaning they contain only a small spotting charge and generate little noise on impact.

Aerial gunnery training is conducted frequently by A-10 aircraft based at Moody AFB, as well as several types of transient aircraft. Aerial gunnery generates a distinctive noise that may be audible at a distance of several miles from the range. Ground-based ordnance training is conducted primarily with munitions designed specifically for training (e.g., training grenades). These training munitions are less loud than the high-explosive munitions they are intended to simulate. EOD detonations take place relatively infrequently.

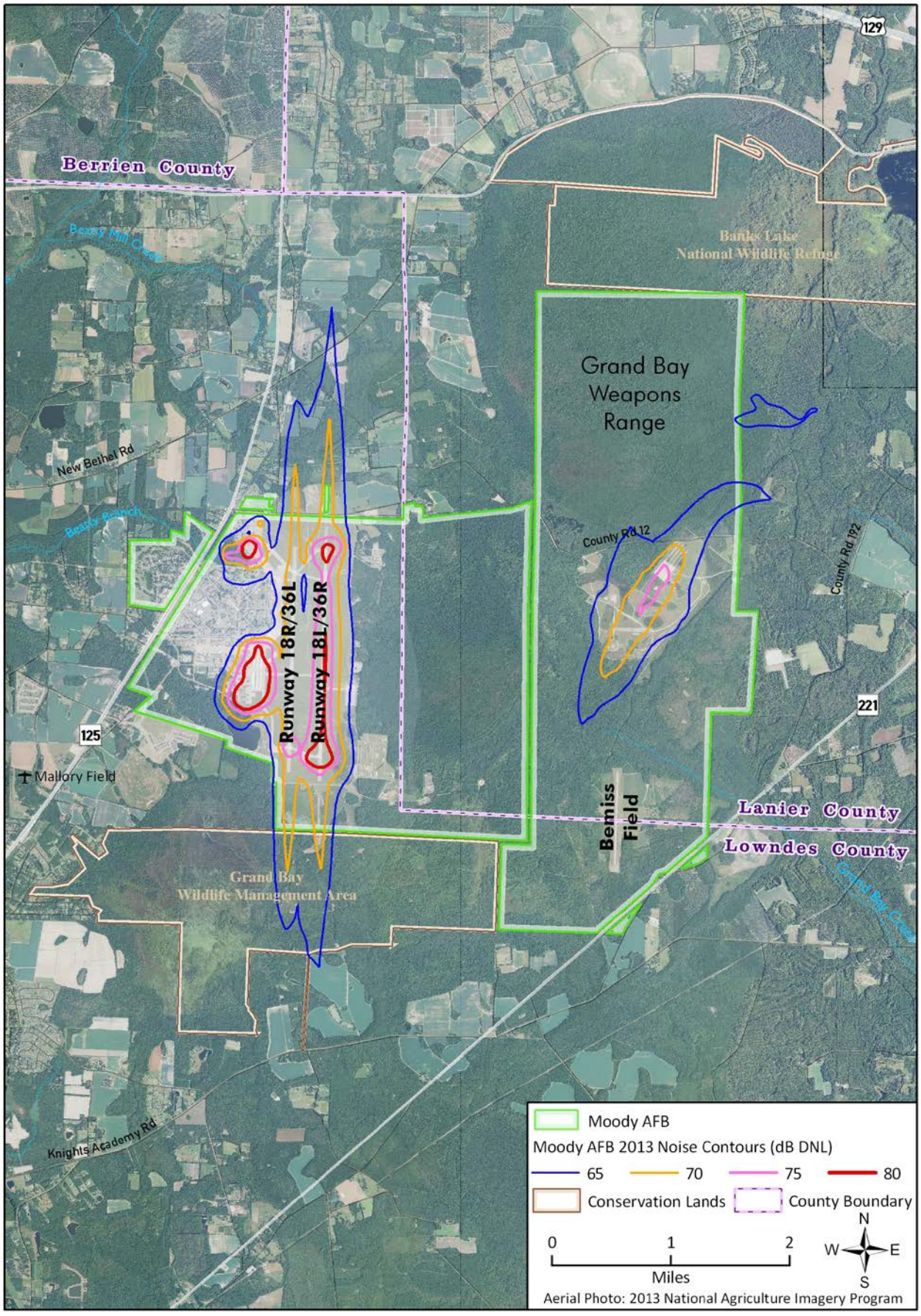

Figure 3–1 2013 Noise Zones at Moody AFB

Munitions noise at Grand Bay Range is discussed in the *Moody AFB Range Expansion Environmental Analysis BNOISE Screening Analysis* (USAF 2013).

The AICUZ Program was developed to describe noise impacts from aircraft operations; therefore, the noise from these other noise-generating activities is not included in this AICUZ Study. However, a separate noise analysis conducted in 2013 to support an Environmental Assessment describes noise levels generated by munitions use on Grand Bay Range. A copy of this study can be obtained from Moody AFB Public Affairs.

3.1.2 Understanding the Historical Noise Environment

The historical noise zones associated with Moody AFB are presented to show how noise exposure has fluctuated over time from varying aircraft-related factors (i.e., aircraft type, number of operations, and flight tracks). This AICUZ Study presents historical noise zones from the 1994 AICUZ Study to show previously published noise zones for the installation. Noise zones were developed in 1992, 1994, 2000, 2008, and 2013 to reflect the changes in flight operations and assigned aircraft types since the previous noise zones, which were completed in 2008. It is important to note that noise contours will continue to change.

Figure 3–2 depicts the 65 dB DNL noise contour in 1992, 1994, 2000, 2008, and 2013. The 65 dB DNL noise contour is considered the level where land use planning recommendations begin. This figure clearly illustrates the fact that noise contours fluctuate over time. Table 3–1 provides the total impacted land area for each year. Since 1992, there has been a 91 percent reduction in land area affected by noise levels of 65 dB DNL or greater. A number of factors contributed to this reduction in acreage, including change in the aircraft type, number of operations flown, and a change in DoD noise planning policy. Between 1992 and the present, the loudest aircraft type based at Moody AFB has been the F-4 (1992), F-16 (1994), T-38 (2000), and A-10 (2008 and 2013).

Table 3–1 Acreage Affected By Noise Contours Over Time

Year in Which Noise Contours Developed	Number of Acres at >65 dB DNL
1992	30,258
1994	9,408
2000	16,786
2008	4,884
2013	2,729

3.1.3 Clear Zones and Accident Potential Zones at Moody AFB

DoD analyses have determined that the areas immediately beyond the ends of runways and along the approach and departure flight paths have a significant potential for accidents compared to the surrounding areas. The CZ, the area closest to the end of the runway, has the highest accident potential. The concern is great enough that DoD generally acquires the land through purchase or easement to prevent development. Moody AFB has two runways, the eastern runway (Runway 18L/36R) and western runway (Runway 18R/36L). Each runway has its own APZs; therefore, Moody AFB has four CZs, APZ I's, and APZ II's. As shown in Figure 3–4, only the land within the southern CZ for Runway 18L/36R is completely within the installation boundary.

APZ I is an area beyond the CZ that has significant potential for accidents. APZ II is an area beyond APZ I with a lesser, but still significant, potential for accidents. While aircraft accident potential in APZs I and II does not warrant acquisition by the USAF, land use planning and controls are strongly encouraged in these areas for the protection of the public. As shown in Figure 3–4, only a small portion of the land in the southern APZ I's is within the installation boundary; the remaining portion of the land in the southern APZ I's and all of the northern APZ I's are outside the installation boundary in Lowndes County. Land in all four APZ II's is outside the installation boundary in Lowndes County. Each of Moody AFB's CZs encompasses an area 3,000 feet wide by 3,000 feet long. Each APZ I is 3,000 feet wide by 5,000 feet long and each APZ II is 3,000 feet wide by 7,000 feet long. Additional information on accident potential is contained in Appendix C of this report.

3.1.4 Height Obstructions

Extremely tall objects in the vicinity of an air installation can impose navigational challenges for aircrews, potentially forcing flying procedure changes to maintain a safe distance from the obstructions. The FAA and USAF define obstructions to air navigation as:

- Man-made objects that extend more than 500 feet above ground level (AGL) at the site of the structure and/or
- Natural objects or man-made structures that protrude above a set of imaginary surfaces defined relative to runways.

Imaginary surfaces are lower near the airfield and higher farther away from the airfield, mirroring the aircraft they are designed to protect. As shown in Figure 3–3, the 'Primary Surface' is located on and immediately adjacent to each runway at ground level. 'Graded Clear Zones' extend from the end of each primary surface for an additional 1,000 feet. 'Approach/Departure Clearance Surfaces' extend from a point 200 feet from the end of each primary surface, rising at a slope of 50:1 to a height of 500 feet above the established airfield elevation. The established airfield elevation at Moody AFB is 233 feet above mean sea level. After reaching 500 feet above the airfield, the 'Approach/Departure Clearance Surface' becomes level.

Imaginary surfaces are higher (i.e., less restrictive) in areas outside of the primary approach and departure corridors. 'Transitional Surfaces' extend upwards from the lateral boundaries of the primary surface to an elevation of 150 feet above established airfield elevation at a slope of 7:1. The transitional surfaces terminate at 'Inner Horizontal Surfaces,' which extend 150 feet above airfield elevation to 7,500 feet horizontally from the runway centerline. At the edge of the 'Inner Horizontal Surfaces,' surfaces referred to as 'Conical Surfaces' extend upwards at a slope of 20:1 to 500 feet above airfield elevation. 'Outer Horizontal Surfaces' extend outward from the edge of the Conical Surfaces to a distance of 30,000 feet from the runway centerline. Imaginary surfaces outside of the primary approach/departure corridor provide an obstacle-free space in which aircraft can maneuver near the airfield. FAR Part 77 provides guidance on submittal of FAA Form 7460-1, *Notice of Proposed Construction or Alteration* (FAA 2012). The form is used to notify the FAA of construction or alteration of structures proximate to imaginary surfaces around airfields.

Although the FAA establishes criteria for the height of structures around airports, the FAA does not have the authority to prevent the construction of a structure that is an obstruction, and can only indirectly influence their construction if the structure or activity requires a permit or license from a Federal agency, e.g., a Federal Communications Commission license for radio station, and sometimes the activity may find it hard to get insurance if the FAA has issued a finding that it is a hazard to flight. Therefore, to protect the health, safety, and welfare of populations around airfields, local communities must enforce the height restriction guidelines established by the FAA. This is particularly important for DoD airfields.

In addition to the imaginary surfaces found in Title 14 of the *Code of Federal Regulations* (CFR) Part 77, specific criteria are established when airdrops of personnel or equipment are performed at a USAF installation. Air Force Instruction (AFI) 13-217, *Drop Zone and Landing Zone Operations* (USAF 2007), outlines the minimum size of a Drop Zone, marking criteria, aerial delivery methods, and parameters for aircraft conducting airdrops. A specific minimum elevation, or floor, is established for the Drop Zone approach and departure corridors. Vertical penetrations into the floor of these corridors would severely limit the viability of airlift training conducted by HC-130J.

The purpose of these imaginary airspace control surfaces is to provide a tool to graphically depict airspace management concepts in a way that can enhance the safety and efficiency of aircraft operations. These regulations can prevent the construction of structures whose height could compromise the ability of aircraft to land safely, particularly in adverse weather conditions or during military training operations.

3.1.5 Flight Safety Criteria

Flight safety not only includes measures for pilot safety during aircraft operations, but also for the safety of those in the community. Local communities are encouraged to restrict development that could compromise aircraft operations. Hazards to flight safety that should be avoided in the airfield vicinity include:

- Uses that attract birds, especially waterfowl;
- Towers, structures, and vegetation that extend into navigable airspace;
- Lighting (direct or reflected) that impairs a pilot's vision;
- Uses that would generate smoke, steam, or dust; and
- Electromagnetic interference with aircraft communication, navigation, or other electrical systems.

3.2 THE LAND USE COMPATIBILITY GUIDELINES

This AICUZ Study contains general land use guidelines related to safety and noise associated with aircraft operations. Each AICUZ Study contains land use guidelines. Table 3–2 identifies land uses and possible noise exposure and accident potential combinations for Moody AFB.

These noise guidelines are essentially the same as those published by the Federal Interagency Committee on Urban Noise (FICUN) in the June 1980 publication, *Guidelines for Considering Noise in Land Use Planning and Control*. The *Standard Land Use Coding Manual (SLUCM)* (USURA 1965) 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. The notes provide more detailed restrictions or conditions that need to be taken into consideration when determining compatibility. For example, Y^1 means land use and related structures are compatible without restriction at a suggested maximum density of one to two dwelling units per acre, possibly increased under a Planned Unit Development where lot coverage is less than 20 percent.

3.3 PARTICIPATION IN THE PLANNING PROCESS

As local communities prepare their land use plans, the USAF must be ready to provide additional inputs. Moody AFB has provided this AICUZ Study to local communities to assist them in preparing their local land use plans.

The initial point of contact for AICUZ matters at Moody AFB is the Public Affairs Office at (229) 257-4146, but the Base Civil Engineer has been designated as the official liaison with the local communities on all planning matters. This office is prepared to participate in the continuing discussion of zoning and other land use matters as they may affect, or may be affected by, Moody AFB.

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

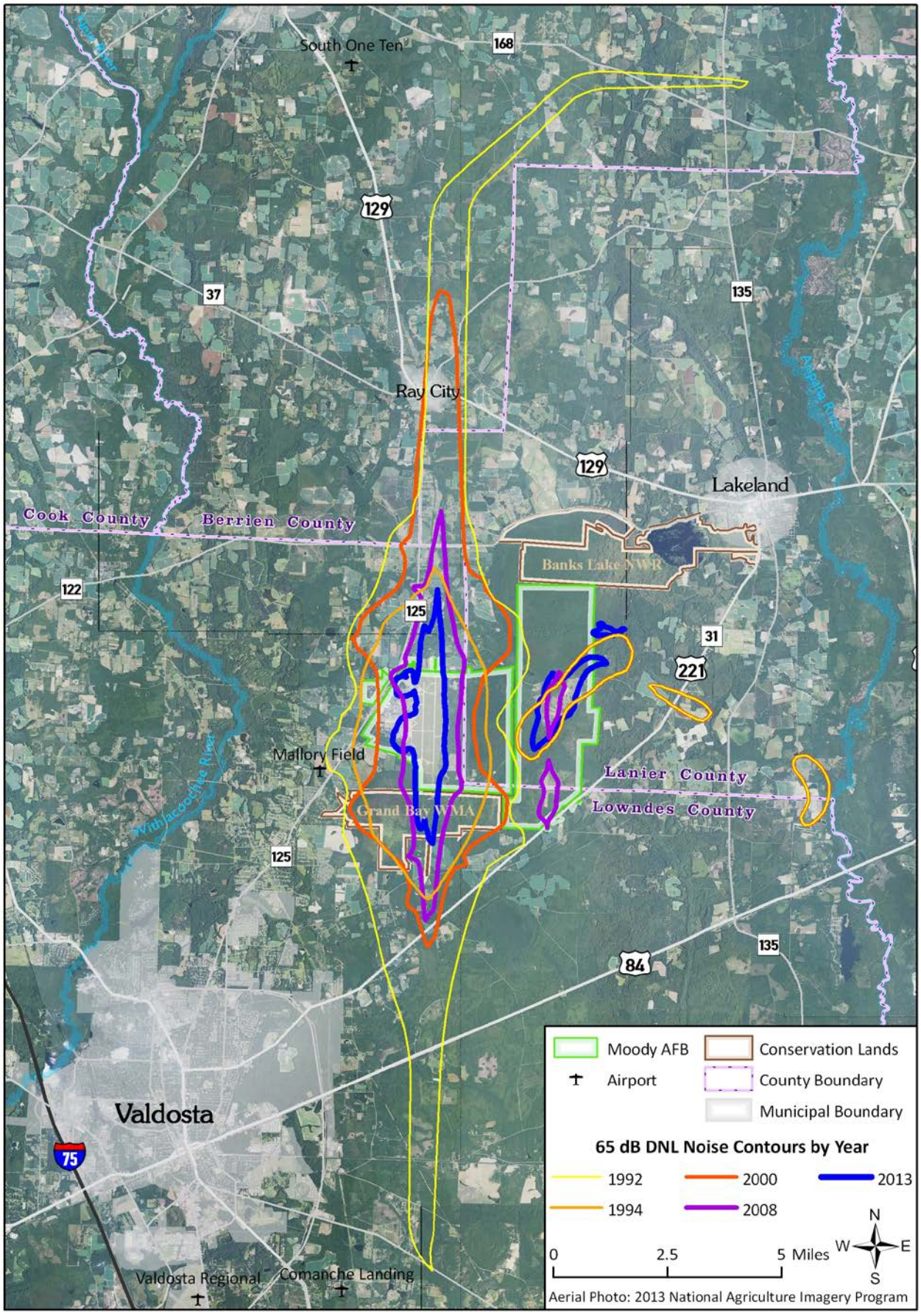

Figure 3–2 Historical and 2013 Noise Zones at Moody AFB

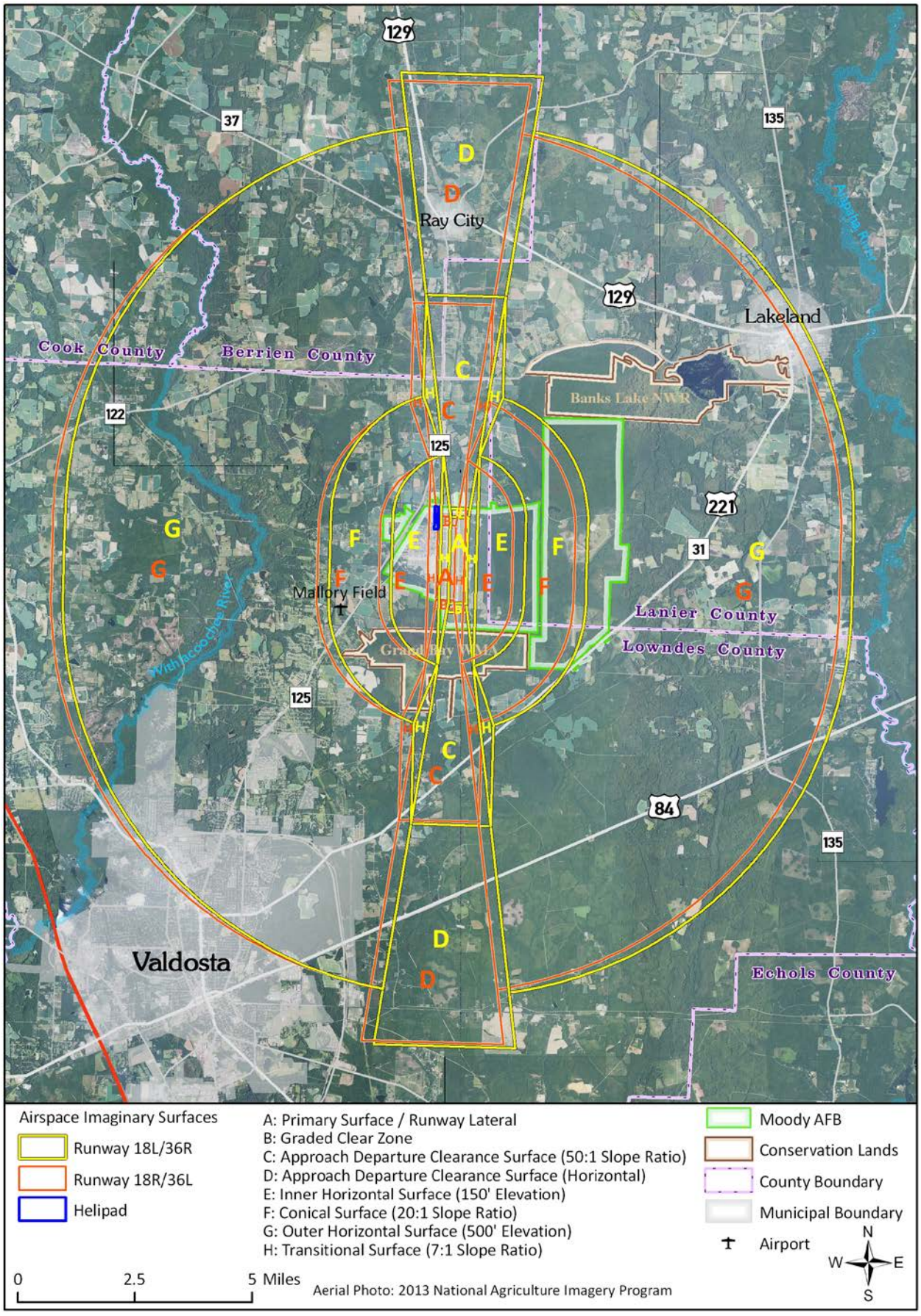

Figure 3–3 Imaginary Surfaces at Moody AFB

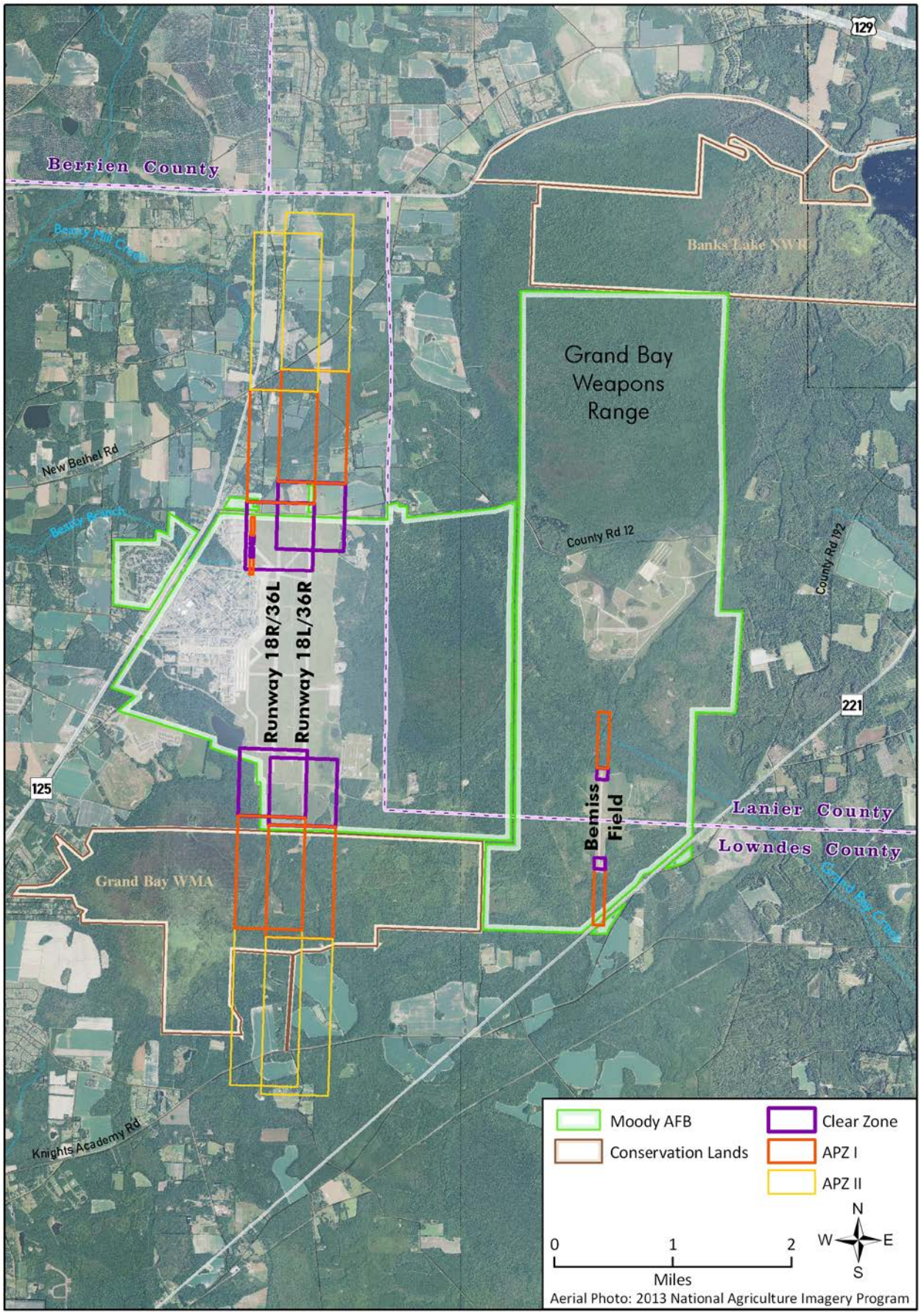

Figure 3–4 Moody AFB Clear Zones and Accident Potential Zones

Table 3–2 Land Use Compatibility Guidelines

Land Use		Accident Potential Zones			Noise Zones (dB DNL)			
SLUCM No.	Name	Clear Zone	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]
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	Y	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]

Table 3–2 Land Use Compatibility Guidelines (*continued*)

Land Use		Accident Potential Zones			Noise Zones (dB DNL)			
SLUCM No.	Name	Clear Zone	APZ I	APZ II	65–69	70–74	75–79	80+
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]
49	Other transportation communications and utilities	N[3]	Y[4]	Y	Y	A[15]	B[15]	N
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 3–2 Land Use Compatibility Guidelines (*continued*)

Land Use		Accident Potential Zones			Noise Zones (dB DNL)			
SLUCM No.	Name	Clear Zone	APZ I	APZ II	65–69	70–74	75–79	80+
70	**Cultural, Entertainment, and Recreational**							
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	Agricultural-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

LEGEND:

SLUCM - Standard Land Use Coding Manual (USURA 1965).

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^{x} - (yes with restrictions) - Land use and related structures generally compatible; see notes 1–21.

N^{x} - (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 (see Appendix E).

A, B, or C - Land use and related structures generally compatible; measures to achieve NLR of A (25 dB DNL), B (30 dB DNL), or C (35 dB DNL) need to be incorporated into the design and construction of structures.

A*, B*, or 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.

Table 3–2 Land Use Compatibility Guidelines (*continued*)

NOTES:

1. Suggested maximum density of one to two 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 Air Force Instruction 32-7063 and Unified Facilities Criteria 3-260-01 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 uses, they are discouraged in 65–69 dB DNL and strongly discouraged in 70–74 dB DNL noise contours. An evaluation should be conducted prior to approvals, indicating a demonstrated community need for residential uses 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 65–69 dB DNL and 70–74 dB DNL noise contours 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 that only protect interior spaces.

12. Measures to achieve the same NLR as required for facilities in the 65–69 dB DNL 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 70–74 dB DNL 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 75–79 dB DNL 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 65–69 dB DNL range.
19. Residential buildings require the same NLR required for facilities in the 70–74 dB DNL 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.

SECTION 4.0

LAND USE ANALYSIS

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SECTION 4. LAND USE ANALYSIS

4.1 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.

Computer technology enables Moody Air Force Base (AFB) to more precisely display its flight tracks and noise zones for land use planning purposes. This same technology allows the installation a means to communicate the extent to which Moody AFB's region of impact extends into the cities of Valdosta and Lakeland, and Lowndes and Lanier counties. The 2013 noise zones do not encompass land within Berrien County; however, as shown in Section 3.1.2, noise zones from previous Moody AFB activities has affected areas in southern Berrien County in the past. Therefore, land use and zoning information for Berrien County is included in this Air Installation Compatible Use Zone (AICUZ) Study, but was not analyzed for impact. For the purpose of this AICUZ Study, existing and future land uses and zoning in the figures in this section are generalized into one of the following six categories:

- Commercial: Offices, retail, restaurants, businesses, and other types of commercial activity.
- Industrial: Areas and the facilities they contain that are owned or used for industrial purposes, such as manufacturing, warehousing, and other similar uses.
- Open Space/Low-Density: Undeveloped land areas, forested land, agricultural land, grazing areas, water or wetland areas, and areas with residential activity at densities less than or equal to one dwelling per acre.
- Public/Quasi-Public: Publicly owned lands or lands to which the public has access, such as public buildings or institutional facilities.
- Recreational: Land areas designated for recreational activity, including local parks; wilderness areas and reservations; conservation areas; and areas designated for trails, hikes, camping, and other similar uses.
- Residential: 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.

4.2 EXISTING LAND USE

Moody AFB was originally developed in a rural area in Lowndes and Lanier counties, Georgia. The city of Valdosta, located in Lowndes County, is now the 14th largest city in Georgia. Lowndes County is one of Georgia's fastest-growing counties; the driver of development within Lowndes County is the growth of the city of Valdosta. Growth in previously rural areas has increased, thereby impacting the land use surrounding the installation. Current land use surrounding Moody AFB is mixed, with the majority of the development to the southwest in the city of Valdosta. Most of the development adjacent to the installation is in Lowndes County along State Highway 125.

The 2013 noise zones and Accident Potential Zones (APZs) from aircraft operations at Moody AFB are depicted on a land use map (see Figure 4–1). No portions of the 65–69 A-weighted decibel (dBA) noise zone extend north into Berrien County; therefore, compatibility for Berrien County was not analyzed in this study.

The land use illustrated on this map consists of 2013 data provided by Lowndes County, 2004 data from Lanier County, and 2003 data from Berrien County. The 2013 noise zones that are a result of operations at the airfield encompass land in Lowndes and Lanier counties, but not in Berrien County. The 2013 noise zones that are a result of training at Grand Bay Training and Gunnery Range (hereafter referred to as Grand Bay Range) are within the installation boundary in Lowndes and Lanier counties. The 2013 noise zones do not encompass any land in the city of Valdosta.

As required by Georgia State Planning Standards, every part of the Greater Lowndes community was delineated into specific Character Areas. A Character Area is defined as "a specific geographic area within the community" that includes the following:

- Has unique or special characteristics to be preserved or enhanced (such as a downtown, a historic district, or a transportation corridor)
- Has potential to evolve into a unique area (such as a strip commercial corridor that could be redesigned as a more attractive village development pattern)

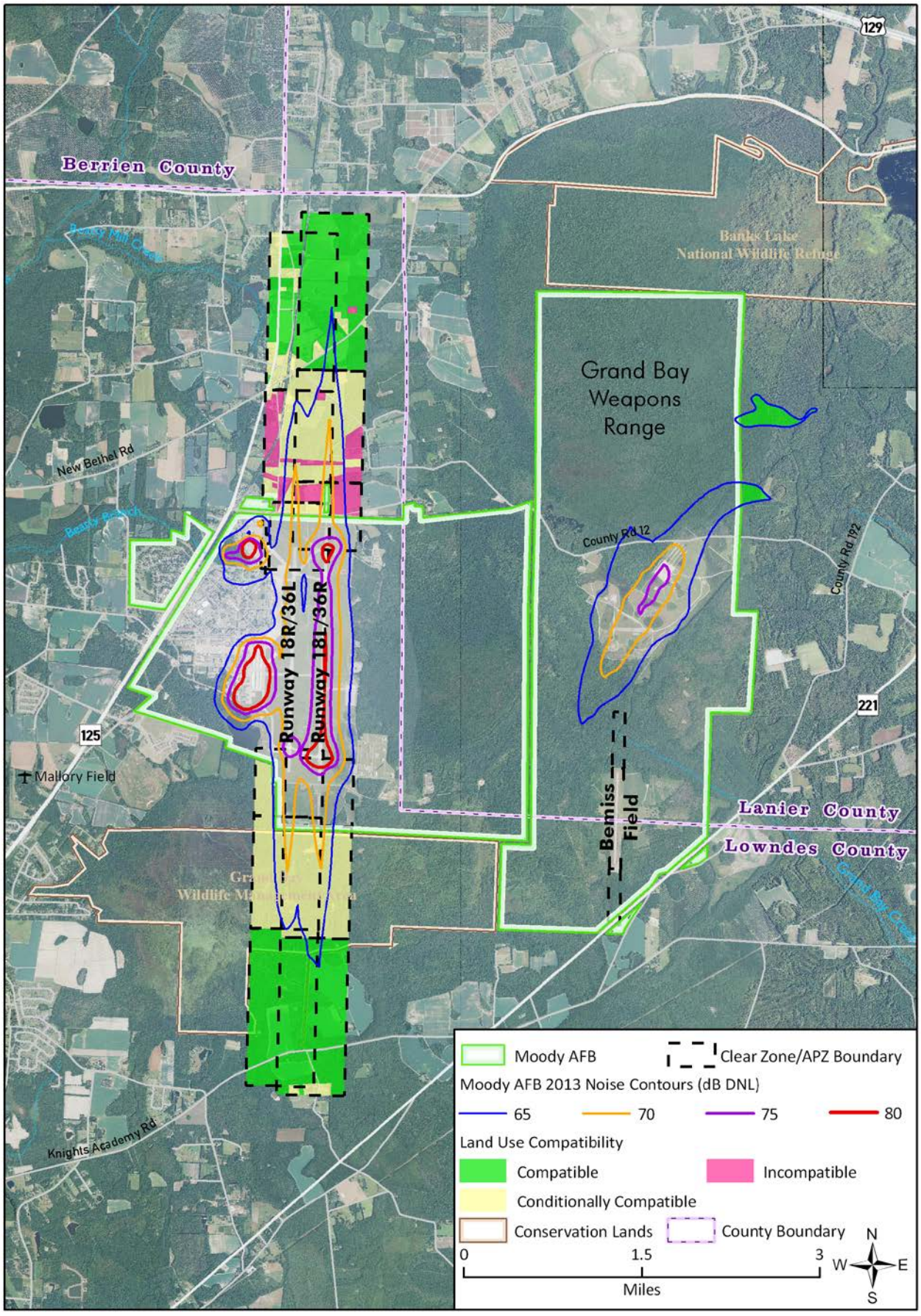

Figure 4–1 Generalized Existing Off-Base Land Use

- Requires special attention due to unique development issues (such as a rapid change in development patterns or economic decline)

Table 4–1 presents the acreage by generalized land use category of the areas within the 65 decibel day–night average sound level (dB DNL) noise contours for Moody AFB. Table 4–2 reflects the land use within the Clear Zones (CZs) and APZs for Moody AFB.

Table 4–1 Generalized Existing Land Use Within ≥ 65 dB DNL Noise Exposure Area for Moody AFB (off-base outside CZs and APZs)

Category	Acreage Within Noise Zones Not Included in CZs and APZs				
	65–69	70–74	75–79	80+	Total
Residential	0	0	0	0	0
Commercial	0	0	0	0	0
Industrial	0	0	0	0	0
Public/ Quasi-Public	0	0	0	0	0
Open Space/ Low-Density	68	0	0	0	68
Recreational	0	0	0	0	0
Total	**68**	**0**	**0**	**0**	**68**

Table 4–2 Generalized Existing Land Use Within the Moody AFB Clear Zones and Accident Potential Zones (off-base)

Category	Acreage Within CZs and APZs			
	Clear Zone	APZ I	APZ II	Total
Residential	1	119	70	190
Commercial	0	41	42	83
Industrial	0	0	0	0
Public/ Quasi-Public	68	2	3	73
Open Space/ Low-Density	69	796	1,226	2,091
Recreational	0	0	0	0
Total	**138**	**958**	**1,341**	**2,437**

4.2.1 Lowndes County Land Use

Moody AFB is in the northeastern corner of Lowndes County. Apart from the city of Valdosta metropolitan area, land in Lowndes County consists primarily of agricultural uses, followed by residential uses. Residential and commercial land uses are present along State Highway 125 (Bemiss Road) west and north of Moody AFB. Additional residential land uses are scattered throughout Lowndes County, primarily along transportation routes. Bordering the installation to the south is the Grand Bay Wildlife Management Area, a recreational land use area.

Parcels of commercial land exist along State Highway 94 and Interstate 75. The largest contiguous section of commercial land is southeast of the city of Valdosta along Interstate 41 in the city of Lake Park.

4.2.2 Lanier County Land Use

The eastern portion of Moody AFB is in Lanier County. Land in Lanier County is primarily rural; approximately 80 percent consists of open space/low-density uses. The city of Lakeland is the county's only urban area. A large residential area is north of the Moody AFB runways in the western part of the county, surrounded by agricultural land uses. Open space/low-density land covers the eastern third of the county, with residential land scattered throughout.

Immediately north of Grand Bay Range is Banks Lake, which includes the Banks Lake National Wildlife Refuge, administered by the U.S. Fish and Wildlife Service. The Banks Lake National Wildlife Refuge is considered a recreational land use area.

4.2.3 City of Valdosta Land Use

Although the 2013 noise zones do not encompass land in the city of Valdosta, the city is approximately 10 miles southwest of Moody AFB and is the largest city near Moody AFB. Consequently, city planners should consider the impact from activities at Moody AFB during their planning process.

Land in the city of Valdosta consists primarily of residential, commercial, and public/quasi-public uses in the city center. Recreational land uses are located sporadically throughout the city, with the largest parcels in the northwestern corner of the city. In addition, the Grand Bay Wildlife Management Area is in the northeastern corner of Valdosta, adjacent to the southern boundary of Moody AFB.

Commercial land is adjacent to major roadways throughout the city, which includes U.S. Highway 84, Ashley Street, and Saint Augustine Road. Land adjacent to the city center consists of open space/low-density and agricultural uses, as well as some residential and commercial uses. Valdosta Regional Airport is south of the city center.

4.2.4 City of Lakeland Land Use

Lakeland is Lanier County's only incorporated city and is located near the center of the county at the intersection of several roads. It is approximately 24 miles northeast of Valdosta and 17 miles from Interstate 75. The city of Lakeland has developed around the intersections of six state and Federal highways. Although annexation has been a consideration in the recent past, Lakeland maintains its original 1-mile radial jurisdiction.

Developed non-agricultural land in Lakeland consists of more than 1,200 acres, which is 57 percent of the city's total land area. This makes the city of Lakeland the largest single mass of urban development anywhere in the county. Residential land uses make up 37 percent of the developed land, with most of this in the form of single-family development. Residential land uses are found in all parts of the city, with development spanning from east to west along Main Street and in the southeastern quadrant.

The central business district covers approximately 8 square blocks along Main Street and is characterized by a mixture of commercial, residential, and industrial land uses. There are two industrial districts in the city of Lakeland, with industrial development scattered throughout the city. Primary public/institutional uses include schools and a hospital. Other institutional uses include churches, cemeteries, the Courthouse, City Hall, Post Office, and other public services.

4.3 LAND USE PLANNING INITIATIVES

4.3.1 Joint Land Use Study

A Joint Land Use Study (JLUS) for Moody AFB was finalized in 2008 and coordinates regional planning efforts between Moody AFB and the three surrounding counties. The JLUS addressed land use and encroachment issues resulting from regional development within Moody AFB's neighboring communities. The JLUS preserves the installation's military mission and facilitates the creation of compatible zoning ordinances by local jurisdictions. Oversight for development of the JLUS includes a Policy Committee and a Technical Committee composed of local elected officials, private sector individuals, and Moody AFB leaders. The JLUS provides recommendations regarding future land use planning, zoning ordinances, communication tower locations and height restrictions, building codes, and other development issues.

4.3.2 Greater Lowndes 2030 Comprehensive Plan

In an effort to promote regional planning and collaboration, each of the Greater Lowndes communities (i.e., Valdosta, Hahira, Lake Park, Dasher, and Remerton) and Lowndes County committed to the development of a joint Comprehensive Plan. The result was the Greater Lowndes 2030 Comprehensive Plan, published in 2006. The goal of the 2030 Comprehensive Plan was to develop a viable, living document that could be utilized by community leaders and stakeholders to guide the community's rapid growth and development.

The 2030 Comprehensive Plan was prepared by the South Georgia Regional Development Center (SGRDC), one of 16 Regional Development Centers in the State of Georgia. The SGRDC serves a nine-county region in south-central Georgia. The SGRDC is the designated Metropolitan Planning Organization for the Valdosta-Lowndes Urbanized Area.

The 2030 Comprehensive Plan classifies existing land use in the Greater Lowndes area into eight categories:

- Agriculture/forestry
- Commercial
- Industrial
- Parks/recreation/conservation
- Public/institutional
- Residential
- Transportation/communication/utilities
- Undeveloped/vacant

Existing land use patterns and trends were evaluated within each jurisdiction; seven areas were identified that require special attention. Moody AFB was not identified as one of these areas.

4.3.2.1 City of Valdosta

Land use planning for the city of Valdosta is part of the Greater Lowndes 2030 Comprehensive Plan, as discussed in Section 4.3.2. The city of Valdosta has a number of programs dedicated to revitalizing, developing, and redeveloping land: the U.S. Department of Housing and Urban Development (HUD) has designated 13 neighborhoods for revitalization,

and a Parks and Recreation Master Plan has recommended future facilities. Residential infill opportunities with existing infrastructure are present in downtown Valdosta. According to the Greater Lowndes 2030 Comprehensive Plan, Valdosta has conservation and resource zoning to aid in establishing a connection of green space and park land. In addition, land use measures exist to help protect natural resources, such as areas within floodplains.

4.3.3 Greater Lanier 2025 Comprehensive Plan

The purpose of the 2025 Greater Lanier Comprehensive Plan is to provide guidelines for future growth and development of Lanier County and the cities within the county to the year 2025. The 2025 Greater Lanier Comprehensive Plan defines the following land use categories, as established by the Georgia Department of Community Affairs:

- Residential
- Industrial
- Commercial
- Public/institutional
- Transportation/communication/utilities
- Parks/recreation/conservation
- Agriculture, forestry
- Undeveloped/unused

Lanier County currently has adopted land subdivision regulations and land development ordinances to eliminate unregulated development for residential uses in rural areas.

4.4 CURRENT ZONING

Proper zoning can facilitate compatible future land use development. Zoning can ensure that the land uses of a community are properly situated in relation to each other, and zoning is the most commonly used legal device for implementing land use plans. Zoning changes can support airport compatibility by directing new growth into compatible areas and thus can prevent the future development of noise-sensitive land uses in AICUZ environs. Areas within the AICUZ environs that currently contain incompatible uses could be re-zoned to more compatible categories, such as commercial or industrial.

Lowndes County has implemented a zoning district called the Moody Activity Zoning District (MAZ), which is a district that encompasses the entire installation boundary; CZs; APZs I and II; and additional land to the north, south, and west of the Moody AFB environs. The MAZ was developed to promote sound land use planning and minimize risks to public safety from potential aircraft accidents (see Section 4.4.1 for more information on the MAZ). The MAZ is an excellent example of a zoning ordinance that was designed to prevent encroachment of incompatible development into areas with high noise exposure levels and accident potential.

Because of the relative impermanence of zoning regulations, continuous monitoring is necessary to preclude the encroachment of incompatible development into undeveloped areas within the AICUZ environs. Zoning that achieves compatibility will be subject to continued pressure for change. Appropriate 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. The 2013 noise zones and APZs from aircraft operations at Moody AFB are illustrated on a zoning map applicable to the area surrounding the installation, utilizing 2013 data provided by local planning organizations. The 2013 noise zones encompass zoned land in Lowndes and Lanier counties, but not in Berrien County. The 2013 noise zones do not encompass any land in the city of Valdosta.

The majority of the 2013 noise zones that are a result of training at Grand Bay Range are within the installation boundary, except for a small portion that encompasses land in southwestern Lanier County that is zoned Rural Residential. Table 4–3 provides a breakdown of the generalized zoning (areas outside Moody AFB only, outside CZs and APZs) within the 65 dB DNL and greater noise area.

Table 4–3 Generalized Zoning Within ≥ 65 dB DNL Noise Exposure Area for Moody AFB (off-base outside CZs and APZs)

Category	Acreage Within Noise Zones Not Included in CZs and APZs				
	65–69	70–74	75–79	80+	Total
Residential	0	0	0	0	0
Commercial	0	0	0	0	0
Industrial	0	0	0	0	0
Moody Activity Zone	0	0	0	0	0
Public/ Quasi-Public	0	0	0	0	0
Open Space/ Low-Density	0	0	0	0	0
Recreational	0	0	0	0	0
Unzoned	68	0	0	0	68
Total	**68**	**0**	**0**	**0**	**68**

A similar analysis was performed to determine the acreage of each generalized zoning category within the Moody AFB CZs and APZs and is shown in Table 4–4.

Table 4–4 Generalized Zoning Within the Moody AFB Clear Zones and Accident Potential Zones (off-base)

Category	Acreage Within CZs and APZs			
	Clear Zone	APZ I	APZ II	Total
Residential	0	0	0	0
Commercial	0	0	0	0
Industrial	0	0	0	0
Moody Activity Zone	132	958	1,341	2,437
Public/ Quasi-Public	0	0	0	0
Open Space/ Low-Density	0	0	0	0
Recreational	0	0	0	0
Unzoned	0	0	0	0
Total	**132**	**958**	**1,341**	**2,437**

4.4.1 Lowndes County Zoning

Within Lowndes County, Moody AFB and the area adjacent to the installation are within the MAZ. Land south of Moody AFB across U.S. Highway 221 (i.e., Lakeland Highway) is zoned Estate Agricultural. Abutting the MAZ to the west are several Residential Agricultural districts. The land encompassed by the 2013 noise zones in Lowndes County is within the MAZ, as shown in Figure 4–2. Please see Section 4.4.1 for more information on the MAZ.

Much of the land in the eastern and western portions of Lowndes County is zoned Estate Agricultural, a rural district intended for agricultural purposes and single-family homes. Residential Agricultural zoning is intended to preserve the mixed agricultural and residential character of land while providing a transition between agricultural and rural land, and suburban and urban land. Land to the north and south of the city of Valdosta includes Residential Agricultural, Low-Density Residential, Suburban Density Residential, Planned Development District, and Highway Commercial zoning. Conservation districts are present throughout Lowndes County along the eastern and western boundaries and along streams to the west of the city of Valdosta.

Zoning regulations for the unincorporated areas of Lowndes County are provided in the Lowndes County Unified Land Development Code (ULDC), updated in 2012 (Lowndes County 2012). The Greater Lowndes 2030 Comprehensive Plan (see Section 4.3.2) is the official development policy and implementation guide for the county; the ULDC is designed to implement all provisions of the Comprehensive Plan for the development and use of land. The ULDC stipulates that the AICUZ Study is fully adopted by reference into the ULDC.

The MAZ was established from the Moody AFB 1992 noise zones discussed in the Lowndes County ULDC, not from the 2013 AICUZ noise zones discussed in this report. Under the ULDC, unincorporated land in Lowndes County is divided into 15 zoning districts, 3 overlay districts, and the MAZ.

The purpose of the MAZ includes the following (Lowndes County 2007):

- Ensure the safety of people and property within the MAZ.
- Prohibit the establishment of incompatible structures.
- Protect the airspace from the establishment of structures or placement of objects that interfere with the safe operation of aircraft.
- Limit land uses to those uses that are compatible with Moody AFB.
- Protect people and property from the potential adverse effects of aircraft noise and aircraft crashes.
- Ensure the continued presence of Moody AFB in Lowndes County.

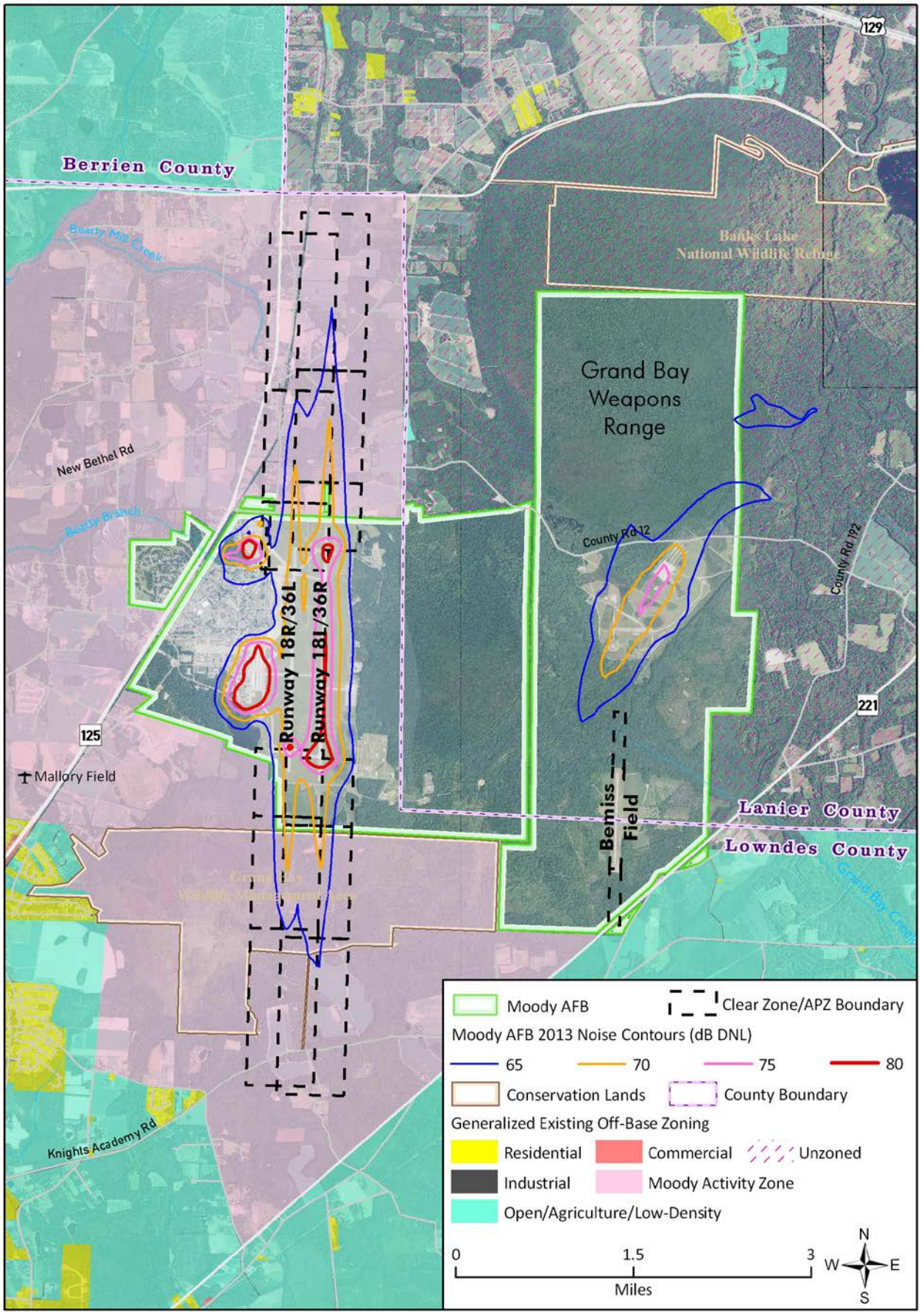

Figure 4–2 Generalized Existing Off-Base Zoning

As shown in Figure 4–2, the MAZ encompasses land to the north, northwest, south, and southeast of Moody AFB, as well as land within the installation boundary. The MAZ is subdivided into the following districts:

- MAZ I: Includes all Moody AFB-owned property, the CZs, and APZ I
- MAZ II: Includes APZ II and areas within the Lowndes County ULDC 65 dBA noise zone (as shown on the Lowndes County zoning map)
- MAZ III: Includes all land outside of the Lowndes County ULDC 65 dBA noise zone (as shown on the Lowndes County zoning map) to the outer boundary of the MAZ

In addition, Lowndes County has established a Noise Impact Area. The Noise Impact Area includes all land within the Lowndes County ULDC 65 dBA noise zone (as shown on the Lowndes County zoning map) plus an additional 2,500 feet outward. Additional standards for the Noise Impact Area include the following (Lowndes County 2007):

- All work and operations shall be conducted within buildings or enclosed structures.
- All new development, redevelopment, and building alterations or additions shall be required to meet the noise attenuation requirements of the AICUZ Study.
- Applications for the approval of development shall include certification from a qualified acoustical expert that the proposed construction complies with the standards of the AICUZ Study.

The ULDC provides permitted land uses within each zoning district. All applications for rezoning and development approval within the MAZ shall be subject to review by a representative from Moody AFB. The MAZ regulations also include prohibited uses; height restrictions; lighting restrictions; and the exclusion of uses that produce smoke or glare, attract birds, or produce electronic interference. The prohibited uses include multi-family residential development and single-family residential development with a density greater than one dwelling per 2.5 acres.

In addition, an application for any tower or tower structure within the MAZ, or that the County Manager determines could interfere with navigable airspace around Moody AFB, shall be submitted to Moody AFB for review. Recommendations from Moody AFB shall be considered in the determination of approval for the tower or structure. Please see Section 3.1 for more information on obstructions to navigable airspace.

4.4.2 Lanier County Zoning

The majority of the land in Lanier County has been zoned Agricultural, including the land adjacent to Grand Bay Range. The 2013 noise zones that are a result of operations at Moody AFB encompass land in southwestern Lanier County that is zoned Rural Residential. Land zoned as Manufactured Housing Park exists in patches throughout the county, with the largest area at the western boundary between Lanier and Berrien counties, approximately 4 miles from Moody AFB and adjacent to land zoned as a MAZ in Lowndes County. Single-Family Residential zoning is present to the north and west of the city of Lakeland, as well as land in the western and southern portions of the county along the western boundary and U.S. Highways 221 and 129. Land zoned Wholesale Light Industrial is present to the south and east of the city of Lakeland.

Zoning for Lanier County is outlined in the Land Development Ordinance for Lanier County, Georgia. To encourage appropriate use of land, buildings, and structures, 10 land development districts were identified such as Agricultural, Manufactured Housing Park, Rural Residential, and Heavy Industrial. These districts govern developments within unincorporated Lanier County.

In addition to land development districts, the ordinance states that structures that exceed established height limits must obtain a proper variance from the Board of Appeals. Approval of a greater height must be in compliance with the flight approach zone maps on file with the Land Development Administrator of the city of Lakeland, Georgia. The ordinance stipulates that height variances should also be closely coordinated with the Lakeland-Lanier County Airport Authority and the Federal Aviation Administration.

Lanier County and the city of Lakeland initiated a Joint Growth Strategies Advisory Committee in 1993 to strengthen intergovernmental coordination. Memorandums of Agreement between the city of Lakeland and Lanier County have been created to ease the potential for intergovernmental conflicts relating to Land Use Intensity Subject to Annexation, as identified by the committee.

4.4.3 City of Valdosta Zoning

Although the 2013 noise zones do not encompass land in the city of Valdosta, the city is approximately 6.5 miles southwest of Moody AFB. Consequently, city planners should consider the impact from activities at Moody AFB during their zoning process.

The city center is characterized by residential, commercial, and professional zoning districts that include Planned Residential, Highway Commercial, Planned Professional Development, and Residential Professional (SGRDC 2007). The southern portion of the city beyond Savannah Avenue has Residential, Industrial, Parks, and Commercial zoning that include Manufacturing, Conservation, and Downtown Commercial districts. Multiple types of Residential zoning are present to the southwest of Moody AFB, as well as Estate Agricultural, Highway Commercial, Conservation, and Office Institutional districts.

Zoning regulations for land within the Valdosta corporate limits are provided in the city's zoning ordinance, most recently updated in October 2007. The zoning ordinance provides permitted uses and development standards for all zoning and overlay districts. Zoning is the means by which the city ensures protection of properties from incompatible uses in accordance with the Greater Lowndes 2030 Comprehensive Plan.

Within the city of Valdosta, there are approximately 20 separate zoning districts, many of which are subdivided into sub-districts. Moody AFB is outside of the Valdosta corporate limits and is therefore not included in Valdosta's zoning ordinance. However, the zoning ordinance requires that prior written notice to Moody AFB officials must be given for any use of search lights or beacons that are designed to attract attention. If Moody AFB officials object to the lighting, the permit for the use may be denied.

4.4.4 City of Lakeland Zoning

The city of Lakeland, through the Lakeland/Lanier County Planning Advisory Commission, has an adopted zoning ordinance, building codes, land subdivision regulations, and soil/sedimentation ordinance and participates in the Federal Emergency Management Agency's Flood Hazard Management Program.

4.5 FUTURE LAND USE AND FUTURE DEVELOPMENT

In addition to the municipality-specific future land use topics discussed below, it is recommended that Lowndes and Lanier counties consider the activities that occur at Grand Bay Range, as described in Section 2.3.3.1. These activities can include intermittent high levels of aircraft and aerial gunnery noise. While the primary concern is with noise generated by training activities conducted at Grand Bay Range, future development and telecommunication towers surrounding the installation could adversely affect Grand Bay Range operations, proposed Drop Zone activities, or flight paths to and from the range. It is recommended that proposed developments be reviewed to ensure that such development does not adversely affect training activities conducted at Grand Bay Range.

4.5.1 Lowndes County

A series of Future Development Maps was created for the 2030 Comprehensive Plan; each map represents the intended style of growth and location of land uses for each of the Greater Lowndes communities. As a result of the extensive land use inventory completed for the Comprehensive Plan, area planners recognized that in some areas of the community, the existing land use is not consistent with the existing zoning, resulting in a situation of nonconformance. The existing zoning was considered in the development of all the Future Development Maps, including the Lowndes County Future Development Map, which is presented as Figure 4–3.

The future land use of the Greater Lowndes area is classified into 17 Character Areas, plus the MAZ and Urban Service Area. Please see Section 4.4.1 for more information on the MAZ and Section 4.5.2 for more information on the Urban Service Area. The Comprehensive Plan provides permitted zoning for each Character Area. The Comprehensive Plan stipulates that Moody AFB personnel will be included in all growth and development decisions for properties located within the MAZ. Two policies of the Comprehensive Plan that apply to Moody AFB include:

- "The continued growth of primary regional economic engines" such as Moody AFB "shall be actively supported" (Policy 2.3)
- "Major institutions such as Moody AFB…shall continue to be protected from incompatible land uses through appropriate and consistent land development decisions" (Policy 7.9)

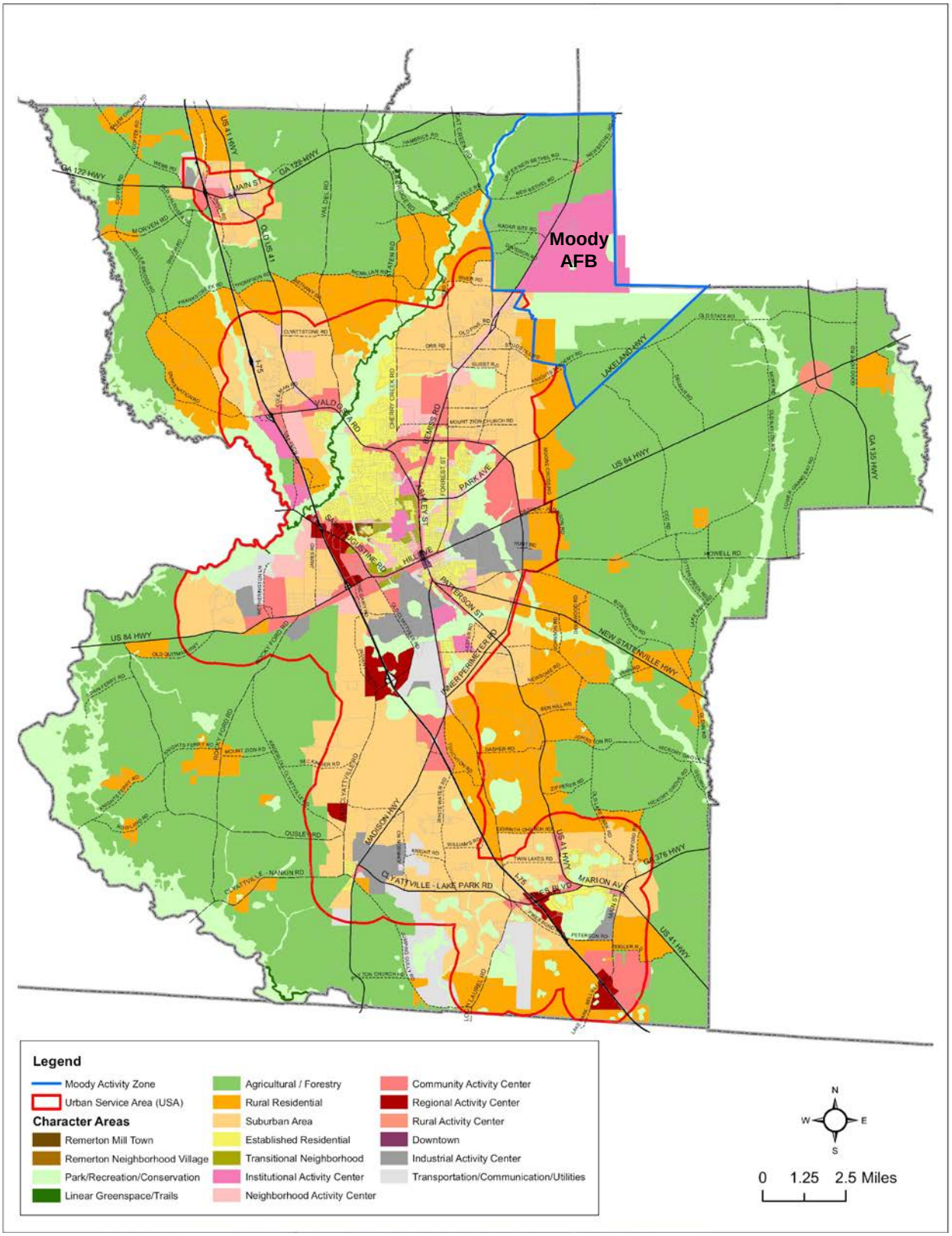

Figure 4–3 Planned Future Land Use and Development for Lowndes County

As shown in Figure 4–3, future land use within the MAZ and within the Moody AFB installation boundary would be primarily classified as an Institutional Activity Center, as well as Park/Recreation/Conservation and Agricultural/ Forestry Character Areas. An Institutional Activity Center is a concentration of public or private large-scale institutional uses, which might have frequent vehicular traffic, large areas of onsite parking, infrequent use of internal open space, and large tracts of unified development.

4.5.2 Lanier County

Future Land Use Plans are incorporated in the Greater Lanier 2025 Comprehensive Plan and stress the importance of the land use patterns that use existing and planned infrastructure to prevent unnecessary infrastructure additions or improvements. Lanier County is divided into the Urban Service Area and Rural Service Areas (RSAs). The Urban Service Area represents growth centers with existing infrastructure and urban services; the Urban Service Area in Lanier County is the city of Lakeland. The Comprehensive Plan stipulates that "all future urban development should locate in this area." The Urban Service Area category represents the highest level of existing or proposed urban density, with the Downtown Activity Center, Urban Activity Center, Commercial Agriculture Area (CAA), and RSAs representing decreasing population densities. RSAs also contain CAAs and Neighborhood Activity Centers. Agriculture, agribusiness, and commercial forestry uses will be promoted in the CAAs, which are based on the presence of prime farmland and prime forest land soils. Neighborhood Activity Centers represent small clusters of urbanized development; any urban development in the RSA will be encouraged in the Neighborhood Activity Centers. Future land use within the 2013 65 to 69 dBA noise zone in Lanier County is residential within an RSA. Residential land uses are considered conditionally compatible in this noise zone.

4.5.3 City of Valdosta

The Future Land Use Plans for the city of Valdosta are provided in the Greater Lowndes 2030 Comprehensive Plan. The 17 Character Areas described in Section 4.5.1 also apply to Valdosta, and are shown on the Valdosta Future Development Map, which is the same as the Lowndes County Future Development Map (Figure 4–3).

The Greater Lowndes 2030 Comprehensive Plan defines an Urban Service Area as a geographically defined boundary that specifies where the local governments will provide urban services (such as water supply or sewage treatment) in the future. By delineating an Urban Service Area, the community is effectively stating that it will support new development of urban density levels only within the delineated area. The Urban Service Area was created in an effort to control the timing, location, and scale of new development and to avoid "playing catch-up in the provision of public facilities and infrastructure" (SGRDC 2006). The 2030 Comprehensive Plan stipulates that endorsement of the Urban Service Area will encourage higher-density infill development within the Urban Service Area boundary, and will help conserve natural resources and maintain the rural character of the areas outside the boundary. Currently, the Urban Service Area boundary is a 1-mile buffer from existing (2006) water and sewer infrastructure and any plans for their immediate extension. The Urban Service Area boundary shown in Figure 4–3 is not considered a projection to the year 2030. The Greater Lowndes 2030 Comprehensive Plan states that the Urban Service Area should be updated on a regular basis to reflect the growth of each community's utility systems in addition to any time the Service Areas for each local government are amended.

4.6 COMPATIBILITY ANALYSIS

An analysis was performed on the property located inside the noise zones or APZs but outside the boundaries of Moody AFB. The acreage of existing land use of this property was calculated by land use type. Land use compatibility is expressed as being "compatible," "conditionally compatible," and "incompatible." Conditionally compatible land use may require incorporation of noise attenuation measures into the design and construction of the structures and further evaluation to be considered "compatible" or density limitations for land in APZs. When a land use falls within a safety and noise zone, the most restrictive criteria shown in Table 3–2 determines its compatibility. For example, a single-family home would be considered conditionally compatible within the 70–74 dBA noise zone if measures to achieve a noise level reduction of 30 dB DNL have been incorporated into the design and construction of the buildings. If the residence doesn't contain the noise level reduction measures, it would be considered incompatible. The same single-family home would be considered incompatible within APZ I or APZ II if there were a residential density of greater than one unit per acre. Therefore, if this single-family home were within both the 70–74 dBA noise zone and APZ I, it would represent an incompatible use. Table 4–5 identifies the compatibility guidelines used in the analysis of land use.

The compatibility guidelines shown in Table 3–2 were combined with the existing land use plan shown in Figure 4–1 to determine land use incompatibility associated with aircraft operations at Moody AFB. Results of this analysis are illustrated in Figure 4–4 and in Table 4–6.

Table 4–6 Incompatible Acreage by Land Use

Land Use Category	Incompatible Acreage		
	Noise	CZ/ APZ	Overlap Noise/CZ/APZ
Residential	0	120	0
Commercial	0	0	0
Industrial	0	0	0
Public/Quasi-Public	0	73	0
Open/Low-Density	0	0	0
Recreational	0	0	0
Total	**0**	**193**	**0**

There are two land uses surrounding Moody AFB that are considered incompatible due to aircraft noise, being located within a CZ or APZ, or a combination of two or three of the planning factors. There are no land uses Moody AFB that are considered incompatible due to aircraft noise and 193 acres off base that are incompatible due to CZs and APZs. Of these two totals, there are no acres that overlap due to incompatibility with both noise and CZ/APZ guidelines. Therefore, there is a total of 193 acres of incompatible land use surrounding Moody AFB.

Table 4–5 Generalized Land Use Compatibility

Land Use Category	Clear Zones/Accident Potential Zones			Noise Zones			
	CZ	APZ I	APZ II	65–69 dBA	70–74 dBA	75–79 dBA	80+ dBA
Residential	N	N	C	C	C	N	N
Commercial	N	C	C	Y	C	C	N
Industrial	N	C	C	Y	C	C	C
Public/Quasi-Public	N	N	C	C	C	C	N
Open/Low-Density	C	C	Y	Y	Y	Y	Y
Recreational	N	C	Y	Y	C	C	N

C = Conditionally Compatible Use
N = Incompatible Use
Y = Compatible Use

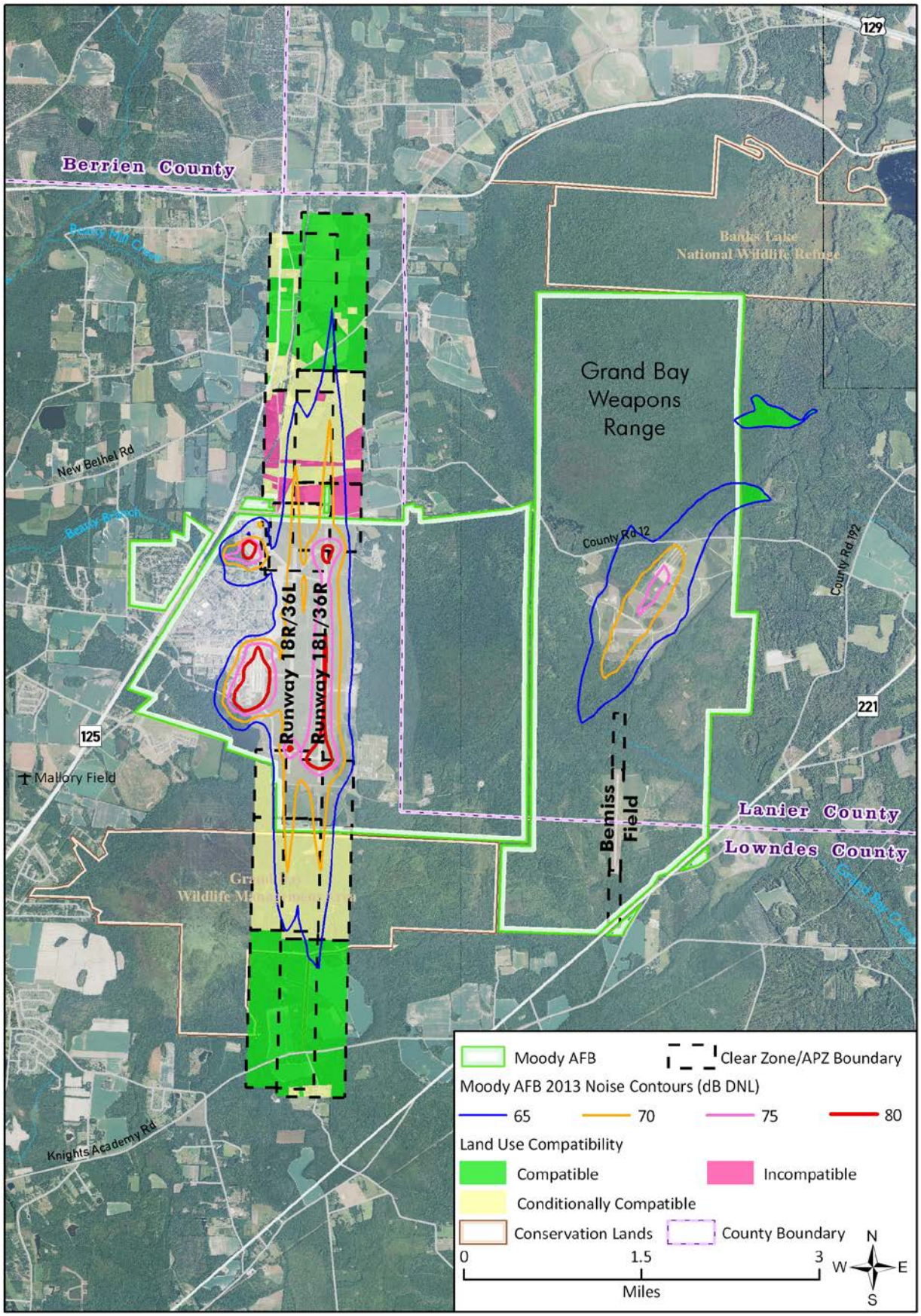

Figure 4–4 Land Use Compatibility in Relation to 2013 DNL Noise Zones, Including Clear Zones and Accident Potential Zones

4.6.1 Clear Zones and Accident Potential Zones

4.6.1.1 Runway 18L/36R Clear Zone and Accident Potential Zones I and II (Eastern Runway)

Approximately half of the land in the 18L northern CZ is within the installation boundaries; the remaining land consists of mixture of uses to include open space/low-density and public/quasi-public uses. While the open space/low-density uses are considered conditionally compatible, the public/quasi-public uses are considered incompatible. Land in the 18L northern APZ I consists primarily of open space/low-density uses, but includes commercial, residential, and public/quasi-public uses. The open space/low-density and commercial uses are considered conditionally compatible, while the public/quasi-public uses are conditionally compatible, and the residential uses are considered incompatible. Land in the 18L northern APZ II consists primarily of open space/low-density uses but includes residential and public/quasi-public uses. The open space/low-density uses are compatible in the 18L northern APZ II, and the residential and public/quasi-public uses are considered conditionally compatible. Residential land in APZ II is compatible with a maximum density of one to two dwellings per acre.

The Runway 36R southern CZ is entirely within the installation boundaries. Land in the 36R southern APZ I consists of open space/low-density uses, with the Grand Bay Wildlife Management Area as the primary use. Land in the 36R southern APZ II consists primarily of open space/low-density uses but includes a parcel of residential use at the southern end. All of the open space/low-density land in the 36R southern APZ I is conditionally compatible and in the 36R southern APZ II is compatible. The residential land within the southern APZ II is considered conditionally compatible.

4.6.1.2 Runway 18R/36L Clear Zone and Accident Potential Zones I and II (Western Runway)

Over 86 percent of the land in the 18R northern CZ is within the installation boundaries; the remaining land consists of a mixture of uses to include open space/low-density, residential, and public/quasi-public uses. While the open space/low-density uses are considered conditionally compatible, the residential and public/quasi-public uses are considered incompatible. Land in the 18R northern APZ I consists primarily of open space/low-density uses, but includes commercial, residential, and public/quasi-public uses. The open space/low-density uses are considered compatible, while public/quasi-public and commercial uses are conditionally compatible, and residential uses are considered incompatible. Land in the 18R northern APZ II consists primarily of open space/low-density uses but includes residential and commercial uses. The residential and commercial uses in the 18R northern APZ II are considered conditionally compatible. Residential land in APZ II is compatible with a maximum density of one to two dwellings per acre.

The majority of the Runway 36L southern CZ is within the installation boundaries. The westernmost portions of the CZ that extend off base are public/quasi-public uses and are conditionally compatible. Land in the 36R southern APZ I consists primarily of open space/low-density uses. Land in the 36R southern APZ II consists primarily of open space/low-density uses but includes a parcel of residential. All of the land in the 36R southern APZ I and the majority of the land in the 36R southern APZ II consist of open space/low-density, which is compatible. Residential land within southern APZ II is considered conditionally compatible.

4.6.2 Noise Zones

As shown in Figure 4–4, the 2013 noise zones, exclusive of the CZ and APZs, extend off base by 68 acres to the northeast of the installation in Lanier County. This off-base acreage is due to operations at Grand Bay and consists of the 65–69 dBA noise zone. The land uses in this noise zone consists of open space/low-density uses, which are considered compatible. All land uses located in noise zones less than 64 dBA are considered compatible.

Future land use north of Moody AFB within the MAZ would consist of an Agricultural/Forestry Character Area. For the purpose of this AICUZ Study, this Character Area would be considered an agricultural use, which would fall into the open space/low-density land use category. Agriculture is considered a compatible use within the 65 to 79 dBA noise zones as long as no residential structures are present. Land directly south of Moody AFB within the MAZ would be classified as a Park/Recreation/Conservation Character Area. For the purpose of this AICUZ Study, this Character Area would be considered a recreational land use.

Recreational land is considered to be a compatible use only in the 65 to 69 dBA noise zone. A portion of a Rural Residential Character Area would also be present southwest of the installation within the MAZ. A Rural Residential Character Area is rural, undeveloped land that is likely to be developed as low-density residential development (one home per 2.5 acres). For the purpose of this AICUZ Study, this Character Area would be considered an open space/low-density use, which is compatible in every noise zone.

4.7 POPULATION DENSITIES

The number of people potentially affected by aircraft noise in proximity to Moody AFB was estimated using U.S. Census tract boundaries from 2010. Table 4–7 shows the estimated population from 2010 U.S. Census data for each noise zone. The acreage percentage for the census tracts inside of each noise zone was estimated. This percentage was applied to the population of the census tract to determine approximately how many people reside within the Moody AFB AICUZ environs. As shown in Table 4–7, there are an estimated 40 people residing within the noise zones of Moody AFB. Of this amount, there are an estimated 37 people in the 65–69 dBA noise zone and 3 individuals in the 70–74 dBA noise zone. No individuals reside in the 75–79 dBA noise zone or the 80+ dBA noise zone.

Table 4–7 Estimated Population Exposed to 2013 Noise Zones Utilizing 2010 Population Data

Noise Zone	Total Number of People
65–69 dBA	37
70–74 dBA	3
75–79 dBA	0
80+ dBA	0
Total	40

Source: U.S. Census Bureau 2010; 2013 Noise Contours.

4.8 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. Should a new mission be established at Moody AFB, adding a larger number of airplanes or additional model types, the AICUZ could be amended.

With these thoughts in mind, Moody AFB has revised the 1994 AICUZ Study (USAF 1994) and has provided flight track, APZ, and noise contour information in this report that reflects the most accurate picture of the installation's aircraft activities as of 2013.

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SECTION 5.0

IMPLEMENTATION

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SECTION 5. IMPLEMENTATION

Implementation of the Air Installation Compatible Use Zone (AICUZ) Study must be a joint effort between Moody Air Force Base (AFB) and adjacent communities. The role of Moody AFB is to minimize noise impact on the surrounding local communities by operational activities on the base. The role of the communities is to ensure that development in the surrounding area is compatible with accepted planning, zoning, and development principles and practices to protect the base's mission. This AICUZ Study provides the best source of information to ensure land use planning decisions made by the local municipalities are compatible with a future installation presence.

5.1 AIR FORCE RESPONSIBILITIES

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

By USAF regulations, Commanders are required to periodically review existing traffic patterns, instrument approaches, weather minima, and operating practices and evaluate these factors in relation to populated areas and other local situations. This requirement is a direct result and expression of USAF 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.

Preparation and presentation of this Moody AFB AICUZ Study is one phase of continuing USAF participation in the local planning process. It is recognized that as the local community updates its land use plans, Moody AFB 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. Moody AFB 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, the base. Moody AFB personnel also are available to provide information, criteria, and guidelines to state, regional, and local planning bodies; civic associations; and similar groups.

Participation in land use planning can take many forms. The simplest of these forms is straightforward, consistent two-way discussion and information sharing with both professionals and neighbors. Copies of this AICUZ Study, including maps, have been provided to local communities and counties and regional planning departments and zoning administrators. Through this communication process, Moody AFB reviews applications for development or changed use of properties within the noise impact and safety areas, as well as other nearby parcels. Moody AFB coordinates closely with surrounding communities and counties on zoning and land use issues.

Moody AFB aircraft crews try to minimize exposure to populated areas, but depending on the weather conditions and air traffic, these areas cannot always be avoided. Daytime operations occur between the hours of 7:00 a.m. and 10:00 p.m. and night operations occur from 10:00 p.m. through 7:00 a.m. Moody AFB personnel try to limit night flying to the minimum required to accomplish their mission and maintain required proficiencies. Night flying is more difficult due to reduced visibility and requires training to maintain currency and safety.

5.2 LOCAL COMMUNITY RESPONSIBILITIES

The residents of the cities of Valdosta and Lakeland, and Lowndes, Lanier, and Berrien counties have a long history of working with personnel from Moody AFB. Adoption of the following recommendations during the revision of relevant land use planning or zoning regulations will strengthen this relationship, increase the health and safety of the public, and help protect the integrity of the installation's flying mission.

- Encourage community planners from the cities of Valdosta and Lakeland, and Lowndes, Lanier, and Berrien counties to consider the recommendations of this AICUZ Study when they are updating their land use plans and zoning regulations.
- Recommend that local governments implement height and obstruction ordinances that reflect current USAF and Title 14 of the *Code of Federal Regulations* Part 77 requirements.

- Recommend that local governments enact fair disclosure ordinances to specify disclosure to the public for those AICUZ items that directly relate to aircraft operations at Moody AFB. In addition, recommend that the areas north and south of the airfield and areas directly north and east of Grand Bay Training and Gunnery Range (hereafter referred to as Grand Bay Range) be included due to the overflight of military aircraft.
- Recommend that real estate disclosures be provided regarding noise zones and Accident Potential Zones (APZs) around Moody AFB. This could be accomplished in a similar manner as the Moody Activity Zoning District (MAZ).
- Recommend that the regulations of the MAZ that can potentially minimize risks and noise exposure levels from aircraft operations at Moody AFB be expanded to include all land that is or was affected by noise from Moody AFB.
- Recommend that the Policy Committee and the Technical Committee formed for the Joint Land Use Study (JLUS) continue to meet at least quarterly to discuss AICUZ concerns and major development proposals that could affect Moody AFB operations.
- Recommend that the capital improvement programs be carefully reviewed to discourage incompatible land use patterns, with particular emphasis on utility extension planning.
- Recommend that planning decisions not be based solely on noise contours, but rather on a complete, long-term picture of the needs of the community.
- Recommend that Lowndes and Lanier counties consider the activities that occur at Grand Bay Range when reviewing proposed developments to ensure that such development does not adversely affect training activities conducted at Grand Bay Range.
- Recommend that Lanier and Lowndes counties adhere to AICUZ land use guidelines when developing all areas affected by noise from Moody AFB.
- Recommend that the cities and counties provide timely notification to Moody AFB regarding new development plans within the noise zones or APZs.
- Recommend that the municipalities surrounding the installation consider the activities that occur at Grand Bay Range, as described in Section 2.3.3.1. These activities can include intermittent high levels of aircraft and aerial gunnery noise. Recommend that proposed developments be reviewed to ensure that such development does not adversely affect training activities conducted at Grand Bay Range.
- Recommend that the Development Suitability Map presented in multiple local planning documents be amended to reflect that land within the 2013 noise zones and APZs is not suitable for high-density development.
- Recommend that the MAZ be adopted by Lanier and Berrien counties, and the MAZ be expanded to encompass all areas currently or previously affected by noise and accident potential from Moody AFB.
- Recommend that subdivision regulations provide for rejection of new subdivisions not compatible with AICUZ land use guidelines and provide controls for continued development in existing subdivisions.
- Recommend that height control of structures (including telecommunications towers) near flight paths be regulated by incorporation of such controls into zoning ordinances.
- Recommend that local county planners consult with Moody AFB officials regarding proposed telecommunications towers and other development in the vicinity of Moody AFB.

SECTION 6.0

REFERENCES

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SECTION 6. REFERENCES

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APPENDIX A

NOISE

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APPENDIX A. NOISE

A.1 NOISE METRICS

There are many types of sound, and several different metrics can be used to quantify different types. Sound intensity is typically described using decibels (dB). The threshold of human hearing is approximately 0 dB, and the threshold of pain is approximately 140 dB.

The human ear can normally hear frequencies from about 20 Hertz (Hz) to about 20,000 Hz. It is most sensitive to sounds in the 1,000 to 4,000 Hz range. Many measurements of sound levels are adjusted so that component frequencies that are best heard by the human ear are emphasized. This process, known as "A-weighting," can be assumed to be applied to all sound levels in this report unless otherwise specified.

The day–night average sound level (DNL) noise metric describes the average noise level over the course of a 24-hour period. It accounts for both the noise levels of individual events and the number of times those events occur. A 10 dB penalty is applied to operations that happen during acoustical night (10:00 p.m. through 7:00 a.m.) because noise tends to be more intrusive at night than during the day. Time-averaged noise levels, such as DNL, are useful for expressing overall noise levels at a location. DNL is the preferred noise metric of the Federal Aviation Administration, U.S. Department of Housing and Urban Development, U.S. Environmental Protection Agency, and U.S. Department of Defense (DoD) for determining land use compatibility in the airport environment.

It is important to recognize that DNL is not the sound level heard at any given time, but rather an average of noise levels that fluctuate over time. Each type of aircraft and each type of maneuver generates its own sound signature. Furthermore, the sound generated by aircraft typically changes over the course of an event. The DNL metric allows summarization of the overall noise level with a single number.

A.2 DAY–NIGHT AVERAGE SOUND LEVEL (DNL) TIME-AVERAGED NOISE ENVIRONMENT DESCRIPTOR

The noise contour methodology used herein is the DNL metric of describing the noise environment. Efforts to provide a national uniform standard for noise assessment have resulted in adoption by the U.S. Environmental Protection Agency of DNL as the standard noise descriptor for use in land use planning.

The DNL metric can be used to describe different types of sounds. Because human hearing picks up noise energy in certain frequency ranges better than others, sound energy in certain frequency bands is emphasized when measuring noise to best predict effects. For aircraft noise and most other types of sound, the frequencies most easily audible to humans are emphasized using a function known as A-weighting. Because A-weighting is very prevalent, sounds can be assumed to be A-weighted unless otherwise specified. Large munitions firing and detonation noise create low-frequency sound energy that is of particular concern because it can be felt as well as heard and can cause vibrations in nearby objects. The sounds may be expressed as C-weighted noise levels, which de-emphasize low-frequency sound energy to a lesser extent than A-weighting, or as un-weighted sound levels. Aircraft noise environments are generally described using A-weighted day–night average sound level (ADNL or DNL), while munitions noise is described using C-weighted day–night average sound level (CDNL).

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 dB. Land use guidelines are based on the compatibility of various land uses with these noise exposure levels. 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 (see Figure A–1).

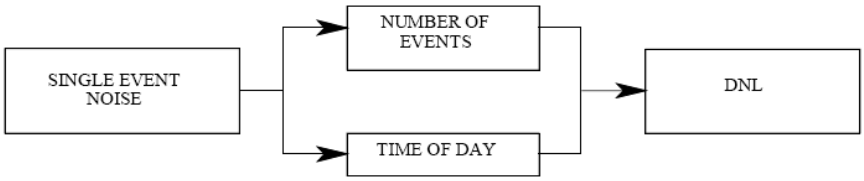

Figure A–1 Day–Night Average A-Weighted Sound Level

As part of the extensive data collection process, detailed information is gathered on the type of aircraft, the number, 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 the contour lines.

A.3 SOUND EXPOSURE LEVEL (SEL) NOISE EVENT DESCRIPTOR

The single-event noise descriptor used in the DNL system is the sound exposure level (SEL). The SEL measure is an integration of an A-weighted noise level over the period of a single event such as an aircraft flyover, in decibels.

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

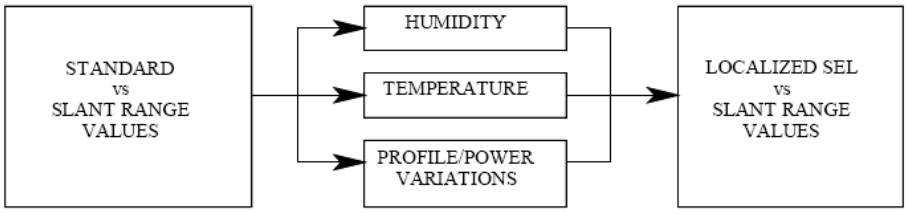

Figure A–2 Sound Exposure Level

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

Ground-to-ground sound propagation characteristics are used for altitudes up to 500 feet absolute 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. 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 is collected for each ground run-up or test position. 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.

A.4 MAXIMUM NOISE LEVEL (L_{MAX}) NOISE EVENT DESCRIPTOR

The maximum noise level (L_{max}) noise metric describes the loudest point during a noise event, such as an aircraft flyover. This noise metric is useful because it is intuitively understood. All maximum noise levels listed in this Air Installation Compatible Use Zone (AICUZ) Study are in A-weighted decibels.

A.5 COMPUTER NOISE MODELS

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 is assembled. Trained personnel process the data for input into the NOISEMAP computer program. Aircraft operations parameters are reviewed for accuracy by operational unit points of contact prior to running the noise model.

The DoD-approved NOISEMAP suite of programs was used to generate the noise zones presented in this AICUZ Study. The program NOISEMAP references a comprehensive database of aircraft noise data known as NOISEFILE in estimating noise levels generated by the specific flight and ground maintenance operations. The program sums noise levels generated by each of the representative aircraft operations at thousands of locations on the ground, allowing a map of noise levels to be constructed. Noise generated by H-60 and V-22 rotorcraft was modeled using the Rotorcraft Noise Model, which accounts for complex patterns of noise distribution. At this time, source noise level data suitable for use in the Rotorcraft Noise Model is available only for relatively few aircraft types.

The computerized noise model takes into account effects that the local environment has on the spreading of noise from the aircraft. Atmospheric conditions (e.g., temperature and humidity) affect the transmission of noise and are factored into the noise modeling. The current version of NOISEMAP also takes into account the effect of topography (e.g., hills and valleys), as well as ground cover (e.g., grass, water) on the transmission of sound. Computer terrain effects modeling was not available as of generation of the noise contours included in the 1994 Moody AFB AICUZ Study, but has been included in noise contours presented in this AICUZ Study update.

Current DoD policy recommends use of the average annual day (AAD), which averages total operations across all 365 days of the year. In all previous noise studies, the average busy day method was used, which calculated noise levels based on dividing aircraft operations across busy flying days (i.e., Monday through Friday for based units). AAD DNL noise levels are smaller than average busy day noise levels for the same operational conditions.

A.6 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, AMRLTR-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, U.S. Government Printing Office, Washington, D.C. 20402.

A.7 CLIMATOLOGICAL DATA

Weather conditions, measured by temperature, relative humidity, and air pressure, are an important factor in the propagation of noise. The average temperature, humidity, and air pressure for each month of the year are an input to the NOISEMAP suite of programs (described in Section 1), which then calculates the sound absorption coefficient for each month. Ranking the 12 monthly sound absorption coefficients from smallest to largest, BASEOPS chooses the sixth smallest sound absorption coefficient to represent the typical weather conditions at the base. The month with the sixth smallest sound absorption coefficient for Moody AFB is the month with an average annual temperature of 68 degrees Fahrenheit, 62.35 percent relative humidity, and 29.78 inches of mercury.

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APPENDIX B

THE AICUZ CONCEPT, PROGRAM, METHODOLOGIES, AND POLICIES

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APPENDIX B. THE AICUZ CONCEPT, PROGRAM, METHODOLOGIES, AND POLICIES

B.1 CONCEPT

Federal legislation, national sentiment, and other external forces, which directly affect the U.S. Department of Defense (DoD) mission, serve greatly to increase the role of the DoD in environmental and planning issues. Problems of airfield and range encroachment from incompatible land uses surrounding installations, as well as air and water pollution and socioeconomic impact, require continued and intensified DoD involvement. The nature of these problems dictates direct DoD participation in comprehensive community and land use planning. Effective, coordinated planning that bridges the gap between the Federal Government and the community requires establishment of good working relationships with local citizens, local planning officials, and state and Federal officials. This 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 noise exposure and accident potential associated with flying activities and
- Prevent degradation of the capability of DoD to achieve its mission by promoting compatible land use planning.

The land use guidelines developed herein are a composite of a number of other land use compatibility studies that have been refined to fit the Moody Air Force Base (AFB) aviation environment.

B.2 PROGRAM

Installation commanders establish and maintain active programs to promote the maximum feasible land use compatibility between air installations and neighboring communities. The programs require that all appropriate government bodies and citizens be fully informed whenever AICUZ or other planning matters affecting the installation are under consideration. This includes positive and 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-level reduction (NLR) measures that are being used; and
- 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/or techniques to minimize the noise impact on populated areas. This must be done without jeopardizing safety or operational effectiveness.

B.3 METHOD

The AICUZ Program consists of land areas upon which certain land uses may obstruct the airspace or otherwise be hazardous to aircraft operations and land areas that are exposed to the health, safety, or welfare hazards of aircraft operations. The AICUZ Program includes:

- Accident Potential Zones (APZs) and Clear Zones (CZs) based on past U.S. Air Force (USAF) aircraft accidents and installation operational data (see Appendix C);
- Noise zones produced by the computerized modeling of the noise created by aircraft operations and munitions training (see Section 3.1.1 of this AICUZ Study); and
- The area designated by the Federal Aviation Administration and the USAF for purposes of height limitations in the approach and departure zones of the base (see Appendix D).

The APZ, CZ, and noise zone are the basic building blocks for land use planning with AICUZ data. Compatible land uses are specified for these zones (see Table 3–2 in Section 3 of this AICUZ Study), and recommendations on building materials and standards to reduce interior noise levels inside structures are provided in Appendix E.

According to DoD policy, ownership in fee or of an appropriate restrictive use easement within the CZ is preferred, unless state and local government development regulations will clearly have long-term effectiveness. Moody AFB either owns or holds restrictive easements on most of the property in the CZs (see Section 3.1.3 of this AICUZ Study). Compatible land use controls for the remaining airfield area of influence should be accomplished through the community land use planning processes.

B.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 standard by which all land use planning and control actions are evaluated. Moody AFB recommends the following policies be considered for incorporation into the comprehensive plans of agencies in the vicinity of the installation's area of influence.

B.4.1 Policy 1

To promote the public health, safety, peace, comfort, convenience, and general welfare of the inhabitants in the airfield area of influence, 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 destruction or impairment of the airfield and the public investment therein;
- Enhance the quality of living in the areas affected; and
- Protect the general economic welfare by restricting incompatible land use.

B.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; and
- Adopt appropriate ordinances to implement airfield area of influence land use plans.

B.4.3 Policy 3

Within the boundaries of the CZ, certain land uses are inherently incompatible. The following land uses are not in the public 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; and
- Uses that provide for structures within 10 feet of aircraft approach-departure and/or transitional surfaces.

B.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 (schools, churches, etc.)
- Recreation buildings and structures

B.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.

B.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 NLR guidelines (see Appendix E) for new construction should be implemented to permit certain uses where they would otherwise be prohibited.

B.4.7 Policy 7

Land use planning and zoning in the airfield area of influence cannot be based solely on aircraft-generated effects. Allocation of land used within the AICUZ guidelines 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

Each runway end at Moody AFB has a 3,000 foot by 3,000 foot CZ and two APZs (see Appendix C). 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 the U.S. Congress to authorize and appropriate funds for the necessary real property interests in this area to prevent incompatible land uses.

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 acceptable.

APZ II is less critical than APZ I, but still has potential for accidents. APZ II is 3,000 feet wide by 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 multistory buildings, places of assembly (e.g., theaters, churches, schools, restaurants), 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.

B.5 BASIC LAND USE COMPATIBILITY

Research on aircraft accident potential, noise, and land use compatibility is ongoing at a number of Federal and other agencies. These and all other 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 local conditions such as:

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

These basic guidelines cannot resolve all land use compatibility questions, but they do offer a reasonable framework within which to work.

B.6 ACCIDENT POTENTIAL

Land use guidelines (see Section 3.2) for the Class B runway CZs and APZs (see Section 3.1.3) 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 recommended. The risk outside APZ I and APZ II, but within the 10-nautical-mile radius area, is significant, but is acceptable if sound engineering and planning practices are followed.

Land use guidelines for APZs I and II have been developed. The main objective has been to restrict all people-intensive uses because there is greater risk in these areas. The basic guidelines aim at prevention of uses that:

- Have high residential density characteristics;
- Have high labor intensity;
- Involve aboveground explosives, fire, toxic, corrosive, or other hazardous characteristics;
- Promote population concentrations;
- Involve utilities and services required for area-wide population, where disruption would have an adverse impact (telephone, gas, etc.);
- Concentrate people who are unable to respond to emergency situations, such as children, elderly, disabled, etc.; and
- Pose hazards to aircraft operations.

There is no question that these guidelines are relative. Ideally, there should be no people-intensive uses in either of these APZs. The free market and private property systems prevent this where there is a demand for land development. To go beyond these guidelines, however, substantially increases risk by placing more people in areas where there may ultimately be an aircraft accident.

B.7 AIRCRAFT NOISE

Nearly all studies analyzing aircraft noise and residential compatibility recommend no residential uses in noise zones above 75 decibels (dB) day–night average sound level (DNL). Usually, no restrictions are recommended below noise zone 65 dB DNL. There is currently no consensus on areas with noise levels of 65–74 dB DNL. These areas may not qualify for Federal mortgage insurance in residential categories according to U.S. Department of Housing and Urban Development (HUD) noise regulations found in Title 24 of the *Code of Federal Regulations*, Part 51B. In many cases, HUD approval requires noise attenuation measures, the Regional Administrator's concurrence, and an environmental impact statement. The U.S. Department of Veterans Affairs also has airfield noise and accident restrictions that apply to its home loan guarantee program. Whenever possible, residential land use should be located in areas with noise levels below 65 dB DNL according to USAF land use recommendations. Residential buildings within the 65–74 dB DNL noise contour should contain NLR in accordance with the USAF land use compatibility guidelines in the 2014 Moody AFB AICUZ Study (see Table 3–2).

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

The transportation, communications, and utilities categories have a high 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. Where 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 noise levels of 70 dB DNL; however, they are generally incompatible above 80 dB DNL. Between 70 and 79 dB DNL, NLR 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 in areas with noise levels below 65 dB DNL (a USAF land use recommendation), or else provide adequate NLR.

Although recreational use has often been recommended as compatible with high noise levels, recent research has resulted in a more conservative view. Above 75 dB DNL, noise becomes a factor that 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.

With the exception of forestry activities and livestock farming, uses in the resources production, extraction, and open space category are compatible almost without restrictions.

APPENDIX C

CLEAR ZONES AND ACCIDENT POTENTIAL ZONES

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APPENDIX C. CLEAR ZONES AND ACCIDENT POTENTIAL ZONES

C.1 GUIDELINES FOR ACCIDENT POTENTIAL

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 do happen.

When the Air Installation Compatible Use Zone (AICUZ) Program began, there were no current comprehensive studies on accident potential. To support the program, the U.S. Air Force (USAF) completed a study of USAF aircraft accidents that occurred between 1968 and 1972 within 10 nautical miles of airfields. The study of 369 accidents revealed that 75 percent of aircraft 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 to either side of the runway centerline), extending from the runway threshold along the extended runway centerline for a distance of 15,000 feet. The USAF updated these studies and this information is presented later in this section.

The Clear Zone (CZ), Accident Potential Zone (APZ) I, and APZ II were established based on crash patterns. 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 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 in an area of further reduced accident potential. Please note that the CZ and APZ for a Landing Zone are designed based on different criteria.

Research in accident potential conducted by the USAF 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 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.

C.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.

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

Because 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 that 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 widths of 2,000, 3,000, and 4,000 total feet. Table C–1 reflects the accident location analysis.

Table C–1 Accident Location Analysis (1968–1972)

Length From Both Ends of Runway (feet)	Width of Runway Extension (feet)		
	2,000	3,000	4,000
Percentage 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 Percentage 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 C–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, and then continues at about the same rate of increase to 15,000 feet, where it levels off rapidly. The accident location analysis also indicates 3,000 feet as the optimum runway extension width and the width that includes the maximum percentage of accidents in the smallest area.

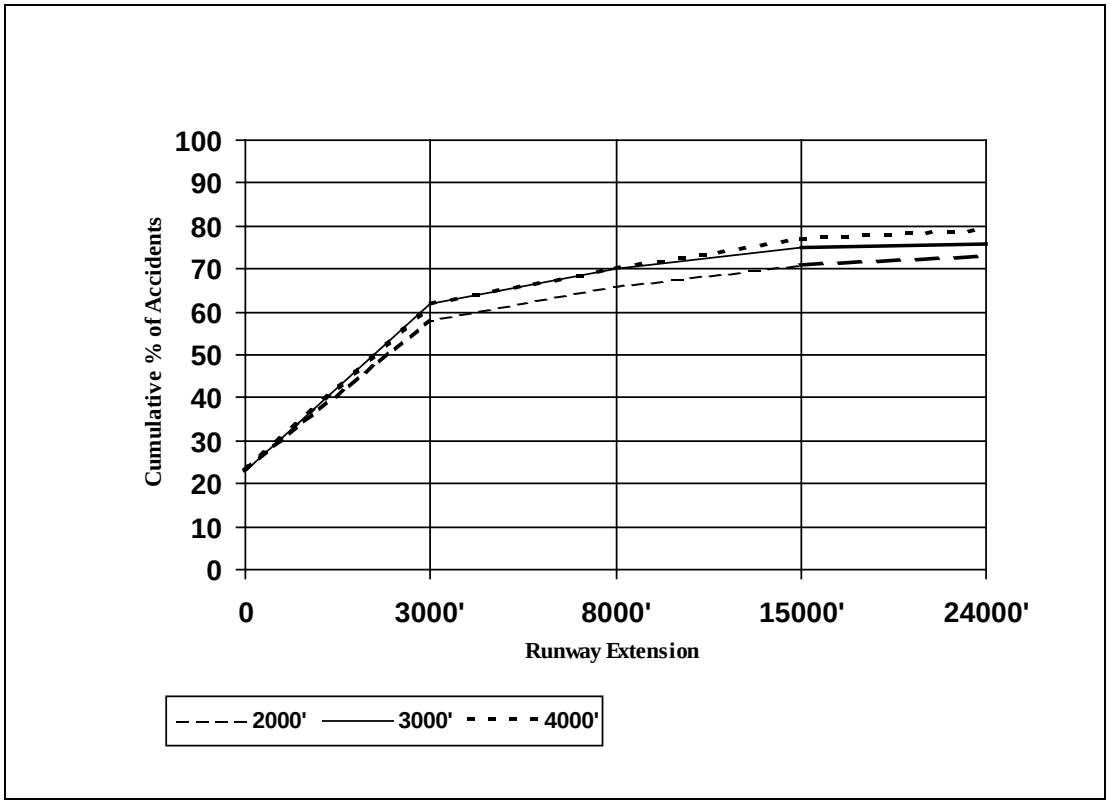

Figure C–1 Distribution of U.S. Air Force Aircraft Accidents (369 Accidents, 1968–1972)

Using the optimum runway extension width of 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 accident statistics for the 1968–1972 study are shown in Figure C–2.

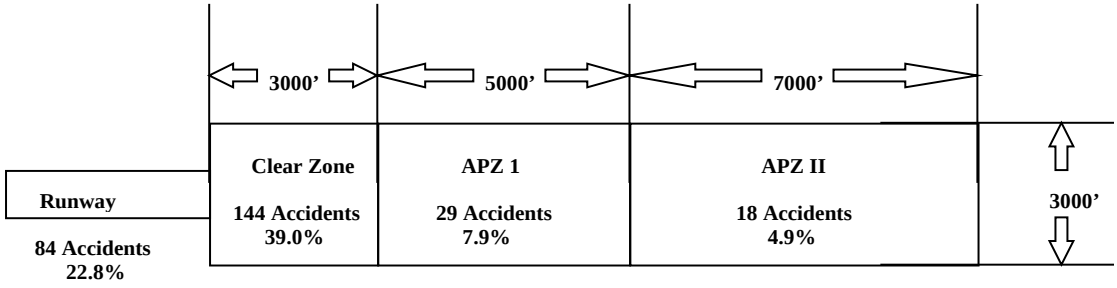

Figure C–2 U.S. Air Force Aircraft Accident Data (369 Accidents, 1968–1972)

The original study was updated to include accidents through September 1995. This updated study includes 838 accidents during the 1968–1995 period. Using the optimum runway extension width of 3,000 feet, the accident statistics of the updated study are shown in Figure C–3.

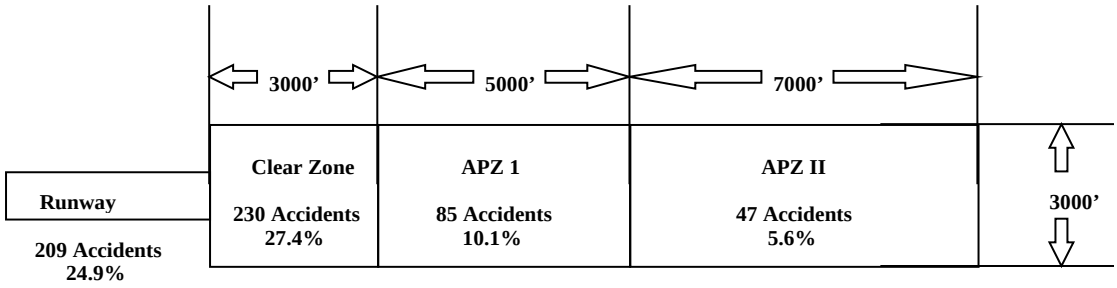

Figure C–3 U.S. Air Force Aircraft Accident Data (838 Accidents, 1968–1995)

Using the designated zones and accident data, it is possible to calculate a ratio of percentage of accidents to percentage of area size. These ratios indicate the CZ, with the smallest area size and the highest number of accidents, has the highest ratio, followed by the runway and adjacent area, APZ I, and then APZ II. Table C–2 reflects this data. Analysis shows that the cumulative changes evident in accident location through July 1995 reconfirm the dimensions of the CZs and APZs.

Table C–2 Ratio of Percentage of Accidents to Percentage of Area (U.S. Air Force Accident Data, 1968–1995)

Zone	Area[1] (Acres)	Number[2] of Accidents	Accident Per Acre	Percentage of Total Area	Percentage of Total Accidents	Ratio:[3] % Accidents to % Area
Runway Area	487	209	1 Per 2.3 acres	0.183	24.9	136
Clear Zone	413	230	1 Per 1.8 acres	0.155	27.4	177
APZ I	689	85	1 Per 8.1 acres	0.258	10.1	39
APZ II	964	47	1 Per 20.5 acres	0.362	5.6	16
Other Area	264,053	267	1 Per 989 acres	99.042	31.9	0.3

[1] Area includes land within 10 nautical miles of runway.

[2] Total number of accidents is 838 (through 1995).

[3] Percentage total accidents divided by percentage total area.

C.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 used weighted averages of impact areas for accidents occurring only in the approach and departure phase to determine the following average impact areas:

Average Impact Areas for Approach and Departure Accidents

- Overall Average Impact Area: 5.06 acres
- Fighter, Trainer, and Miscellaneous Aircraft: 2.73 acres
- Heavy Bomber and Tanker Aircraft: 8.73 acres

C.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.

- 25 percent occurred on the runway or within an area extending 1,000 feet out from each side of the runway.
- 27 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.
- 15 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 debris impact areas. The size of the impact areas were:

- 5.06 acres overall average.
- 2.73 acres for fighters and trainers.
- 8.73 acres for heavy bombers and tankers.

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APPENDIX D

HEIGHT AND OBSTRUCTION CRITERIA

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APPENDIX D. HEIGHT AND OBSTRUCTION CRITERIA

D.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 and/or man-made objects that extend more than 500 feet above the ground at the site of the structure.

D.2 EXPLANATION OF TERMS

The following will apply:

Controlling Elevation. Whenever surfaces or planes within the obstructions criteria overlap, the controlling (or governing) elevation becomes that of the lowest surface or plane.

Runway Length. Moody Air Force Base (AFB) has two runways, and 17,300 feet of pavement designed and built for sustained aircraft landings and takeoffs.

Established Airfield Elevation. The elevation, in feet above mean sea level, for Moody AFB is 233 feet.

Dimensions. All dimensions are measured horizontally unless otherwise noted.

D.3 PLANES AND SURFACES

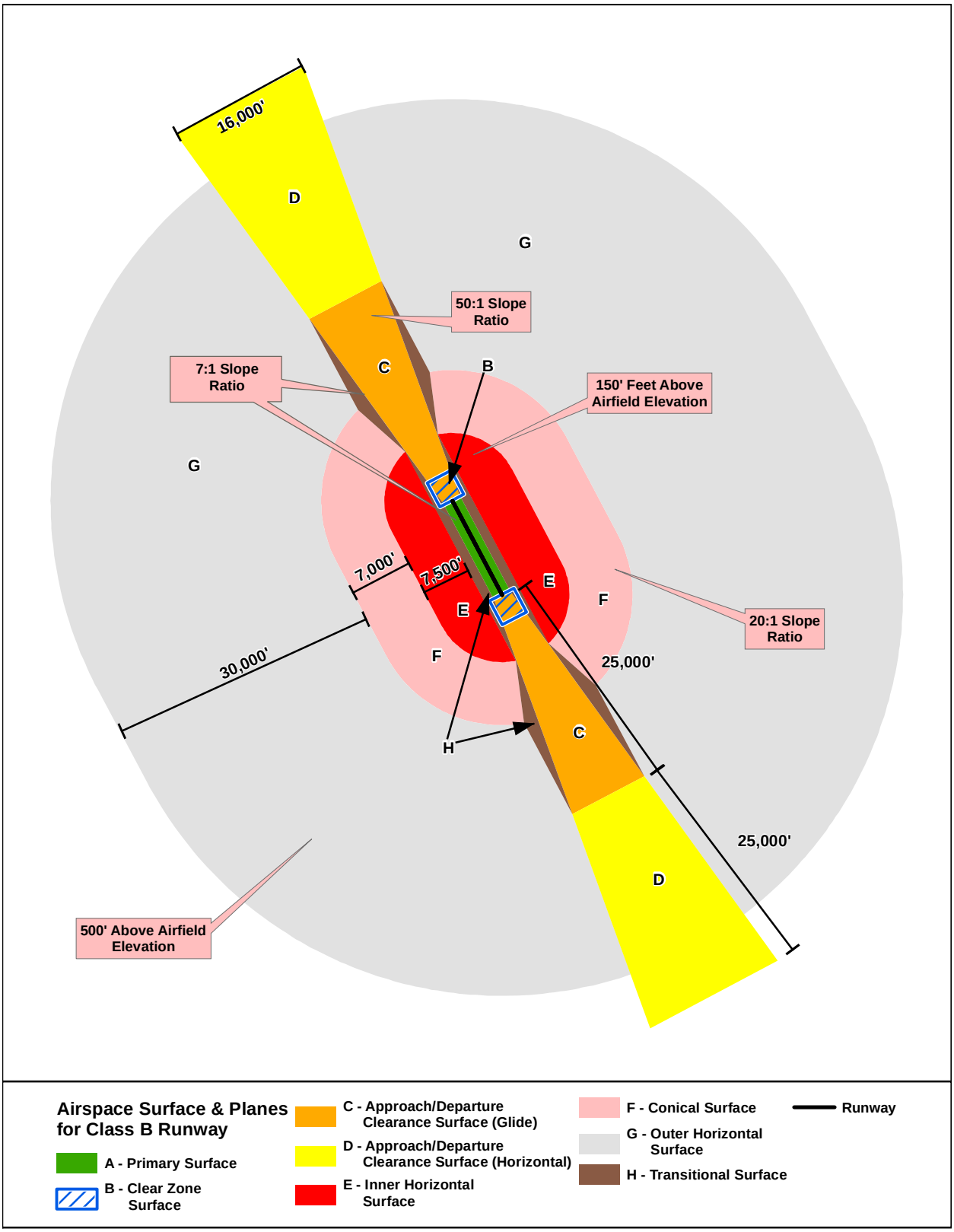
Definitions are as follows: (see Figures D–1, D–2, and D–3)

Primary Surface. This surface defines the limits of the obstruction clearance requirements in the immediate vicinity of the landing area. The primary surface comprises surfaces of the runway, runway shoulders, and lateral safety zones and extends 200 feet beyond the runway end. The width of the primary surface for a single class “B” runway is 2,000 feet, or 1,000 feet on each side of the runway centerline. For a Landing Zone (LZ), the primary surface begins at the end of the runway, extends to the Clear Zone (CZ), and is 180 feet wide.

Clear Zone Surface. This surface defines the limits of the obstruction clearance requirements in the vicinity contiguous to the end of the primary surface. The length and width (for a single runway) of a CZ surface at Runway 18/36 at Moody AFB is 3,000 feet by 3,000 feet.

Approach-Departure Clearance Surface. This surface is symmetrical about the runway centerline extended, begins as an inclined plane (glide angle) 200 feet beyond each end of the primary surface of the centerline elevation of the runway end, and extends for 50,000 feet. 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. For an LZ, the approach-departure clearance surface starts at the end of the primary surface and slopes upward with a 20:1 slope. The slope length is 10,500 feet, with a width of 500 feet at the beginning of the slope and a width of 2,500 feet at the 10,500-foot mark.

Inner Horizontal Surface. This surface is a plane, oval in shape at a height of 150 feet above the established airfield elevation. It 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.



Source of Airspace & Planes: Federal Aviation Administration Regulation Part 77, Subpart C.

Figure D–1 Airspace Control Surface Plan

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 located 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 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 and/or prohibited:

- Uses that release into the air any substance that would impair visibility or otherwise interfere with the operation of aircraft (i.e., steam, dust, or smoke)
- 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 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, or the growing of certain vegetation
- Uses that provide for structures within 10 feet of aircraft approach-departure and/or transitional surfaces

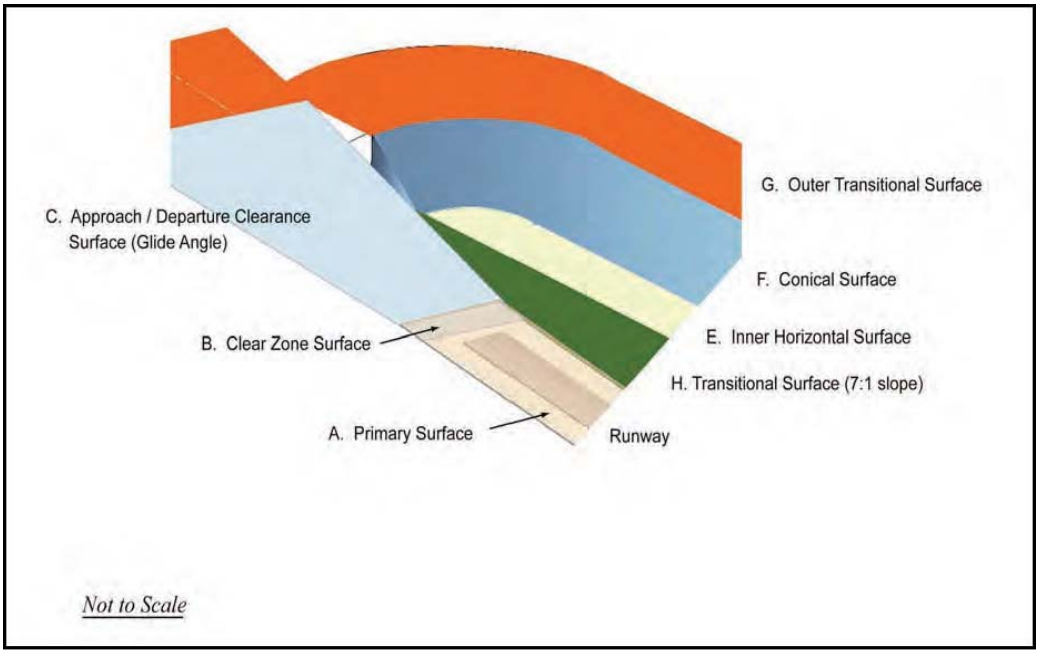


Figure D–2 Three-Dimensional View of 14 CFR 77 Imaginary Surfaces

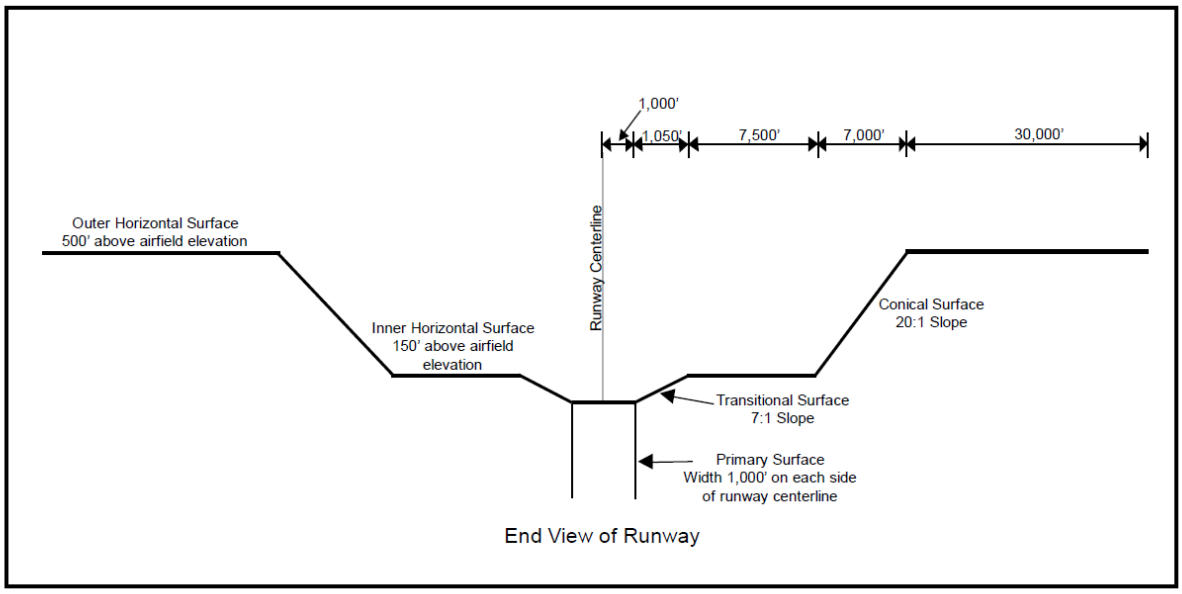


Figure D–3 Cross-Section View of 14 CFR 77 Imaginary Surfaces

D.4 HEIGHT RESTRICTIONS

City/county agencies involved with approvals of permits for construction should require developers to submit calculations that show that projects meet the height restriction criteria of Unified Facilities Code 03-260-01, *Airfield and Heliport Planning and Design*, as described, in part, by the information contained in this section. For a more complete description of airspace and control surfaces for Class A and Class B runways, refer to Unified Facilities Code 03-260-01, *Airfield and Heliport Planning and Design*.

APPENDIX E

NOISE-LEVEL REDUCTION GUIDELINES

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APPENDIX E. NOISE-LEVEL REDUCTION GUIDELINES

Wyle Labs completed a study for the Naval Facilities Engineering Command in April 2005, titled *Guidelines for Sound Insulation of Residences Exposed to Aircraft Operations* (U.S. Navy 2005). The study provides in-depth noise-level reduction guidelines.

Copies of this study are available online at http://www.fican.org/pdf/Wyle_Sound_Insulation.pdf.

E.1 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 45 A-weighted decibels (dBA) or lower. 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 values, 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. Lowndes, Lanier, and Berrien counties currently utilize the 2006 International Building Code with Georgia Amendments. Provisions for building code modifications, to include sound insulation from exterior noise sources, require local legislation and enforcement by building inspectors. Additional sound insulation can slightly increase the cost of the construction but provide significant benefits.

Building codes, residential standards, and zoning within the Moody AFB environs should be modified to address Air Installation Compatible Use Zone (AICUZ) development concerns with respect to the AICUZ Program and the noise zones presented in this AICUZ Study. The Lowndes County Unified Land Development Code requires that all new development, redevelopment, and building alterations or additions within the Noise Impact Area of the Moody Activity Zoning District (see Section 4.4.1) meet noise attenuation requirements of the AICUZ Study. Strict enforcement of these ordinances by local governments can effectively limit incompatible land uses.

The 2005 U.S. Navy Guidelines for Sound Insulation of Residences Exposed to Aircraft Operations (U.S. Navy 2005) provides a comprehensive overview of sound insulation techniques for homeowners and builders who are concerned about modifying an existing residence or constructing a new residence that incorporates sound insulation principles. A typical home built with standard design and materials might provide 20 to 30 dBA of noise-level reduction (NLR) from military aircraft noise exposure. In contrast, an acoustically well-insulated home can provide 30 to 35 dBA of NLR. Providing more than 35 to 40 dBA of NLR is not usually practical for a residence.

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