JUNE 2024

2024 AIR INSTALLATIONS COMPATIBLE USE ZONES STUDY

SHAW AIR FORCE BASE

SUMTER, SC

PREPARED FOR

U.S. ARMY CORPS OF ENGINEERS
Southwestern Division Regional Planning and Environmental Center

AIR FORCE CIVIL ENGINEERING CENTER
Shaw Air Force Base

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DEPARTMENT OF THE AIR FORCE
20th FIGHTER WING (ACC)
SHAW AIR FORCE BASE SOUTH CAROLINA

MEMORANDUM FOR AREA GOVERNMENTS

FROM: COMMANDER, SHAW AIR FORCE BASE
517 LANCE AVE., STE 128
SHAW AFB SC 29152

SUBJECT: Air Installations Compatible Use Zones (AICUZ) Study

1. The 2024 AICUZ Study for Shaw Air Force Base (AFB) is an update of the AICUZ Study dated 2013. The Air Force initiated the update to include changes related to the anticipated Combat Air Forces Adversary Air (ADAIR) mission. It is a reevaluation of military operational noise and safety zones. The Air Force provides this AICUZ study to aid in the development of local planning mechanisms that will protect the public health, safety, and welfare as well as preserve the operational capabilities of Shaw AFB.

2. The AICUZ Study contains a description of the affected area around the installation. It outlines the location of runway Clear Zones (CZs), Accident Potential Zones (APZs), operational noise footprint and provides recommendations for development that is compatible with military operations. It is our recommendation that local governments incorporate these recommendations into community plans, zoning ordinances, subdivision regulations, building codes and other related documents.

3. This update provides noise contours based on the Day-Night Average Sound Level (DNL) metric and utilizes a planning noise contour. Long-range planning by local land use authorities involves strategies to influence present and future uses of land. Due to the long-range nature of planning, the Air Force provides planning contours in the form of noise contours based on reasonable projections of future missions and operations. AICUZ studies using planning contours provide a description of the long-term (5 to 10-year) aircraft noise environment for projected aircraft operations that is more consistent with the planning horizon used by state, tribal, regional and local planning bodies.

4. We greatly value the positive relationship Shaw 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 night flying and avoiding flights over heavily populated areas. The Air Force appreciates and values the cooperation of all community stakeholders in the collaborative implementation of the recommendations and guidelines presented in this AICUZ Study update.

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KEVIN D. HICOK, Colonel, USAF
Commander

Victory By Valor

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ABBREVIATIONS AND ACRONYMS

ACD	Airfield Compatibility District
ADAIR	Adversary Air
AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
AFFSA	Air Force Flight Standards Agency
AFH	Air Force Handbook
AFI	Air Force Instruction
AGL	Above Ground Level
AICUZ	Air Installations Compatible Use Zones
Air Force	United States Air Force
APZ	Accident Potential Zone
ATC	Air Traffic Control
AWACS	Airborne Warning and Control System
BASH	Bird/Wildlife Aircraft Strike Hazard
C2BM	Command and Control Battle Management
CFR	Code of Federal Regulations
CZ	Clear Zone
dB	Decibel
dBA	A-weighted Decibel
DDZ	Density Dispersion Zone
DNL	Day-Night Average Sound Level
DoD	Department of Defense
DoDI	Department of Defense Instruction
EA	Environmental Assessment
ECR	Electronic Combat Range
EMI	Electromagnetic Interference
EPA	United States Environmental Protection Agency
FAA	Federal Aviation Administration
FAR	Floor Area Ratio
FHWA	Federal Highway Administration
GIS	Geographic Information System
HAFZ	Hazards to Aircraft Flight Zone
Hz	Hertz
JLUS	Joint Land Use Study
MAJIC	Midlands Area Joint Installation Consortium
MBTF	Military Base Task Force
MSL	Mean Sea Level
MPUD	Master and Planned Unit Development
NA	Noise Attenuation
NAF	Numbered Air Force
NASA	National Aeronautics and Space Administration
NATO	North Atlantic Treaty Organization
NEPA	National Environmental Policy Act of 1969
NVG	Night Vision Goggles
NLR	Noise Level Reduction
NM	Nautical Mile
PA	Public Affairs
PUD	Planned Unit Development
RCD	Range Compatibility District
REPI	Readiness and Environmental Protection Integration
SFO	Simulated Flame-Out
SLUCM	Standard Land Use Coding Manual
SUA	Special Use Airspace
T&G	Touch-and-Go
TDR	Transfer of Development Rights
TDY	Temporary Duty
UAS	Unmanned Aircraft Systems
USCENTCOM	United States Central Command
VFR	Visual Flight Rules

1

1. INTRODUCTION

This 2024 Shaw Air Force Base (AFB) Air Installations Compatible Use Zones (AICUZ) Study identifies and evaluates noise and safety impacts associated with projected flying operations at the base. This update presents and documents changes since the previous study was released in 2013. It reaffirms the United States Air Force's policy of promoting public health, safety, and general welfare in areas surrounding an air installation while seeking development that is compatible with the defense mission. This study presents changes in flight operations since the previous study and provides planning noise contours and recommendations for compatible land use.

1.1 AICUZ PROGRAM

Military installations attract development—people who work on the installation want to live nearby, while others want to provide services to installation employees and residents. When incompatible development occurs near an installation or training area, affected parties within the community may seek relief through political channels that could restrict, degrade, or eliminate capabilities necessary to perform the defense mission. In the early 1970s, the Department of Defense (DoD) established the AICUZ Program. The goal of the program is to protect the health, safety, and welfare of those living and working near air installations while sustaining the Air Force's operational mission. The Air Force accomplishes this goal by promoting proactive, collaborative planning for compatible development to sustain mission and community objectives.

The AICUZ Program recommends that local land use agencies incorporate noise zones, Clear Zones (CZs), Accident Potential Zones (APZs), and Hazards to Aircraft Flight Zones (HAFZ) associated with military operations into local community planning programs to maintain the airfield's operational requirements while minimizing the impact to residents in the surrounding community. Cooperation between military airfield planners and community-based counterparts serves to increase public awareness of the importance of air installations and the need to address mission requirements and associated noise and risk factors in the public planning process. As the communities that surround airfields grow and develop, the Air Force has the responsibility to communicate and collaborate with local governments on land use planning, zoning, and similar matters that could affect the installation's operations or missions. Likewise, the Air Force has a responsibility to understand and communicate potential impacts that new and changing missions may have on the local community.

1.2 SCOPE AND AUTHORITY

1.2.1 SCOPE

The Air Force provides Shaw AFB's CZs, APZs, and noise zones associated with the airfield's runways to the local communities, along with recommendations for compatible land use near the installation, for incorporation into comprehensive plans, zoning ordinances, subdivision regulations, building codes, and other related documents.

1.2.2 AUTHORITY

Two documents provide authority for the Air Force AICUZ Program:

- *Air Force Instruction (AFI) 32-1015, Integrated Installation Planning, implements Department of Defense Instruction (DoDI) 4165.57, Air Installations Compatible Use Zones,* and applies to all Air Force installations with active runways located in the United States and its territories. This AFI defines the program objectives and responsibilities.
- *Air Force Handbook (AFH) 32-7084, AICUZ Program Manager's Guide,* provides installation AICUZ Program Managers with specific guidance concerning the organizational tasks and procedures necessary to implement the AICUZ Program. It is written in a "how to" format and includes the land use compatibility tables used in AICUZ studies.

1.3 PREVIOUS AICUZ EFFORTS AND RELATED STUDIES

Previous studies relevant to this AICUZ Study include:

- Sha*w AFB Air Installation Compatible Use Zone Update (2013).*
- *2016 Sumter-Shaw AFB Joint Land Use Study (JLUS).*
- *Environmental Assessment (EA) for Combat Air Forces Adversary Air (ADAIR), Shaw AFB, South Carolina (2024).*

1.4 CHANGES THAT REQUIRE AN AICUZ STUDY UPDATE

This 2024 Shaw AFB AICUZ Study replaces the 2013 report. It provides the installation's flight tracks, CZs, APZs, and noise contour information, and presents the most accurate representation of anticipated installation operations. With this information, the AICUZ Program allows surrounding communities to consider both current and potential activities when making land use decisions.

As the DoD aircraft fleet mix and training requirements change over time, flight operations and the resulting noise contours change as well. These changes can drive an AICUZ Study update. Additionally, non-operational changes, such as noise modeling methods and a local community's land use, may also require the need for an update. The primary changes occurring since the previous Shaw AFB AICUZ Study that necessitated this update include:

- EA for Combat Air Forces ADAIR, Shaw AFB, South Carolina. Pursuant to the National Environmental Policy Act (NEPA), the Air Force is studying the potential impacts of the proposed addition of the Combat Air Forces ADAIR mission at Shaw AFB. The proposed operations include around 12 aircraft that would conduct about 3,500 operations annually. A variety of foreign aircraft would be used to simulate ADAIR operations. All ADAIR support activities would take place on the installation, and operations would take place within the same Special Use Airspace (SUA) that Shaw AFB currently uses. The beddown of the ADAIR aircraft is expected in 2024.
- Increase or reduction in air operations. The number of average annual operations are expected to increase slightly in the next few years in support of the new ADAIR mission and existing missions at Shaw AFB.
- Change in day/night operational mix. The number of night missions are expected to increase slightly in the next few years in support of national defense.
- Changes to planning noise contours. Due to the anticipated operational changes at Shaw AFB, the operational noise contours have changed since the 2013 AICUZ Study was completed.
- Changes to AICUZ AFI and AFH. *AFI 32-1015, Integrated Installation Planning, and AFH 32-7084, AICUZ Program Manager's Guide,* were published after the *2013 Shaw AFB AICUZ Study* was released.


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2. SHAW AFB, SOUTH CAROLINA

2.1 LOCATION

Shaw AFB is located in Sumter County, South Carolina, approximately 40 miles east of Columbia and 8 miles west of downtown Sumter. The City of Sumter is the county seat of Sumter County and is the closest city to the installation. The installation has an area of 3,336 acres. The base is included in "The Midlands of South Carolina," which is a region characterized by both rural and urban areas; the region had a population of about 926,000 at the 2020 census.

Location of Shaw AFB within South Carolina

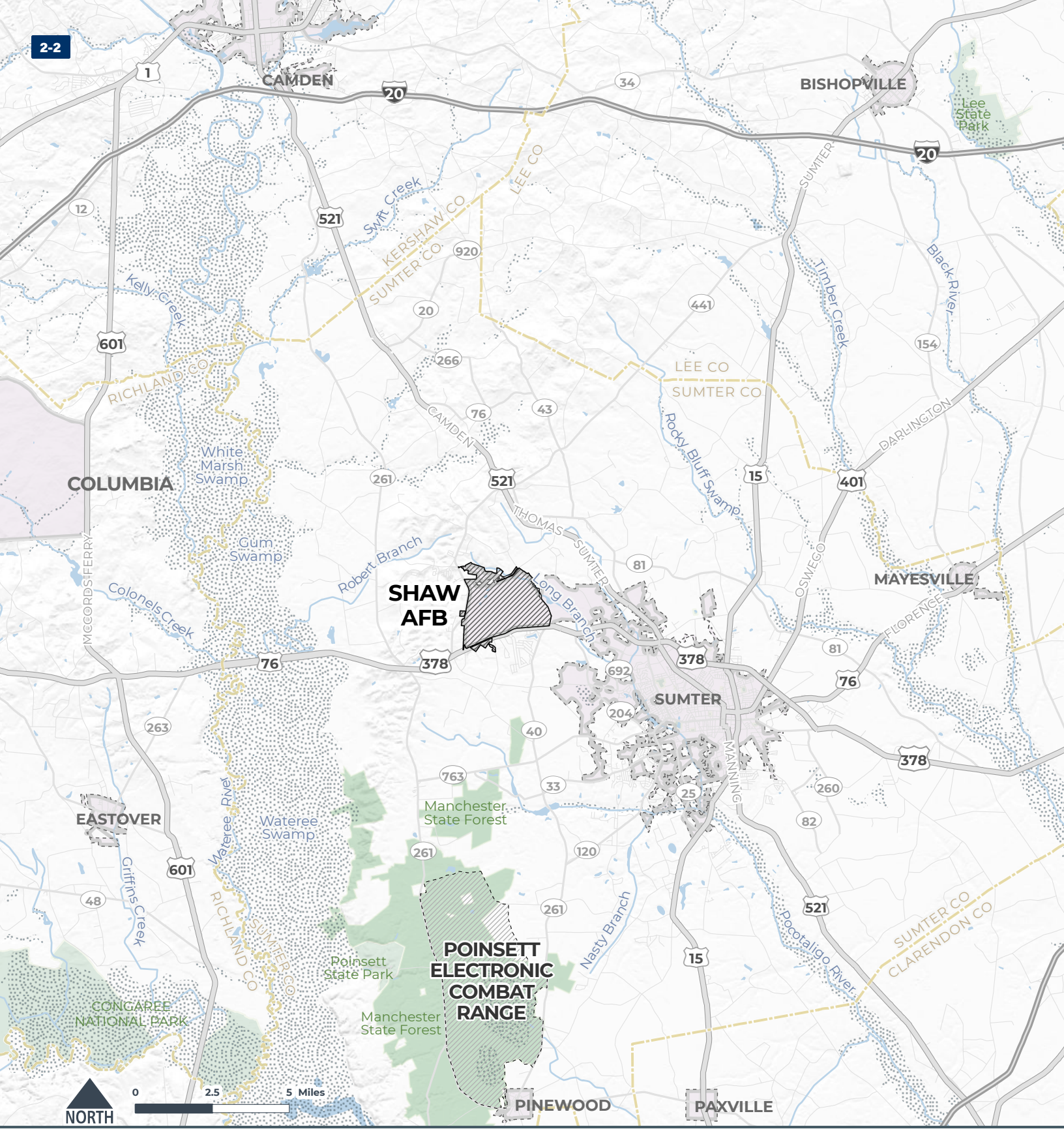


FIGURE 2-1
Shaw Regional Setting

2.2 HISTORY

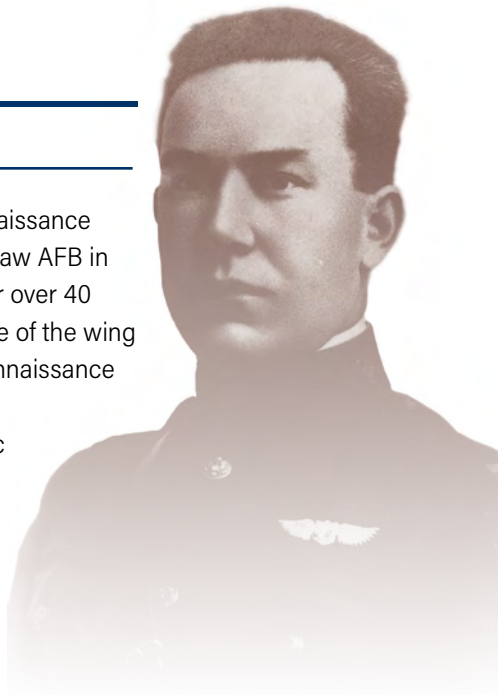
Named after 1st Lt. Ervin David Shaw, Shaw AFB (originally Shaw Airfield) was established as a pilot training and flight school in 1941. As time progressed, the airfield adapted to increased demand for pilots, training nearly 9,000 pilots during World War II. Shaw Airfield also served as a German prisoner-of-war camp during the war.

In 1948, the U.S. Air Force renamed the airfield to Shaw Air Force Base and designated it as an official U.S. Air Force installation.

After World War II, it transitioned from a training facility to a strategic hub for tactical and combat operations. During the Cold War, the base became a vital part of the United States' strategic defense.

The base also played a pivotal role in the Vietnam conflict and the Gulf War, providing reconnaissance patrols and operations support during these conflicts.

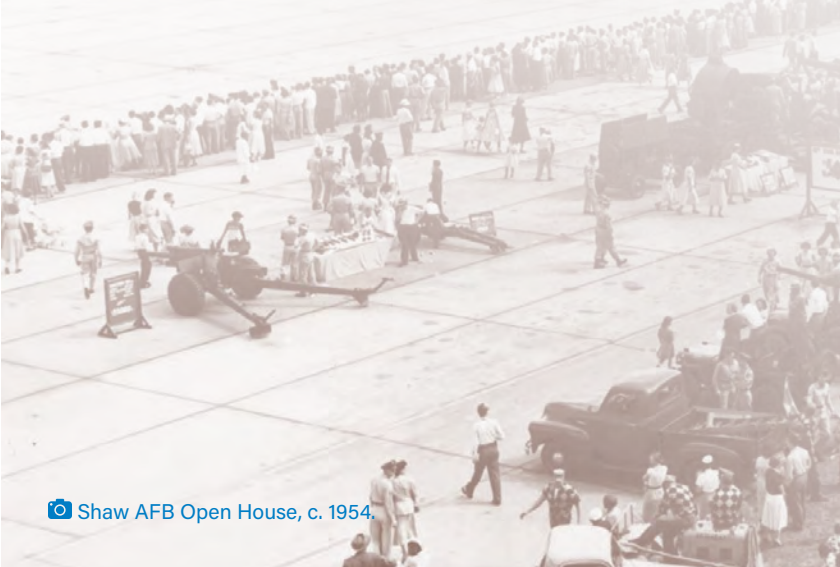
The 363rd Tactical Reconnaissance Wing was transferred to Shaw AFB in 1951 and remained there for over 40 years. The primary objective of the wing was to conduct aerial reconnaissance missions, encompassing photography and electronic intelligence gathering. These missions aimed to provide critical support to the operations of American and Allied ground forces. Over the years, Shaw AFB also hosted many other missions: the 161st Tactical Reconnaissance Squadron, the 432nd Tactical Reconnaissance Wing, the 4411th Combat Crew Training Group, and the 66th Tactical Reconnaissance Wing, among others.



1ST LT. ERVIN DAVID SHAW

1st Lt. Ervin David Shaw died in aerial combat over France on July 9, 1918, during World War I, but not before downing two German warplanes.

In 1993, Shaw AFB became the established headquarters for the 20th Fighter Wing. Some of its missions have included supporting the North Atlantic Treaty Organization (NATO) in the Kosovo War and enforcing no-fly zones over the Middle East. Following the aftermath of the September 2001 terrorist attacks, Shaw AFB deployed personnel and aircraft to actively engage against Taliban and Al Qaeda forces in Afghanistan. Today, Shaw AFB has about 7,200 active-duty members and employs about 1,000 civilians.



Shaw AFB Open House, c. 1954.

2.3 MISSION

Shaw AFB is the host site for the 20th Fighter Wing, which is responsible for training, equipping, and deploying highly skilled Airmen and advanced aircraft to provide combat ready airpower. Its mission includes the following aspects: air superiority, global precision strike, combat support, building partnerships, counterterrorism, and deterrence.

2.4 HOST AND TENANT ORGANIZATIONS

20th FIGHTER WING

As the host organization for Shaw AFB, **the 20th Fighter Wing** is assigned to Air Combat Command's Fifteenth Air Force and provides combat-ready airpower and support operations essential to the defense of the United States. Established in 1947, the wing moved to several different air bases before returning as the host unit at Shaw in 1994. The 20th Fighter Wing currently flies the F-16C Fighting Falcon and is tasked with conducting and providing close air support, counter-air operations in pursuit of global combat objectives, and base functions such as security, communications, facilities management, personnel, and materiel. The wing is composed of four groups: Operations, Maintenance, Mission Support, and Medical.

20th OPERATIONS GROUP

The 20th Operations Group employs about 79 F-16C fighter aircraft in conventional and anti-radiation suppression of enemy air defenses, strategic attack, counter air, air interdiction, joint maritime operations, and combat search-and-rescue missions. The 55th, 77th, and 79th Fighter Squadrons, each equipped with F-16 aircraft, maintain a mission-ready, multi-role capability to mobilize, deploy, and tactically employ forces worldwide. Their primary duties encompass providing personnel for conventional air-to-surface, air superiority, suppression of enemy air defenses, destruction of enemy air defenses, and maritime operations. The 20th Operations Support Squadron is responsible for enabling the 20th Fighter Wing's missions through airfield operations, weapons and training, current operations, intelligence, and weather.

20th MAINTENANCE GROUP

The 20th Maintenance Group is composed of the 20th Component Maintenance Squadron and the 20th Equipment Maintenance Squadron. These squadrons support a combat-ready wing and three combat-ready F-16C Fighting Falcon squadrons. The 20th Component Maintenance Squadron services jets engines, accessories, avionics components and systems, and manages a test, measurement, and diagnostic equipment laboratory. The 20th Equipment Maintenance Squadron maintains aerospace ground equipment, armament systems, and munitions for worldwide deployment. It also performs aircraft phase inspections, corrosion control, engine oil analysis, nondestructive inspections, and munitions storage and accountability, in addition to fabricating parts and tools.

FIFTEENTH AIR FORCE

Fifteenth Air Force (15 AF), headquartered at Shaw AFB, was activated in 20 August 2020. It is a Numbered Air Force (NAF) under Air Combat Command that trains Airmen to deliver combat airpower worldwide and provides a light, lean, and agile Air Force, Joint, or Combined Task Force Headquarters. The 15 AF Headquarters maintains its capability to serve as an operational headquarters that is ready to deploy, and as a force provider, the headquarters is at the core of many force structural changes that will continue to advise, assist, and advocate to ensure the readiness of subordinate units. The 15 AF is responsible for ensuring the agile combat support capabilities of 13 wings, including the 20th Fighter Wing at Shaw AFB, and three direct reporting units. These units encompass about 600 aircraft and more than 47,000 active-duty and civilian members.

NINTH AIR FORCE

AIR FORCES CENTRAL

Ninth Air Force (Air Forces Central [AFCENT] or 9 AF) is the air component of United States Central Command (USCENTCOM), a regional unified command. The 9th AF (AFCENT) is responsible for air operations, either unilaterally or in concert with regional partners, and developing contingency plans in support of national objectives for USCENTCOM's 21-nation area of responsibility, with 17 partner nations in Southwest Asia. Within the Combined Air Operations Center, AFCENT has 16 global partners working together to support operations in the region. Additionally, AFCENT manages an extensive supply and equipment prepositioning program at several area of responsibility sites.

2.5 AIRFIELD ENVIRONMENT

Located in the center of the installation, the Shaw AFB airfield **(Figure 2-2)** includes aircraft hangars for maintenance and storage, an Air Traffic Control Tower, aircraft parking ramps and taxiways, two hard surface runways, assorted administrative buildings, test cells and ramp space for engine runups, and other airfield support facilities. The two parallel runways are oriented to a magnetic heading, with Runways 04L/22R and 04R/22L oriented 043 to 223 degrees magnetic. The western runway (04L/22R) is 150 feet wide and 10,000 feet long, and the eastern runway (04R/22L) is 150 wide and 8,000 feet long. The overruns at the ends of each runway are 1,000 feet long and 150 feet wide. The airfield elevation is 241 feet above mean sea level (MSL).

A major contributor to Shaw AFB's air- and ground-based training capabilities is the Poinsett Electronic Combat Range (ECR) near Wedgefield, South Carolina, about 10 miles south of the base, as shown in **Figure 2-1.** The range consists of bombing and shooting areas regulated by a control tower onsite, electronic warfare capabilities, and 12,500 acres used for navigation, survival, evasion, resistance, escape, and other ground-based training. It provides Airmen the ability to use unguided bombs, global positioning system-guided bombs, and laser-guided bombs. Munitions dropped on Poinsett are inert, not live ordnance. The range also offers an electronic warfare capability, enabling pilots to experience a simulated combat environment. Poinsett is also used to train Terminal Air Control Party personnel to coordinate airstrikes with pilots. The range is a 20th Fighter Wing asset, with procedures managed by 20th Operations Support Squadron, but it is open to all services. Other services that use the range include the U.S. Army, U.S. Marine Corps, South Carolina Air National Guard, South Carolina Army National Guard, and North Carolina Army National Guard.

RUNWAYS

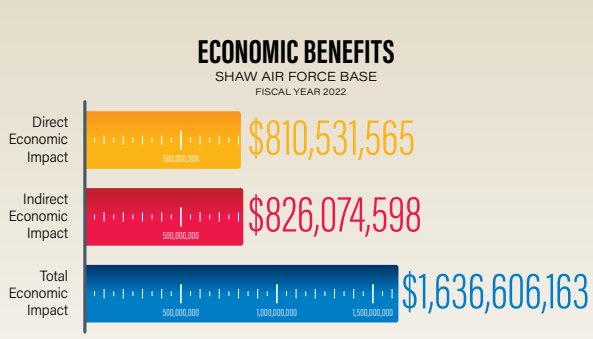
A runway is typically used in both directions and is counted as two separate runways, depending on the direction of the departure or arrival. Each direction is labeled as a separate runway and numbered based on its magnetic heading, divided by 10 and rounded to a whole number.

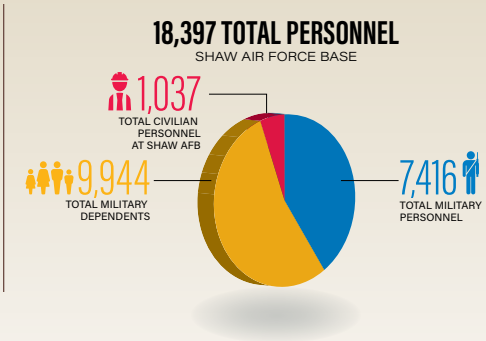
2.6 LOCAL ECONOMIC IMPACTS

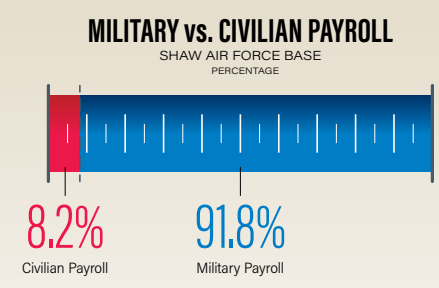
Shaw AFB is one of the largest single-site employers in South Carolina and boasts an annual federal payroll of over $750 million and annual expenditures of over $58 million. The installation generates over $200 million in payrolls annually, with $1.6 billion in total annual economic impact. That makes the base's economic footprint enormously important for both the region and state.

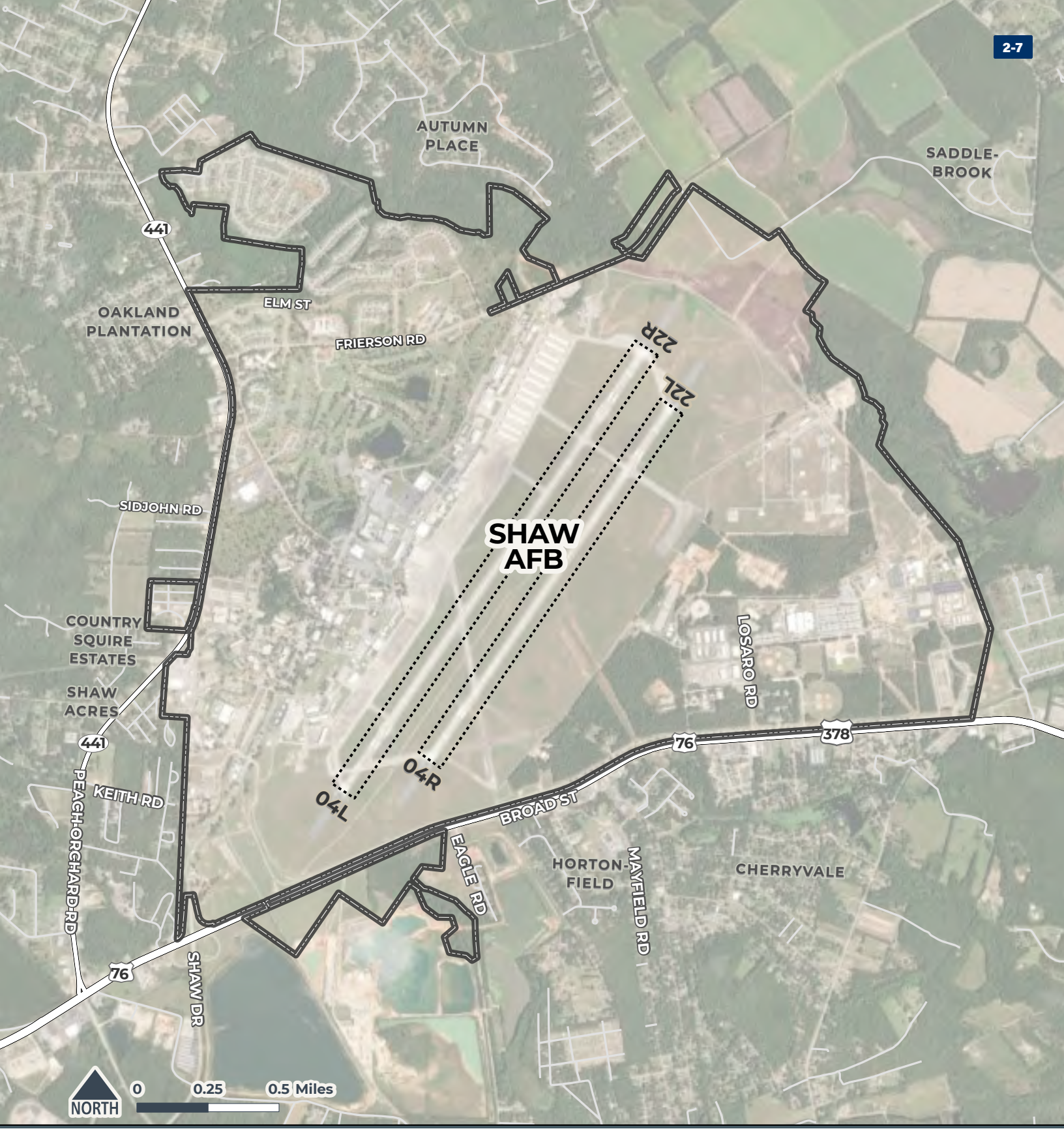
The military provides direct, indirect, and induced economic benefits to local communities through jobs and wages. Benefits include employment opportunities and increases in local business revenue, property sales, and tax revenue.

The economic impact of a military installation is based on annual payroll (jobs and salaries), annual expenditures, and the estimated annual dollar value of the jobs created. The military further contributes to the economic development of communities through induced economic benefits, such as increased demand for local goods and services and increased household spending by military and civilian employees.









Runway

Shaw AFB

FIGURE 2-2
Shaw AFB Airfield Diagram

Based on the 2017 Economic Impact Statement, there are 18,397 total personnel and dependents within Shaw AFB, including over 7,400 military personnel, over 9,900 military dependents, and approximately 1,000 civilians.

Tables 2-1 through 2-3 provide summaries of personnel and dependents for Shaw AFB; the economic impact of the installation; military and civilian payroll; and construction, contract, and expenditures for materials, equipment, and supplies.

TABLE 2-1
Total Personnel and Dependents

CLASSIFICATION	TOTAL
Air Force	6,671
Army Central Command	745
Total Military	**7,416**
Appropriated Fund Civilians	587
Non-Appropriated Fund Civilians	308
Base Exchange	130
Private Businesses	12
Total Civilians	**1,037**
Total Dependents	**9,944**
TOTAL	**18,397**

Source: FY17 Shaw AFB Economic Impact Statement.

TABLE 2-2
Annual Payroll by Classification

PAYROLL	AMOUNT ($)
MILITARY PAYROLL	
Air Force	574,935,212
Army Central Command	115,698,135
All Military Pay	690,633,347
CIVILIAN PAYROLL	
Appropriated Fund	50,943,055
Non-Appropriated Fund	7,228,735
Base Exchange	3,000,000
Private Businesses	402,296
All Civilian Pay	61,574,086
TOTAL PAYROLL	**$752,207,433**

Source: FY17 Shaw AFB Economic Impact Statement.

TABLE 2-3
Summary of Expenditures

EXPENSE CATEGORY	AMOUNT ($)
O&M Construction	16,253,510
Other Construction	1,667,261
Service Contracts	14,800,251
Base Exchange	9,000
Health/TRICARE	12,409,374
Other Materials, Equipment, Supplies	4,715,189
Tuition Assistance	1,560,000
Temporary Duty (TDY) Expenditures	4,924,554
Non-Local Expenditures (at 35% retail margin)	1,924,693
TOTAL ANNUAL EXPENDITURES	**$58,263,832**

Source: FY17 Shaw AFB Economic Impact Statement.


WARNING
Keep Out!

3

3. AIRCRAFT OPERATIONS

Shaw AFB has a high operations tempo, hosting many permanently assigned and transient aircraft that take part in a wide range of training and exercise operations each year. Aircraft flight and maintenance operations are the primary sources of noise generated by the base. The noise experienced is related to several factors, including variables in the natural environment, such as temperature, relative humidity, and the level of cloud ceilings, as well as parameters of the operational environment, such as flight times during the day or night, frequency of takeoffs and landings, directions of flights, flight tracks, altitude, aircraft engine types, power settings, and use of afterburner. This chapter discusses the aircraft operations at or around Shaw AFB, including permanently assigned and transient aircraft, the types and number of operations conducted at the airfield, the runways, and flight tracks used.

3.1 AIRCRAFT TYPES

Fixed-wing aircraft are the primary type assigned to and operating at Shaw AFB. Aircraft that are not permanently assigned to the installation but conduct operations from the installation on a temporary basis are referred to as "transient" aircraft. Transient aircraft are common at the base due to the numerous training and exercise operations taking place each year. Below are brief descriptions of assigned aircraft and the most common transient aircraft at Shaw AFB.

3.1.1 PERMANENTLY ASSIGNED AIRCRAFT

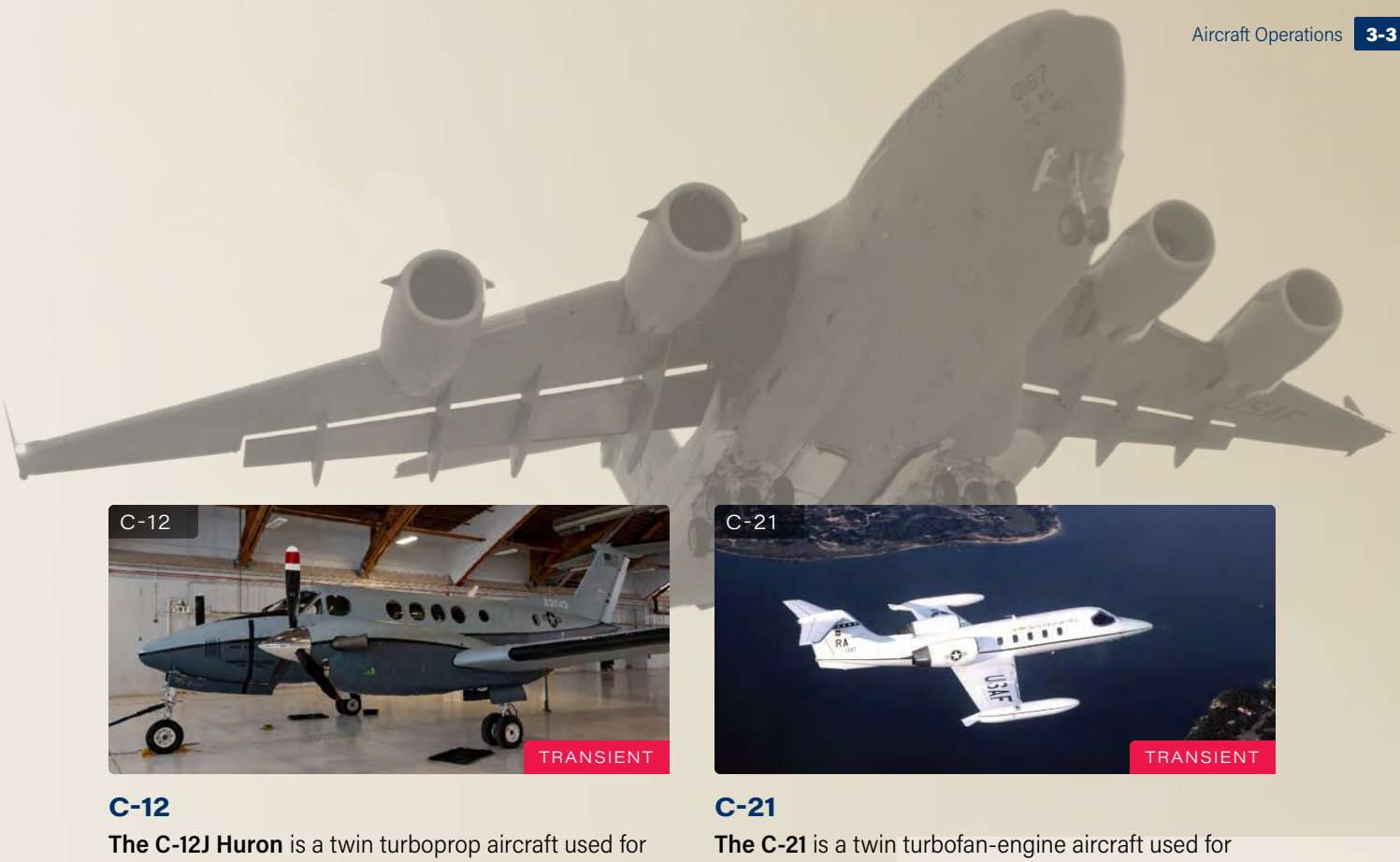
F-16

The F-16 Fighting Falcon is a compact, multi-role fighter aircraft. It is highly maneuverable and has proven itself in air-to-air combat and air-to-surface attack. It provides a relatively low-cost, high-performance weapon system for the United States and allied nations. The F-16 fighter aircraft at Shaw AFB are employed in conventional and anti-radiation suppression of enemy air defenses, strategic attack, counter air, air interdiction, joint maritime operations, and combat search and rescue missions.

3.1.2 TRANSIENT AIRCRAFT

C-5

The C-5 Super Galaxy is a strategic transport aircraft and is the largest aircraft in the Air Force inventory. Its primary mission is to transport cargo and personnel for the Department of Defense. The current C-5 Super Galaxy is a modernized version of the legacy C-5 Galaxy designed and manufactured by Lockheed Martin.



C-12

The C-12J Huron is a twin turboprop aircraft used for cargo and passenger airlift. The aircraft is a military version of the Raytheon 1900C regional airliner. The C-12J can carry 19 passengers or up to 3,500 pounds of cargo. In addition to providing cargo and passenger airlift, the aircraft is capable of transporting two litter or ten ambulatory patients during aeromedical evacuations.

C-21

The C-21 is a twin turbofan-engine aircraft used for passenger and cargo airlift. The aircraft is the military version of the Learjet 35A business jet. The C-21 can carry eight passengers and 42 cubic feet of cargo. In addition, the aircraft is capable of transporting one litter or five ambulatory patients for aeromedical evacuation operations.

C-17

The C-17 Globemaster III is the most flexible cargo aircraft to enter the airlift force. The C-17 is capable of rapid strategic delivery of troops and all types of cargo to main operating bases or directly to forward bases in the deployment area. The aircraft can perform tactical airlift and airdrop missions and can transport litters and ambulatory patients during aeromedical evacuations.

C-130

The C-130 Hercules primarily performs the tactical portion of the airlift mission. The aircraft is capable of operating from rough, dirt strips and is the prime transport for airdropping troops and equipment into hostile areas. Basic and specialized versions of the aircraft airframe perform a diverse number of roles, including airlift support, Antarctic ice resupply, aeromedical missions, weather reconnaissance, aerial spray missions, firefighting, and natural disaster relief.

E-3

The E-3 Sentry is an airborne warning and control system (AWACS) aircraft with an integrated command and control battle management (C2BM) surveillance, target detection, and tracking platform. The aircraft provides an accurate, real-time picture of the battlespace to the Joint Air Operations Center. AWACS provides situational awareness of friendly, neutral, and hostile activity; command and control of an area of responsibility; battle management of theater forces; all-altitude and all-weather surveillance of the battle space; and early warning of enemy actions during joint, allied, and coalition operations.

E-4B

The E-4B serves as the National Airborne Operations Center and is a key component of the National Military Command System for the President, the Secretary of Defense, and the Joint Chiefs of Staff. In case of national emergency or destruction of ground command and control centers, the aircraft provides a highly survivable command, control, and communications center to direct U.S. forces, execute emergency war orders, and coordinate actions by civil authorities.

F-15

The F-15 Eagle is a twin engine, all-weather, extremely maneuverable, tactical fighter designed to permit the Air Force to gain and maintain air supremacy over the battlefield. The F-15 Eagle's air superiority is achieved through a mixture of unprecedented maneuverability and acceleration, range, weapons, and avionics.

F/A-18

The McDonnell Douglas F/A-18 Hornet/Super Hornet is designed to meet current Navy fighter escort and interdiction mission requirements to maintain F/A-18 fleet air defense and close air support roles, as well as an increasing range of missions, including Forward Air Controller (Airborne) and Aerial Tanking, as they have proven capability to replace the S-3 as an aerial tanker.

F-35

The F-35 Lightning II is the U.S. Air Force's latest fifth-generation fighter. With its aerodynamic performance and advanced integrated avionics, the F-35A will provide next-generation stealth, enhanced situational awareness, and reduced vulnerability for the United States and allied nations.

KC-135

The KC-135 Stratotanker provides the core aerial refueling capability for the Air Force and has excelled in this role for more than 50 years. This unique asset enhances the Air Force's capability to accomplish its primary mission of global reach. It also provides aerial refueling support to Air Force, Navy, Marine Corps, and allied nation aircraft. The KC-135 is also capable of transporting litter and ambulatory patients using patient support pallets during aeromedical evacuations.

HH-60

The primary mission of the HH-60 Pave Hawk helicopter is to conduct day or night personnel recovery operations into hostile environments to recover isolated personnel during war. It is also tasked to perform military operations other than warfighting, including civil search and rescue, medical evacuation, disaster response, humanitarian assistance, security cooperation/ aviation advisory, National Aeronautics and Space Administration (NASA) space flight support, and rescue command and control.

3.2 MAINTENANCE OPERATIONS

Keeping aircraft and weapon systems fully mission capable is a critical element enabling operations at any air installation. Maintenance is an integral part of any flying operation and requires a dedicated team of professionals to ensure that units can meet their flying requirements. Certain aspects of maintenance operations can generate considerable noise and can impact the need for compatible use planning as much as flight operations.

The loudest maintenance operations are engine maintenance runs. Aircraft maintainers may conduct engine maintenance runs at power settings ranging from idle to maximum power. F-16 engine runs with power settings up to 85 percent may be conducted anywhere on the aircraft parking ramp, but F-16 engine runs with power settings above 85 percent must be anchored and conducted on the trim pad. All transient aircraft engine runs for other than normal operations (e.g., start, taxi) must be coordinated and approved by Airfield Management. High-powered engine runs are typically conducted in the two acoustical enclosures at Shaw AFB, commonly referred to as "hush houses." Hush houses are buildings specifically designed to reduce the noise associated with the engine runups.

Noise abatement procedures at Shaw AFB limit engine runs in several ways. First, engine runups are to be conducted during normal operating hours, 07:00 a.m. to 11:00 p.m., to limit disruption of the nearby communities after hours. Any necessary engine runups after 11:00 p.m. require higher-level approval, such as the Operations Group or Maintenance Group Commander. Second, engine runups are limited to a percentage of the full-power settings. For example, F-16s are limited to doing runups at 85 percent of full power unless conducted on the trim pad or in the hush houses. Noise associated with these maintenance operations is included in the analysis and has been modeled for incorporation into the Shaw AFB noise contours.

Load Crew of the Year at Shaw AFB.

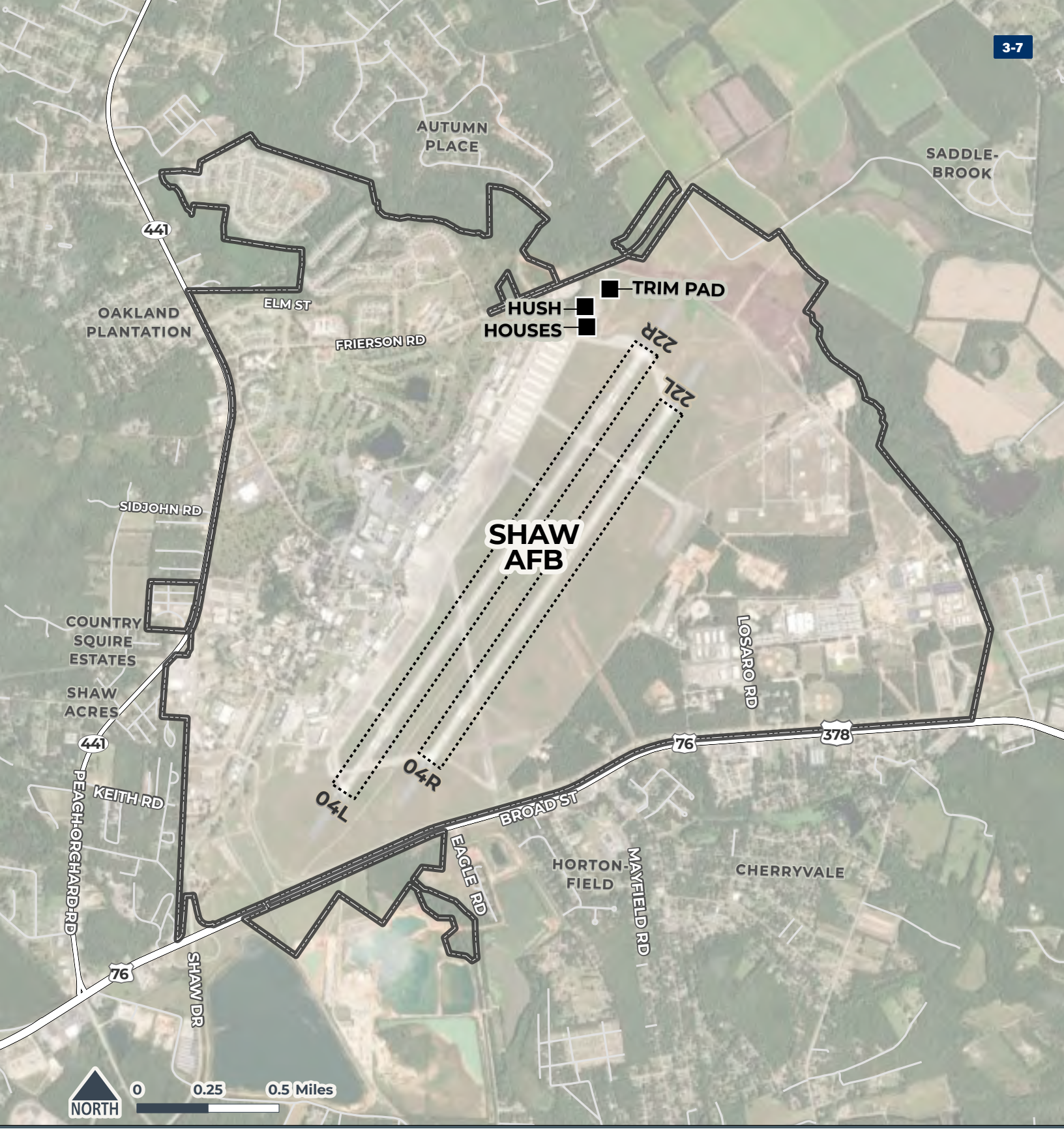
3.3 FLIGHT OPERATIONS

Flight activities, including where aircraft fly, how high they fly, how many times they fly over a given area, and the time of day they operate, must be fully evaluated to understand the relationship between flight operations and land use. This chapter discusses typical flight operations for aircraft based at or visiting Shaw AFB.

Each time an aircraft crosses over a runway threshold (the beginning or ending of a runway's usable surface) to either takeoff, practice an approach, or land, it is counted as a single flight operation. For example, a departure counts as a single operation as does an arrival. As another example, when an aircraft conducts a pattern (a departure followed by an immediate return), it counts as two operations because the aircraft crosses both the approach and departure ends of the runway during the pattern.

Operations at Shaw AFB are conducted on a year-round basis and, in general, temporarily increase during local training exercises. The following list highlights typical operations utilized during normal or increased flight operations. Each flight track is designed to maximize flight operations and, when possible, minimize the effects of noise.

- **Takeoff.** When a pilot **positions an aircraft** on the runway and the **engine power is set to facilitate movement** and eventual flight.



■ Runup Location

Runway

Shaw AFB

FIGURE 3-1

Engine Runup Locations

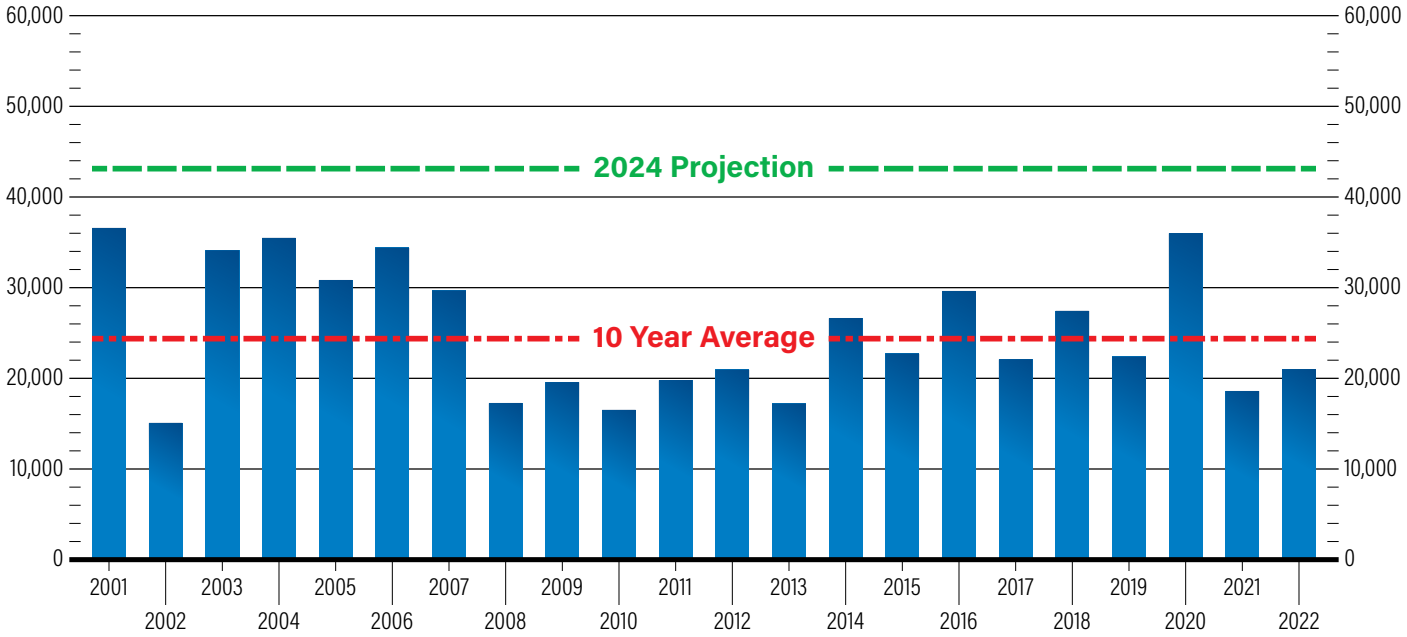
- **Departure.** For the purpose of air traffic sequencing, **separation, noise abatement, compliance with avoidance areas, and overall safety of flight,** aircraft follow specific ground tracks and altitude restrictions as they depart the airfield's immediate airspace.
- **Straight-In Arrival.** An aircraft performing a **straight-in arrival aligns with the runway extended centerline** and begins a gradual descent for landing. This type of approach enables an aircraft to maintain a smooth, stable, and steady approach and requires no additional maneuvering.
- **Overhead Break Arrival. An overhead break arrival** is an expeditious arrival using visual flight rules (VFR). The aircraft arrives over the airfield on the runway centerline at a specified point and altitude and then performs a 180-degree "break turn" away from the runway to enter the landing pattern. Once established, the landing gear and flaps are lowered, and the pilot performs a second 180-degree descending turn toward runway centerline to land.
- **Pattern. A pattern operation** refers to traffic pattern training where the pilot performs takeoffs and landings in quick succession by taking off, flying the pattern, and then landing. A pattern consists of two portions: a takeoff/departure and an approach/landing. A complete pattern is counted as two operations because the aircraft crosses over a runway threshold twice, once on departure and once on arrival. Traffic pattern training is demanding and utilizes all the basic flying maneuvers a pilot learns: takeoffs, climbs, turns, climbing turns, descents, descending turns, and straight and level landings.
- **Low Approach. A low approach** is an approach to a runway that does not result in a landing, but rather a descent toward the runway (usually below 500 feet above ground level [AGL]) followed by a climb-out away from the airfield. Pilots perform low approaches for several reasons, including practicing to avoid potential ground obstructions (e.g., vehicles, debris, stray animals).
- **Touch-and-Go (T&G). A T&G landing pattern** is a training maneuver that involves landing on a runway and taking off again without coming to a full stop. Usually, the pilot then circles the airfield in a defined pattern, known as a circuit, and repeats the maneuver.
- **Radar Approach. Radar approaches** are instrument approaches performed with active assistance from Air Traffic Control (ATC) during poor weather conditions. ATC personnel direct the aircraft toward the extended runway centerline. Once established on the centerline, pilots use aircraft instruments to maintain runway alignment and adherence to altitude restrictions until the pilot is able to acquire visual sight with the runway environment. Pilots often practice this type of approach to maintain proficiency.
- **Simulated Flame-Out (SFO).** The **SFO** is a visual flight maneuver used to simulate a landing recovery from a complete loss of engine thrust. To execute the maneuver, a pilot must establish the aircraft on a specified flight profile (e.g., altitude, airspeed, position over the airfield) that would allow the aircraft to glide safely across the runway threshold in a position to land. If properly executed, the maneuver should not require the use of additional engine power until after the maneuver is complete.

3.4 ANNUAL AIRCRAFT OPERATIONS

Total annual operations **(as shown in Figure 3-2)** describe all aircraft operations that have occurred at Shaw AFB since 2001, including permanently assigned and transient aircraft. As described below, total annual operations account for each departure and arrival, including those conducted as part of a pattern operation. Data for the most recent 10 year period show that aircraft operations at Shaw AFB have remained relatively consistent, with an average of 24,474 operations per year, but with some variability depending on the year. A peak in operations occurred in 2020, with 36,142 operations recorded (about 48 percent more operations than the 10-year

FIGURE 3-2

Summary of Flight Operations for 2001-2022



Flight Operations, Shaw AFB

Source: Air Force Civil Engineer Center (AFCEC) | Air Force Flight Standards Agency (AFFSA) Air Traffic Reporting System Annual Report

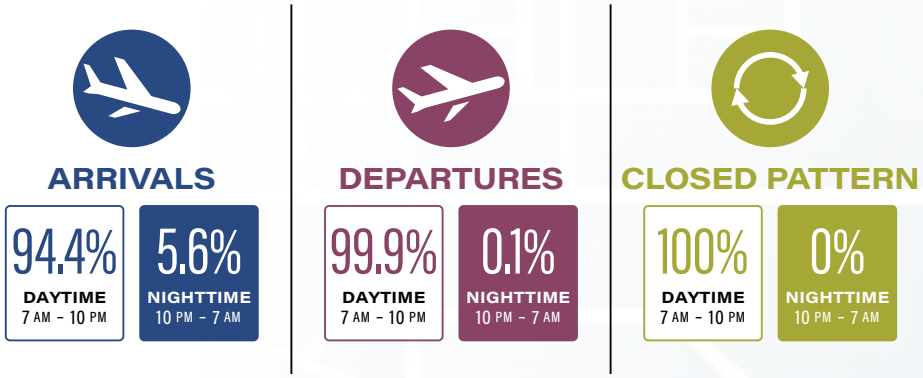
average). In 2013, the fewest operations occurred, with 17,358 operations recorded (about 29 percent fewer operations than the 10-year average). The projection for 2024, based on current and anticipated operational tempos, is 43,440 operations.

The number and frequency of deployments for the 20th Fighter Wing is decreasing and is projected to continue a downward trend. This trend will translate into increased flying activity at and around Shaw AFB. The majority of flight activities consist of permanently assigned F-16 aircraft. Other aircraft represent a smaller but still significant portion of the operations at the base.

Over the past five years, the vast majority of operations at Shaw AFB took place during acoustical daytime (defined as taking place from 7:00 a.m. to 10:00 p.m.); only a small percent occurred during acoustical nighttime (defined as taking place from 10:00 p.m. to 7:00 a.m.). Nearly 100 percent of departures and pattern operations took place during daytime hours. The vast majority of arrivals also took place during daytime hours, with only 6 percent of arrivals occurring during nighttime hours.

FIGURE 3-3

Time of Day for Arrivals, Departures, and Pattern Operations



3.5 RUNWAY UTILIZATION AND FLIGHT TRACKS

3.5.1 RUNWAY UTILIZATION

The frequency with which a runway is used is determined by a variety of factors including the airfield environment (e.g., layout, lights, runway length), direction of prevailing winds, location of natural terrain features (e.g., rivers, lakes, mountains), wildlife activity, number of aircraft in the pattern, and the preference of a runway for the purpose of safety and noise abatement.

The runway in use at Shaw AFB is established by Airfield Management personnel, control tower personnel, and the Supervisor of Flying. Pattern procedures are adjusted accordingly to maximize air traffic safety, noise abatement, and efficiency. **Table 3-1** depicts the runway orientation and size characteristics for each runway, while **Table 3-2** shows the utilization rates of each runway and helipad. Air Traffic Control personnel establish the runway in use. Aviation planners adjust the pattern procedures accordingly to maximize air traffic flow efficiency, effectiveness, and safety.

TABLE 3-1
Runway Dimensions and Orientations

RUNWAY	ORIENTATION (RELATIVE TO MAGNETIC NORTH)	LENGTH (FEET)	WIDTH (FEET)	OVERRUN LENGTH (FEET)
04L/22R (Primary)	43°/223°	10,014	150	1,000 (Each End)
04R/22L	43°/223°	8,014	150	1,000 (Each End)

Source: 20th Operations Support Squadron and Federal Aviation Administration (FAA).

3.5.2 FLIGHT TRACKS

Flight tracks depict where aircraft fly in relation to an airfield. They are designed for departures, arrivals, and for pattern work procedures, and are designated for each runway to facilitate operational safety, noise abatement **(Section 3.6),** aircrew proficiency, and the efficient flow of air traffic within the tower-controlled airspace. While aircraft flight tracks are shown as a line on a map, they are actually more like bands, not set highways in the sky. Aircraft de-confliction, configuration, pilot technique, takeoff weight, and wind all affect the path taken. The flight tracks for Shaw AFB are shown in **Figures 3-4, 3-5, and 3-6.**

TABLE 3-2
Runway Direction and Utilization

RUNWAY DIRECTION	UTILIZATION
Runway 04L	41%
Runway 22R	51%
Runway 04R	4%
Runway 22L	4%

Source: AFCEC.

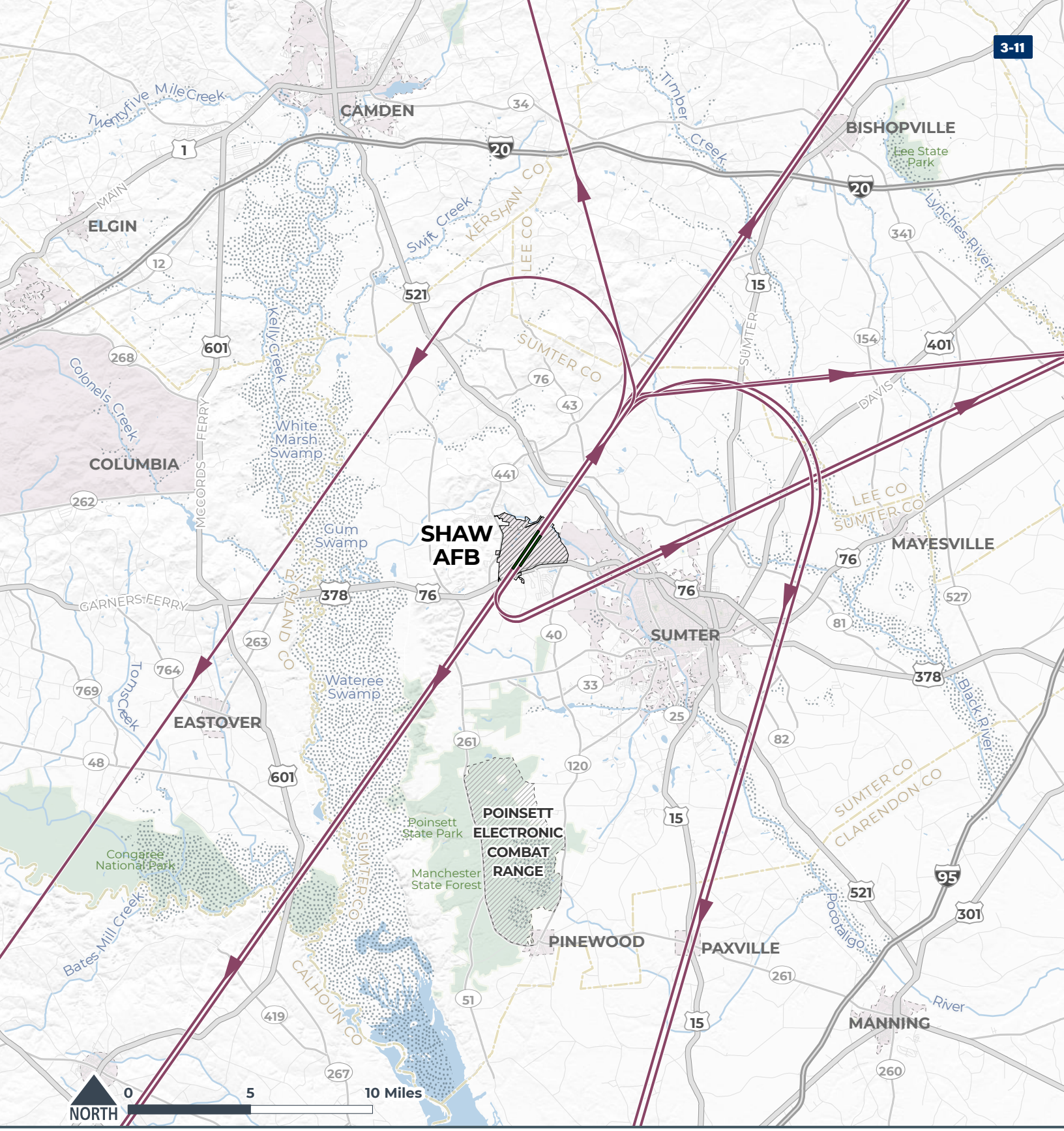


FIGURE 3-4
Departure Flight Tracks

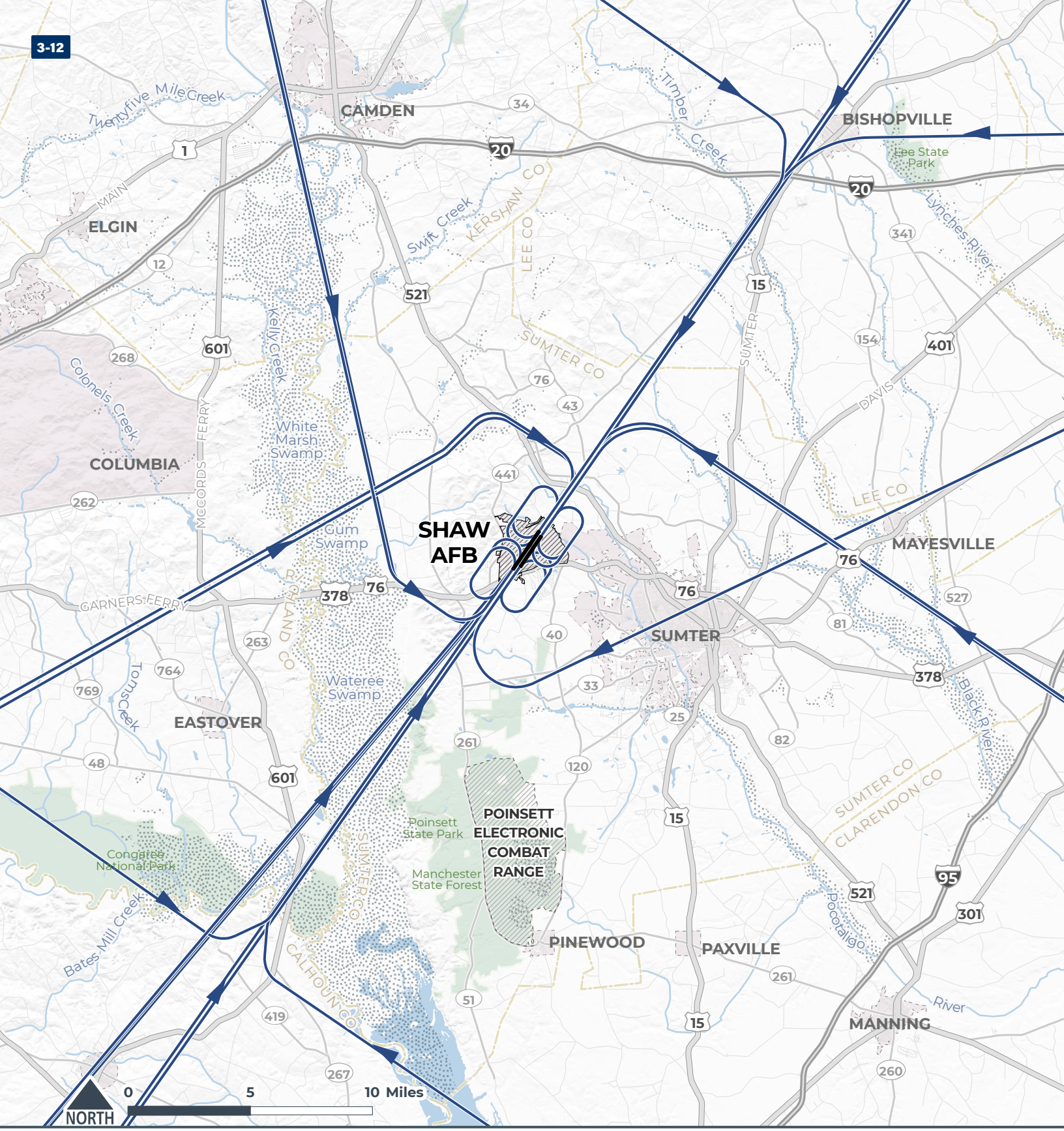


FIGURE 3-5
Arrival Flight Tracks

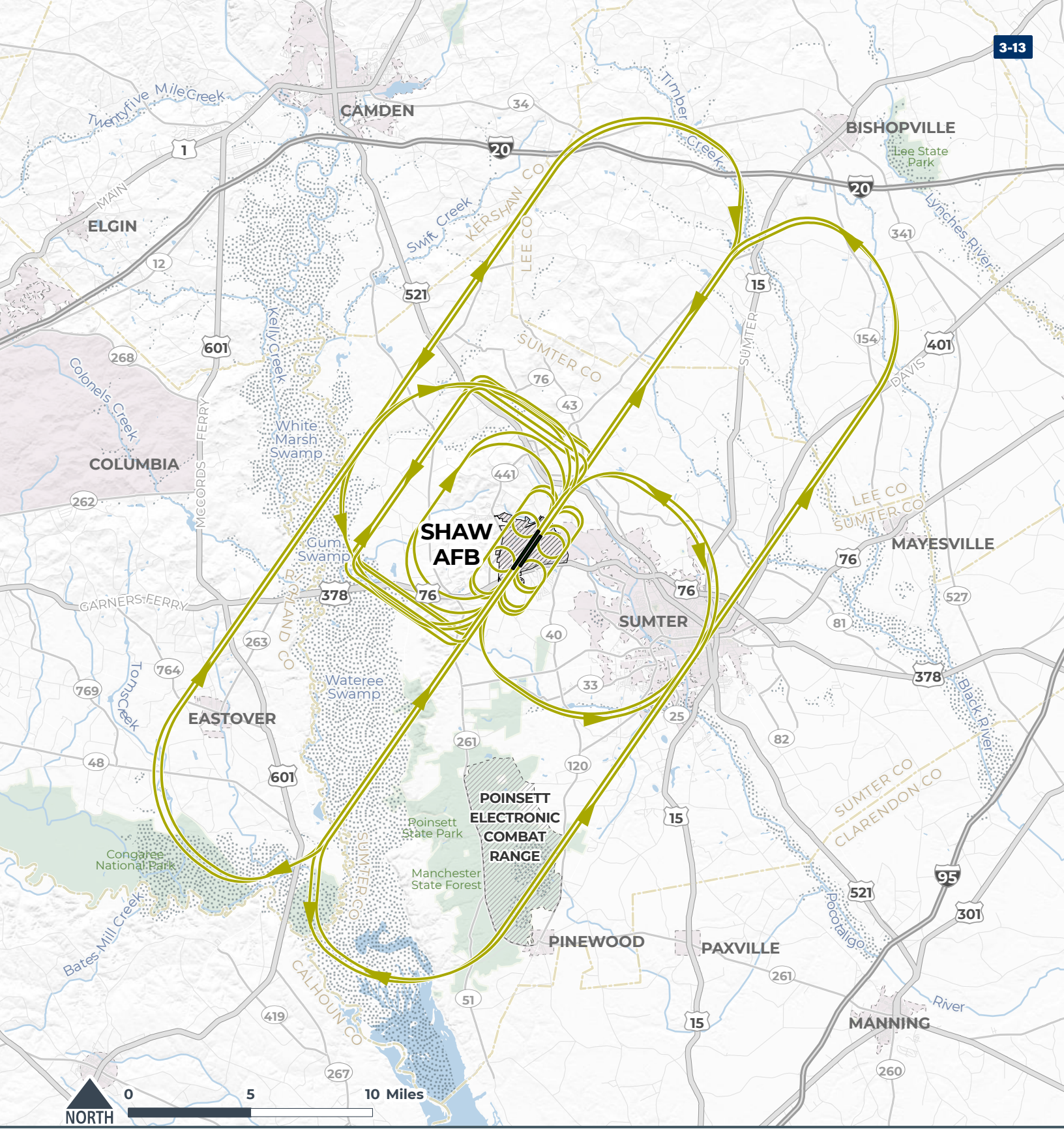


FIGURE 3-6
Pattern Flight Tracks

4

4. MILITARY OPERATIONAL NOISE

How an installation manages operational noise can play a key role in shaping its relationship with neighboring communities. Ideally, aircraft noise and its management should be key considerations in local land use planning decision-making. Because noise from aircraft or associated operations may affect areas around the installation, the Air Force has defined noise zones using the guidance provided in *AFH 32-7084, The AICUZ Program Manager's Guide.*

Noise contours for Shaw AFB have been developed in accordance with the AICUZ Handbook to graphically depict how sound, or noise, propagates from the aircraft operating around the airfield and out toward surrounding communities. The following sections will define and discuss sound/noise and how it is perceived and will then conclude with a graphic of the Shaw AFB AICUZ noise contours.

FEATURES

Terrain features, weather phenomena, man-made structures, and daily life activity contribute to noise exposure.

SOUND

Sound becomes noise when it interferes with normal activities.

4.1 WHAT IS SOUND/NOISE?

Sound consists of vibrations in the air. A multitude of sources can generate these vibrations, including roadway traffic, barking dogs, radios—or aircraft operations. We call these vibrations compression waves. Just as a pebble dropped into a pond generates ripples, the compression waves—formed of air molecules pressed together—radiate out, allowing the compression to decrease with distance. If these vibrations reach your eardrum at a perceptible rate and intensity, you perceive it as sound. When the sound is unwanted, we refer to it as noise. Generally, sound becomes noise to a listener when it disturbs or interferes with normal activities. Sound has three components: intensity, frequency, and duration.

- **Intensity or loudness** relates to sound pressure change. As the vibrations oscillate back and forth, they create a change in pressure on the eardrum. The greater the sound pressure change, the louder it seems.
- **Frequency** determines how we perceive the pitch of the sound. We hear low frequency sounds as rumbles or roars, while sirens or screeches typify high frequency sounds. We measure sound frequency in cycles per second or hertz (Hz). While human hearing ranges go from 20 to 20,000 Hz, we hear best in the range of 1,000 to 4,000 Hz. For environmental noise, we use A-weighting, which focuses on this range, to best represent human hearing. While we may refer to A-weighted decibels as "dBA," if it is the only weighting being discussed, the "A" is generally dropped.
- **Duration** is the length of time that one can detect the sound.

4.2 HOW SOUND IS PERCEIVED

The loudest sounds that the human ear can comfortably hear are a billion times higher in intensity than those of sounds we barely hear. Because such large numbers become awkward to use, we measure noise in decibels (dB), which uses a logarithmic scale.

Figure 4-1 is a chart of A-weighted sound levels from common sources. A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above 120 dB can cause discomfort inside the ear, while sound levels above 130 dB start to be felt as pain.

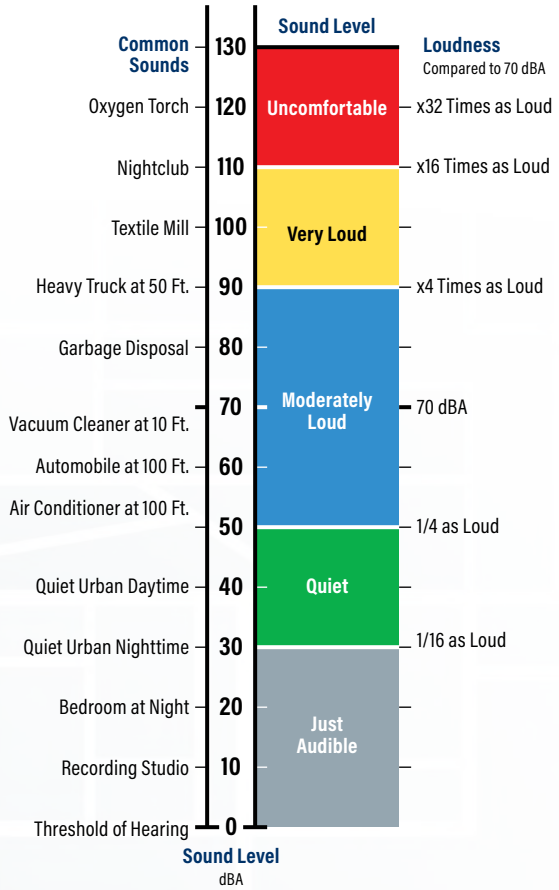


FIGURE 4-1
Typical A-weighted Levels of Common Sounds

Table 4-1 shows the subjective responses with change in (single-event) sound level. While noise energy doubles or halves with every 3 dB change, we do not perceive all this noise energy. It takes a 10 dB increase or decrease for our ears to perceive a doubling or halving of loudness. Please note: These metrics correspond to a single event and cannot be compared to Day-Night Average Sound Level (DNL), which is a cumulative metric and is defined below.

TABLE 4-1
Subjective Response to Changes in Sound Level

CHANGE IN SOUND LEVEL	CHANGE IN LOUDNESS
10 dB	Twice or half as Loud
5 dB	Quite Noticeable
3 dB	Barely Perceptible
1 dB	No Noticeable Change

4.3 THE DAY-NIGHT AVERAGE SOUND LEVEL

When people hear an aircraft fly overhead, they may ask, "How loud was that?" While we may often find ourselves concerned over the loudness of a sound, there are other dimensions to the sound event that draw our interest. For instance, does one overflight draw the same interest as two separate overflights—or 20? Does the 30-second runup of engines prior to takeoff draw the same interest as a 30-minute maintenance run? Additionally, is an overflight more noticeable at 2:00 p.m. or at 2:00 a.m., when the ambient noise is low, and most people are sleeping?

The length and number of events (e.g., the total noise energy), combined with the time of day that a noise event takes place, play key roles in our perception of noise. To reflect these concerns, the Air Force uses the DNL metric, which was created by the Environmental Protection Agency (EPA) for use throughout the United States.

DNL, when used as a metric for aircraft noise, is 'A-weighted' or ADNL; this represents the accumulation of noise energy from all aircraft noise events in a 24-hour period. This weighting factor removes lower frequencies to provide the sound level humans hear. Oftentimes, when discussing ADNL, the 'A' is dropped. Additionally, for all operations between 10:00 p.m. and 7:00 a.m., DNL adds a 10 dB adjustment to each event to account for the intrusiveness of nighttime operations. As is implied in its name, the DNL represents the noise energy present in a daily period. However, because aircraft operations at military airfields fluctuate from day to day, the Air Force typically bases DNL on the annual average of a year's worth of aircraft operations.

DNL is not a sound level heard at any given time but instead represents long-term exposure. Scientific studies have found a correlation between the percentages of groups of people highly annoyed by sounds and the level of the cumulative average sound exposure measured in DNL.

4.3.1 AIRCRAFT NOISE CONTOURS

The DoD develops noise contours to assess the compatibility of aircraft operations with surrounding land uses. Noise contours connect points of equal value, just as contours on topographic maps connect points of equal elevation. The Air Force utilizes NOISEMAP, the DoD standard modeling software, for assessing the operational noise footprint from military aircraft operations at air installations. Noise contours, when overlaid on local land use maps, can help to identify areas of incompatible land uses and assist communities in planning for future development around an air installation.

4.3.2 PLANNING CONTOURS

Long-range planning conducted by local land use authorities involves strategies that shape the present and future uses of land. To assist communities with promoting compatible land uses, the Air Force provides planning noise contours based on reasonable projections of missions and operations based on documented programs of record. AICUZ studies use planning noise contours to provide a description of the long-term (5-10 years) aircraft noise environment for projected aircraft operations that is consistent with the planning horizon used by state, tribal, regional, and local planning bodies. It is important that local land use authorities regularly update their regulations (e.g., zoning, comprehensive plans) according to the latest available noise contours.

The noise contours are based on the best available long-range projections of unclassified estimates of future mission requirements, including reasonable projections of future operations based on trends in operational tempo, retirement of legacy aircraft, or programs of record for new aircraft entering the inventory.

These long-range projections are not commitments of future operations. Inclusion of planning noise contours in the AICUZ study does not eliminate the need to conduct appropriate environmental analysis if an assumption used in the development of the planning contours becomes a proposed Air Force action.

TABLE 4-2
Annual Aircraft Flight Operations for AICUZ Noise Contours

	ARRIVAL				DEPARTURE			
AIRCRAFT	Day	Evening	Night	Total	Day	Evening	Night	Total
PERMANENTLY ASSIGNED AIRCRAFT								
B-737-700	37	0	1	**38**	37	0	1	**38**
F-16C	15,323	0	907	**16,230**	16,230	0	0	**16,230**
ADAIR Aircraft	3,304	0	196	**3,500**	3,500	0	0	**3,500**
TRANSIENT AIRCRAFT								
Attack/Fighter	97	0	3	**100**	97	0	3	**100**
Bomber/Transport	34	0	15	**49**	39	0	10	**49**
Helo Operations	14	0	0	**14**	14	0	0	**14**
Miscellaneous Aircraft	50	0	2	**52**	50	0	2	**52**
TOTALS								
BASED OPERATIONS	**18,664**	**0**	**1,104**	**19,768**	**19,767**	**0**	**1**	**19,768**
TRANSIENT OPERATIONS	**195**	**0**	**20**	**215**	**200**	**0**	**15**	**215**
COMBINED AIRCRAFT OPERATIONS	**18,859**	**0**	**1,124**	**19,983**	**19,967**	**0**	**16**	**19,983**

Source: EA for Combat Air Forces ADAIR, Shaw AFB (2024).

While the assumptions are logical, changes to certain factors supporting these assumptions are highly likely. When significant changes in the projected mission or operational tempo warrant it, the AICUZ study will again be updated.

The assumptions that informed the Shaw AFB planning contours include:

- With the period of contingency deployments coming to an end, a full program of flight operations, training, and local exercises for the assigned aircraft at Shaw AFB are assumed, modeled, and included in this AICUZ.
- Airfield operations are projected for 2024, at which time the beddown of the Combat Air Forces ADAIR mission at Shaw is scheduled to be complete.
- This study does not include the beddown of anticipated F-35 aircraft, though the F-35 is the envisioned replacement for F-16 aircraft; these aircraft are not currently programmed for Shaw AFB.

Table 4-2 presents the annual aircraft flight operations for the Shaw AFB planning contours.

	PATTERN OPERATIONS				INTERFACILITY OPERATIONS				COMBINED OPERATIONS			
	Day	Evening	Night	Total	Day	Evening	Night	Total	Day	Evening	Night	Total
	0	0	0	**0**	0	0	0	**0**	74	0	2	**76**
	15,274	0	0	**15,274**	1,879	0	0	**1,879**	48,706	0	907	**49,613**
	350	0	0	**350**	0	0	0	**0**	7,154	0	196	**7,350**
	286	0	0	**286**	0	0	0	**0**	480	0	6	**486**
	27	0	0	**27**	0	0	0	**0**	100	0	25	**125**
	98	0	0	**98**	0	0	0	**0**	126	0	0	**126**
	0	0	0	**0**	0	0	0	**0**	100	0	4	**104**
	15,624	**0**	**0**	15,624	**1,879**	**0**	**0**	1,879	**55,934**	**0**	**1,105**	**57,039**
	411	**0**	**0**	**411**	**0**	**0**	**0**	**0**	**806**	**0**	**35**	**841**
	16,035	**0**	**0**	16,035	**1,879**	**0**	**0**	1,879	**56,740**	**0**	**1,140**	**57,879**

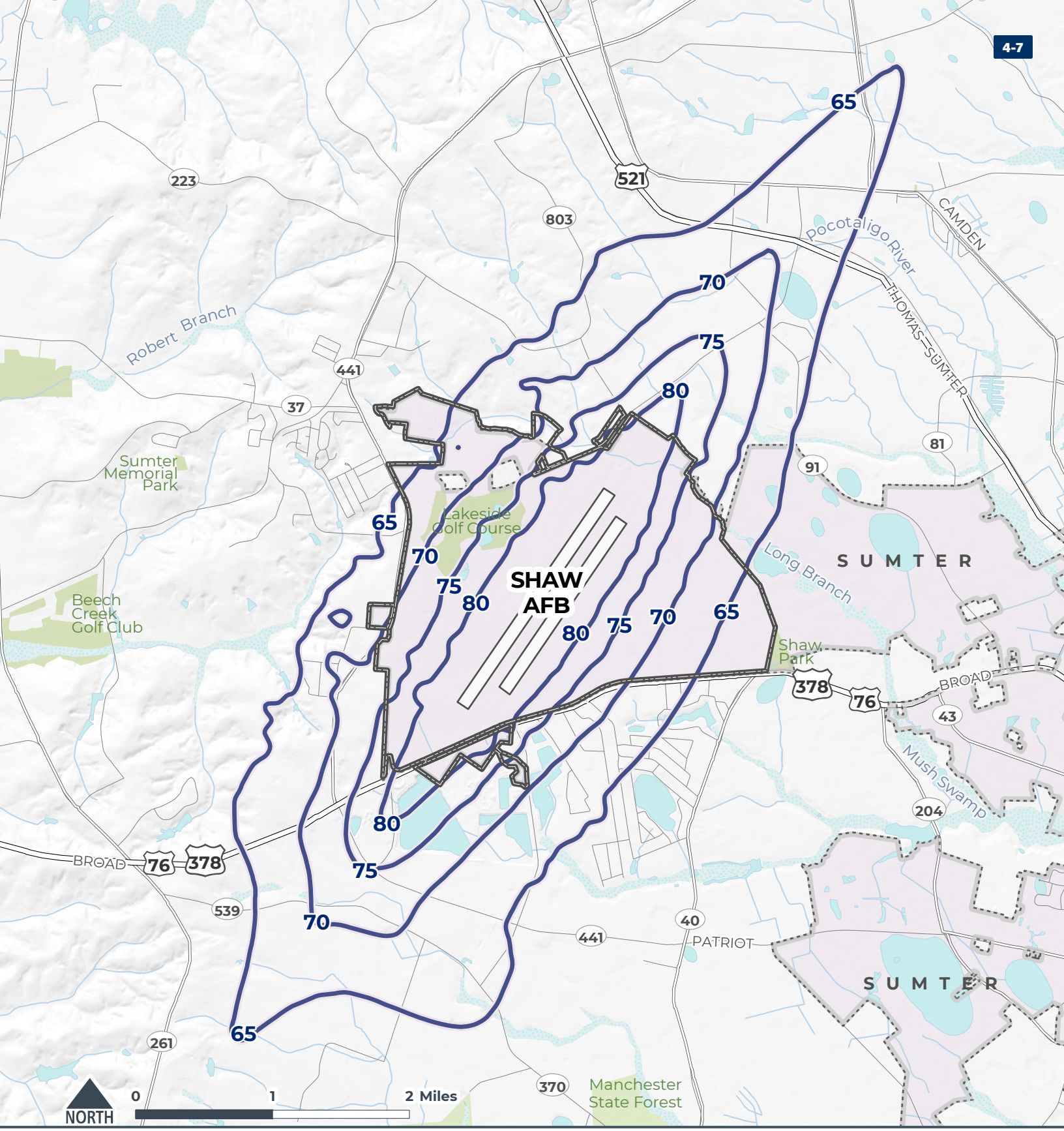
4.4 SHAW AFB NOISE CONTOURS

The 2024 AICUZ noise contours are presented in **Figure 4-2.** As previously noted, this AICUZ study is presenting noise contours modeled under the medium noise scenario as part of the continued operation of the F-16s at Shaw AFB and proposed contract Combat Air Forces ADAIR at Shaw AFB.

It is important to note that some areas of louder noise extend beyond the base boundaries. As shown in **Figure 4-2,** the 65 dB DNL contour extends beyond the boundary of Shaw AFB, approximately 3.5 miles to the northeast and 2.5 miles to the southwest, within unincorporated Sumter County to the west of the City of Sumter. The 75 dB DNL contour extends beyond the installation boundary approximately 1 mile to the northeast, and 1 mile to the southwest.

Figure 4-3 shows the Shaw AFB noise contours with color gradient shading, which depicts how Shaw AFB noise propagates. **Figure 4-4** compares the 2024 and the 2013 AICUZ's DNL contours. As this comparison shows, the 2024 contours cover slightly more off-base land than those shown in the 2013 DNL contours, particularly to the north and the west of the installation.

The main reason for the larger contour is the 2024 noise modeling accounted for all fighter squadrons operating out of Shaw AFB for the entire year because future deployment requirements are unknown. However, currently this is not happening as real-world missions require the fighter squadrons to deploy overseas on a regular basis, which in turn decreases the number of operations at Shaw AFB. The noise is louder when all fighter squadrons are operating at Shaw AFB.



2024 AICUZ Contours (dB)

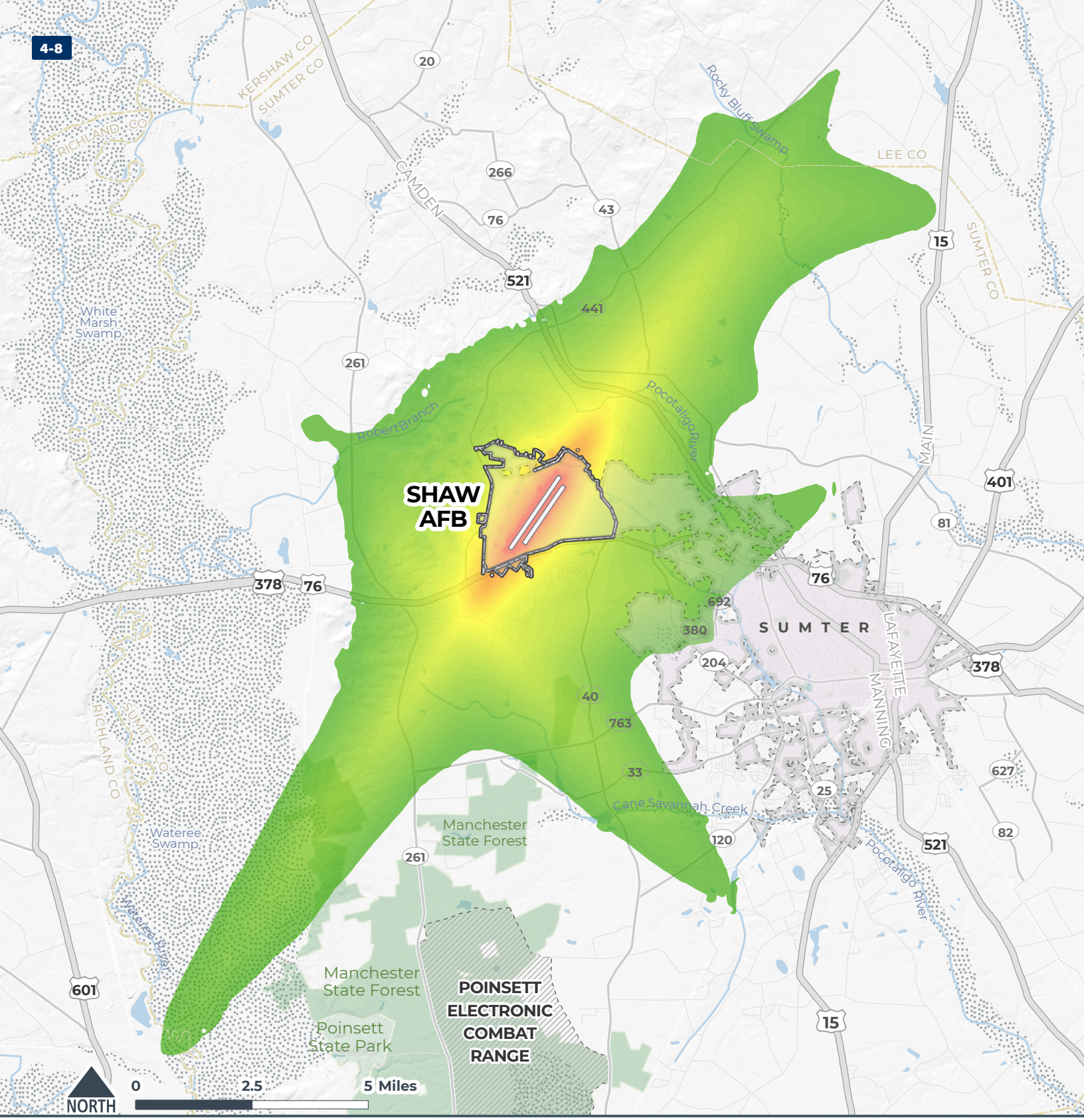
Runway

Shaw AFB

Municipal Area

FIGURE 4-2

2024 Shaw AFB AICUZ Noise Contours



50 dB DNL 80+

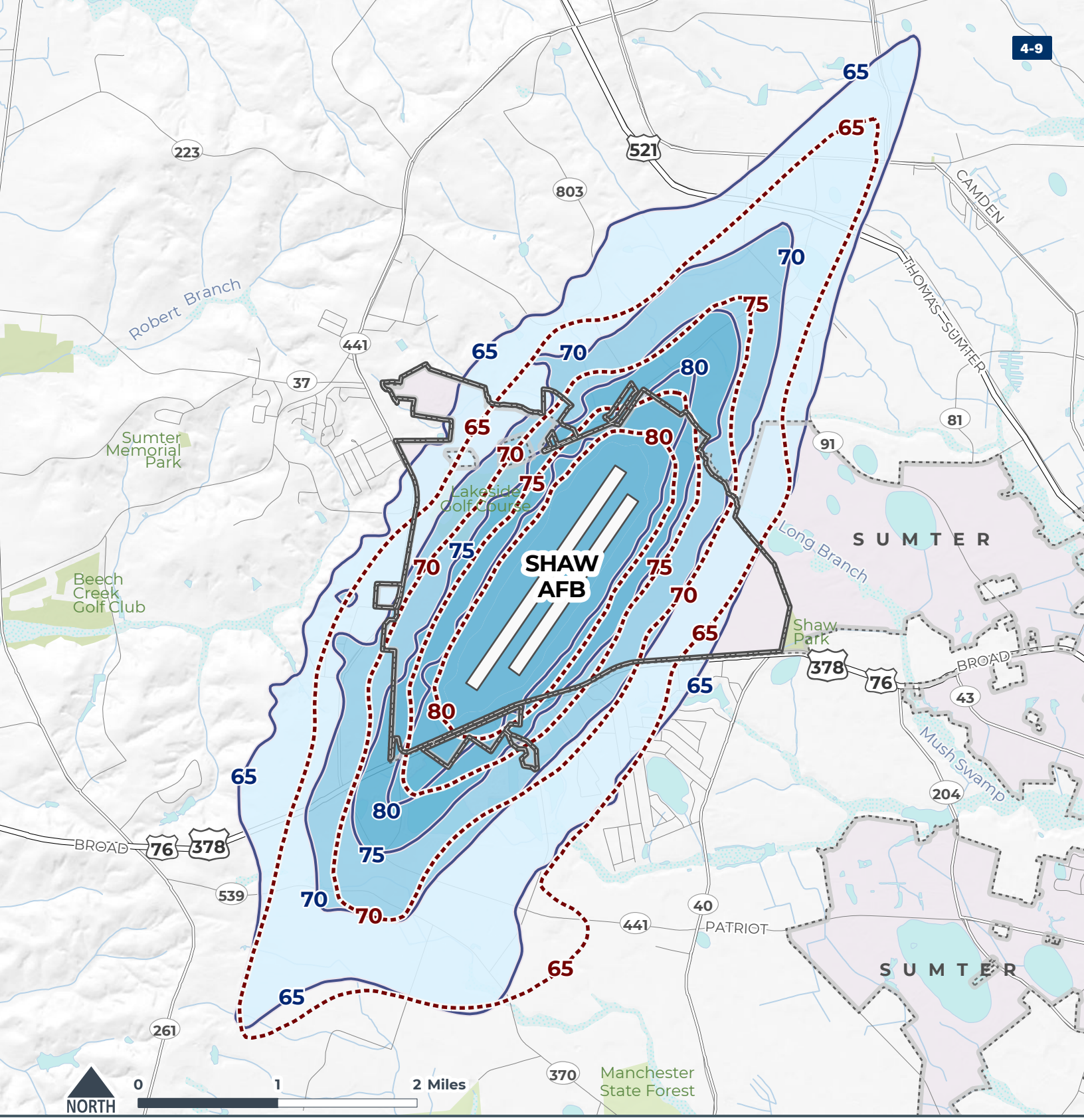
Runway

Shaw AFB

Municipal Area

FIGURE 4-3

2024 AICUZ Noise Contour Gradient Shading



2013 AICUZ Contours (dB)

Runway

Shaw AFB

Municipal Area

2024 AICUZ Contours (dB)

65-69

70-74

75-79

80+

FIGURE 4-4

Comparison of 2013 and 2024 AICUZ Noise Contours

Table 4-3 presents the off-installation land acreage and estimated population within the planning contours. The population estimates are for the year 2023 and are derived from U.S. Census 2020 data. A geometric proportion method was used to determine the estimated population within the contour bands. This method assigns population based on the portion of a census block that falls within the contour. The population across census blocks is assumed to be evenly distributed.

Approximately 4,400 people are exposed to noise at or above 65 dB DNL across the 6,335-acre off-base area; nearly 100 percent of this population resides within the 65-69 dB DNL and 70-74 dB DNL noise zones. The 75-79 dB DNL noise zone contains around 600 acres of off-base land and only 13 estimated residents. There are no residences within the 80+ dB DNL noise zone, which overlies 123 acres of off-base land.

4.5 NOISE ABATEMENT

The Air Force recognizes that noise from military operations may cause concern for people living or working near military installations.

For this reason, the Air Force has established a Noise Program aimed at reducing and controlling the emission of noise and vibrations associated with the use of military aircraft, weapons systems, and munitions. The result is the implementation of various strategies, techniques, and procedures, documented under the Shaw AFB Noise Abatement Program, which are aimed at protecting persons and structures from the harmful effects of noise and vibrations.

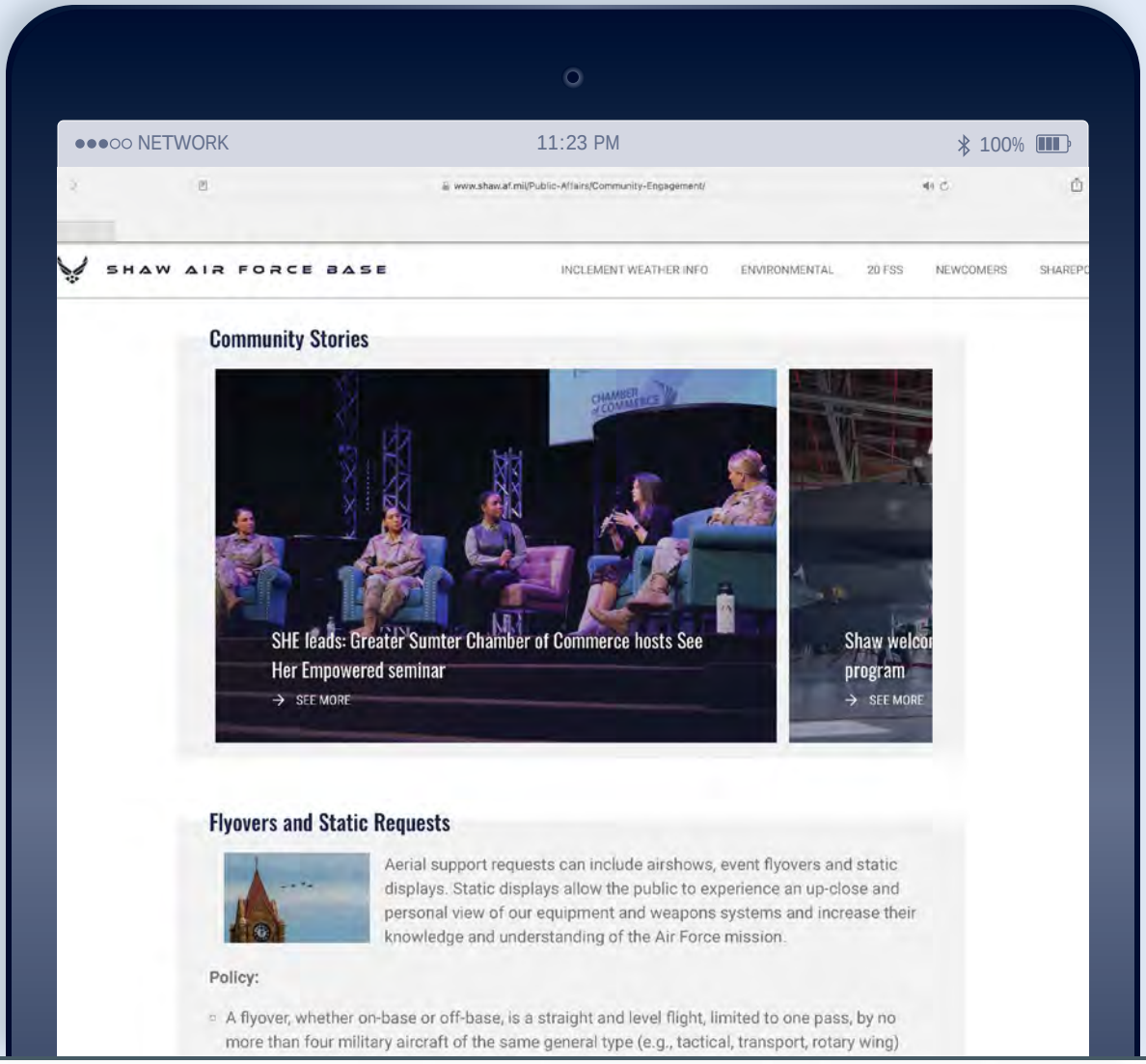
Shaw AFB has noise abatement procedures for its operations that include:

- **Normal operations typically occur between 7:00 a.m. and 11:00 p.m.** The hours of 11:00 p.m. to 7:00 a.m. are considered quiet hours. Operations are minimized during quiet hours to reduce the impact on local communities. Approval to conduct flight operations or engine runups during quiet hours requires the approval from the associated group commander.
- **Flying over populated areas is avoided** except as noted in the Shaw AFB operations manual.
- **Flights departing and climbing out of the Shaw AFB** environs are typically conducted to the west of the airfield to avoid populated areas closer to the City of Sumter.
- **Overhead breaks and SFOs** are conducted between 10,000 feet above MSL and the surface above and within 3 nautical miles (NM) of the airfield.
- **Straight-in approaches and landing procedures** 10 NM out from the airfield are used when required by weather or during SFOs.
- **Minimum Risk Arrival patterns** are conducted using VFR to descend quietly and quickly from between 5,000 feet to 9,000 feet MSL (typically 8,000 feet MSL) at an idle power setting.
- **Afterburner** is used during takeoff to reach 300 NM per hour (knots) before departing the departure end of the runway.
- **Installation leadership periodically reviews existing flight operation practices** and their potential impact on surrounding communities and other populated areas. This requirement facilitates the planning, designation, and establishment of flight tracks to avoid highly populated areas, to fly over sparsely populated areas, and/or waterways, when possible, to reduce noise exposure levels.

TABLE 4-3
Off-Installation Land Area and Estimated Off-Installation Population within Noise Zones for the 2024 AICUZ Noise Contours

NOISE ZONE (dB DNL)	ACRES	ESTIMATED POPULATION
65-69	4,073.5	3,833
70-74	1,533.4	555
75-79	605.0	13
80-84	122.9	0
Total (65+)	6,334.8	4,401

Source: ESRI Updated Demographics 2023; U.S. Census Bureau, 2016-2020 American Community Survey 5-year Estimates



4.6 NOISE COMPLAINTS

Shaw AFB has historically experienced a relatively low number of noise complaints due to its noise abatement procedures, distance from major population centers and public use areas, and the surrounding municipalities' compatible land use planning and building regulations. All noise complaints are evaluated to ensure future operations, where possible, do not generate unacceptable noise, and to provide results from noise investigations back to the complainant as soon as practical.

Citizens are encouraged to contact 20th Fighter Wing Public Affairs with any noise complaints.

- To report an issue, please fill out and return the **Noise Concern Form** to 20fwpublicaffairs@us.af.mil.
  - Available on the 20th Fighter Wing website: https://www.shaw.af.mil/Public-Affairs/Community-Engagement/
- If you do not receive a response within 48 business hours, please call **Community Engagement at (803) 895-2023.**

WWW.SHAW.AF.MIL

/ShawAFB

5. COMMUNITY AND AIRCRAFT SAFETY

Community and aircraft safety is paramount to the Air Force and is a shared responsibility between the Air Force and the surrounding communities, with each playing a vital role in its success. Cooperation between the Air Force and the community results in strategic and effective land use planning and development. As such, the Air Force has established a flight safety program and has designated areas of accident potential around its air installations to assist in preserving the health, safety, and welfare of residents living near its airfield. This AICUZ Study provides the information needed, in part, to reach this shared safety goal.

Identifying safety zones assists the community in developing land uses compatible with airfield operations. As part of the AICUZ Program, the Air Force defines areas of accident potential, imaginary surfaces, and hazards to aircraft flight.

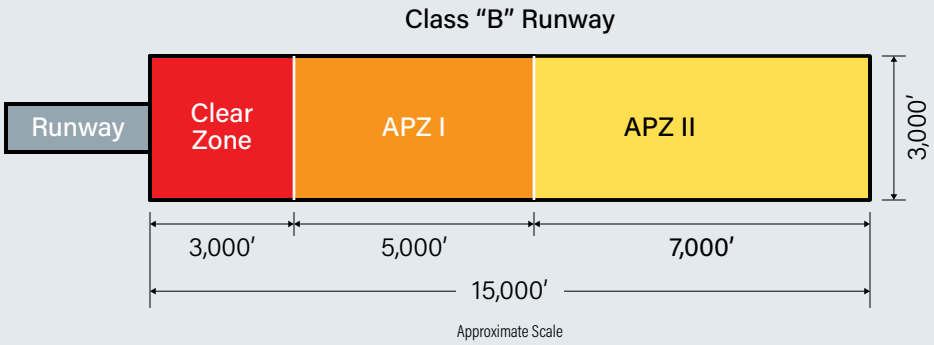
5.1 CLEAR ZONES AND ACCIDENT POTENTIAL ZONES

In the 1970s and 1980s, the DoD conducted studies of historical accidents and operations data throughout the military. The studies showed that most aircraft mishaps occur on or near the runway, diminishing in likelihood with distance from the runway. Based on these studies, the DoD identified Clear Zones and Accident Potential Zones as areas where an aircraft accident is most likely to occur in the event of an aircraft mishap. However, it should be noted that CZs and APZs are not predictors of accidents. The studies identified three areas that, because of accident potential, planners should consider for density and land use restrictions: the Clear Zone (CZ), the Accident Potential Zone I (APZ I), and the Accident Potential Zone II (APZ II).

The typical CZs and APZs for Class B runways are described in the bullets below and are depicted on **Figure 5-1.**

- **CZ.** At the end of all active runways is an area known as the CZ. The CZ is a square area beyond the end of the runway and centered on the runway centerline extending outward for 3,000 feet. In other words, it is 3,000 feet in width and 3,000 feet in length along the extended runway centerline. A CZ is required for all active runways and should remain undeveloped.
- **APZ I.** APZ I is the rectangular area immediately beyond the CZ. APZ I is 3,000 feet in width and 5,000 feet in length along the extended runway centerline.
- **APZ II.** APZ II is the rectangular area beyond APZ I. APZ II is 3,000 feet in width and 7,000 feet in length along the extended runway centerline.

FIGURE 5-1
Typical Class "B" Runway Clear Zones and Accident Potential Zones



Within the CZ, the only compatible land uses with military aircraft operations and defense missions are undeveloped lands and certain right-of-way and agricultural uses. For this reason, it is the Air Force's policy, where possible, to acquire real property interests in land within the CZ to ensure incompatible development does not occur. Within APZ I and APZ II, a variety of land uses are compatible; however, higher density uses (e.g., schools, apartments, churches) and more intense uses (e.g., office buildings, strip malls) should be limited and, if possible, prevented because of the greater safety risk in these areas. Chapter 6 discusses land use and recommendations for promoting compatible growth and addressing incompatibility issues within APZs for each runway.

Figure 5-2 depicts the CZs and APZs for Runways 04L/22R and 04R/22L. The 2024 AICUZ CZs and APZs have not changed since the 2013 AICUZ report.

Table 5-1 tabulates the off-base land acreage and estimated population within the CZs and APZs. Approximately 62 acres of the CZs extend outside of the installation property off the southern end of the runways in a portion of unincorporated Sumter County, but there are no residents living within the CZ. Approximately 29 people are located within the 62 acres of APZ I extending beyond the base property boundary. Both APZ I areas fall outside of Shaw AFB within unincorporated portions of Sumter County on both the northeast and southwest sides of the runways. Approximately 984 people are located within the 1,285 off-installation acres of the APZ IIs. The entirety of the areas and population within APZ II are outside of the base boundary in Sumter County on the northeast and southwest sides of Shaw AFB.

TABLE 5-1

Off-installation Land Area and Off-installation Estimated Population within the Clear Zones and Accident Potential Zones

FIXED WING ZONE	ACRES	POPULATION
CZ	61.8	0
APZ I	898.6	29
APZ II	1,285.3	984
TOTAL	**2,245.7**	**1,013**

Source: ESRI Updated Demographics 2023; U.S. Census Bureau, 2016-2020 American Community Survey 5-year Estimates.

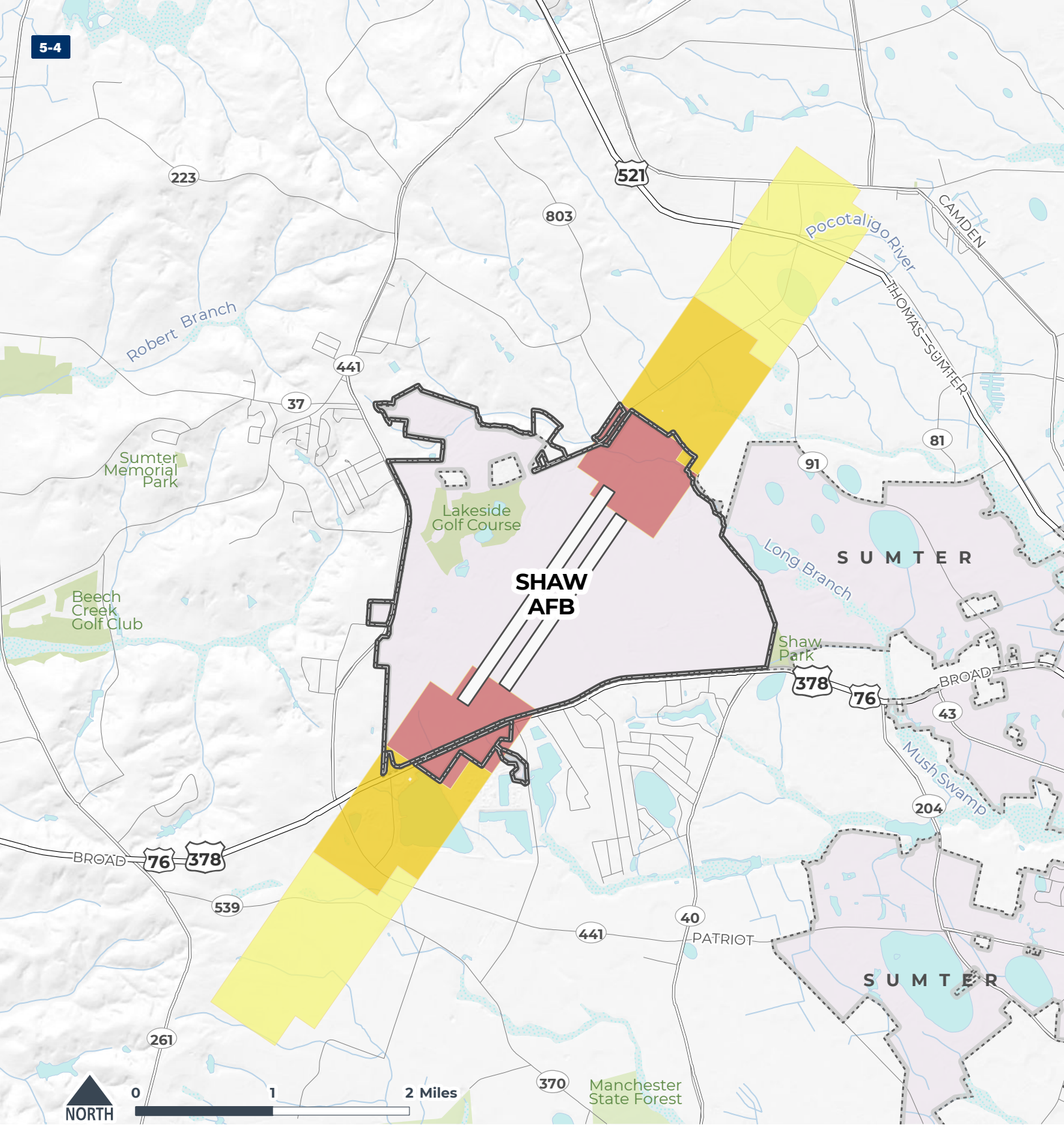


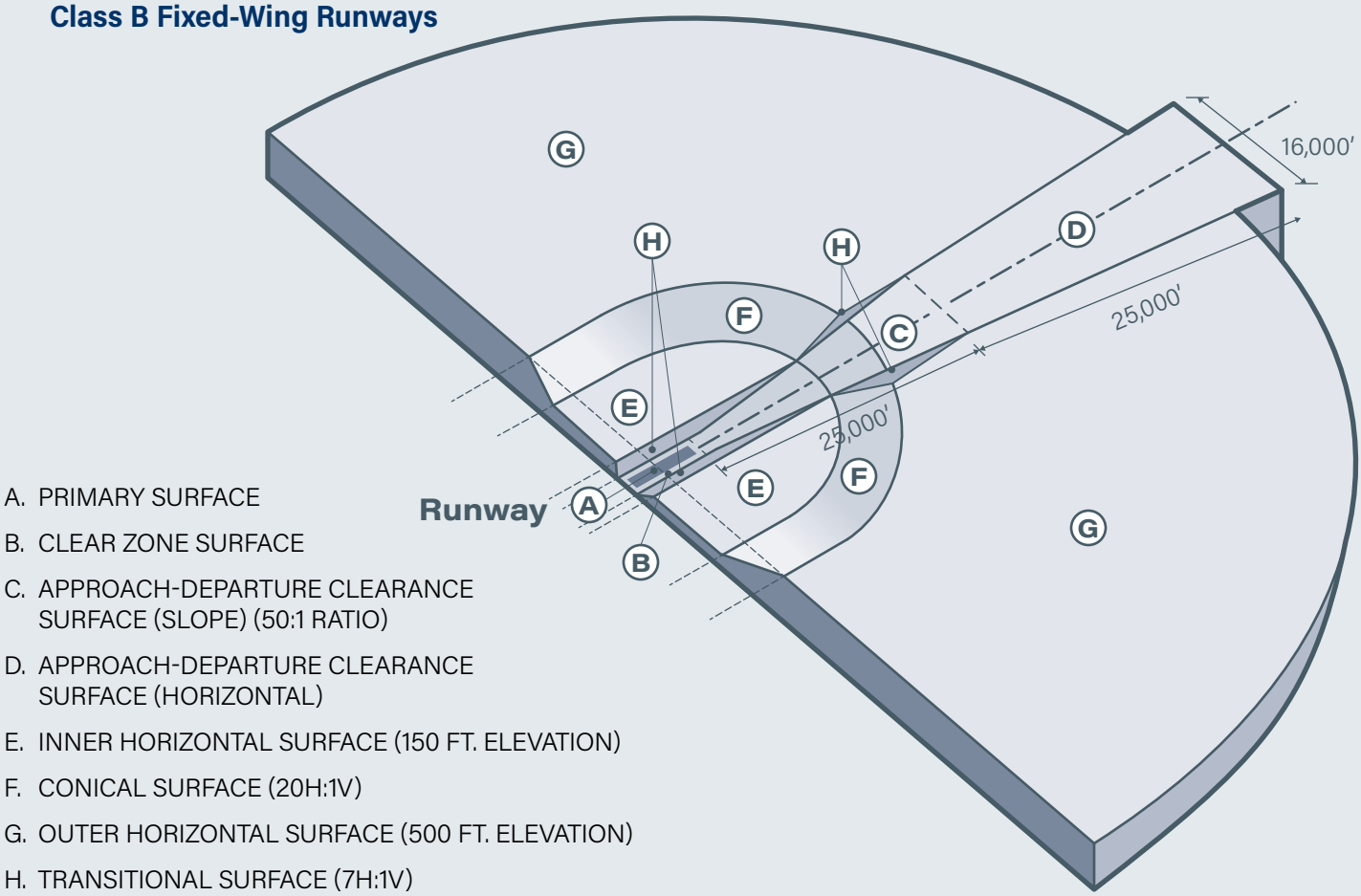
FIGURE 5-2
2024 AICUZ Clear Zones and Accident Potential Zones for Shaw AFB

5.2 IMAGINARY SURFACES

The DoD and Federal Aviation Administration (FAA) identify a complex series of imaginary planes and transition surfaces defining the airspace that needs to remain free of obstructions around an airfield. Obstruction-free imaginary surfaces help ensure safe flight approaches, departures, and pattern operations. Obstructions include natural terrain and built features, such as buildings, towers, poles, wind turbines, cell towers, and other vertical obstructions to airspace navigation.

Fixed-wing runways and rotary-wing runways/helipads have different imaginary surfaces. Brief descriptions of the imaginary surfaces for fixed-wing runways are provided in **Figure 5-3 and in Table 5-2.** **Figure 5-4** depicts the fixed-wing runway airspace imaginary surfaces specific to Shaw AFB. In general, no above-ground structures are permitted in the Primary Surface or CZs, and height restrictions apply to transitional surfaces, as well as approach and departure surfaces. Height restrictions are more stringent as one approaches the runways and flight paths.

FIGURE 5-3
Imaginary Surfaces and Transition Planes for Class B Fixed-Wing Runways

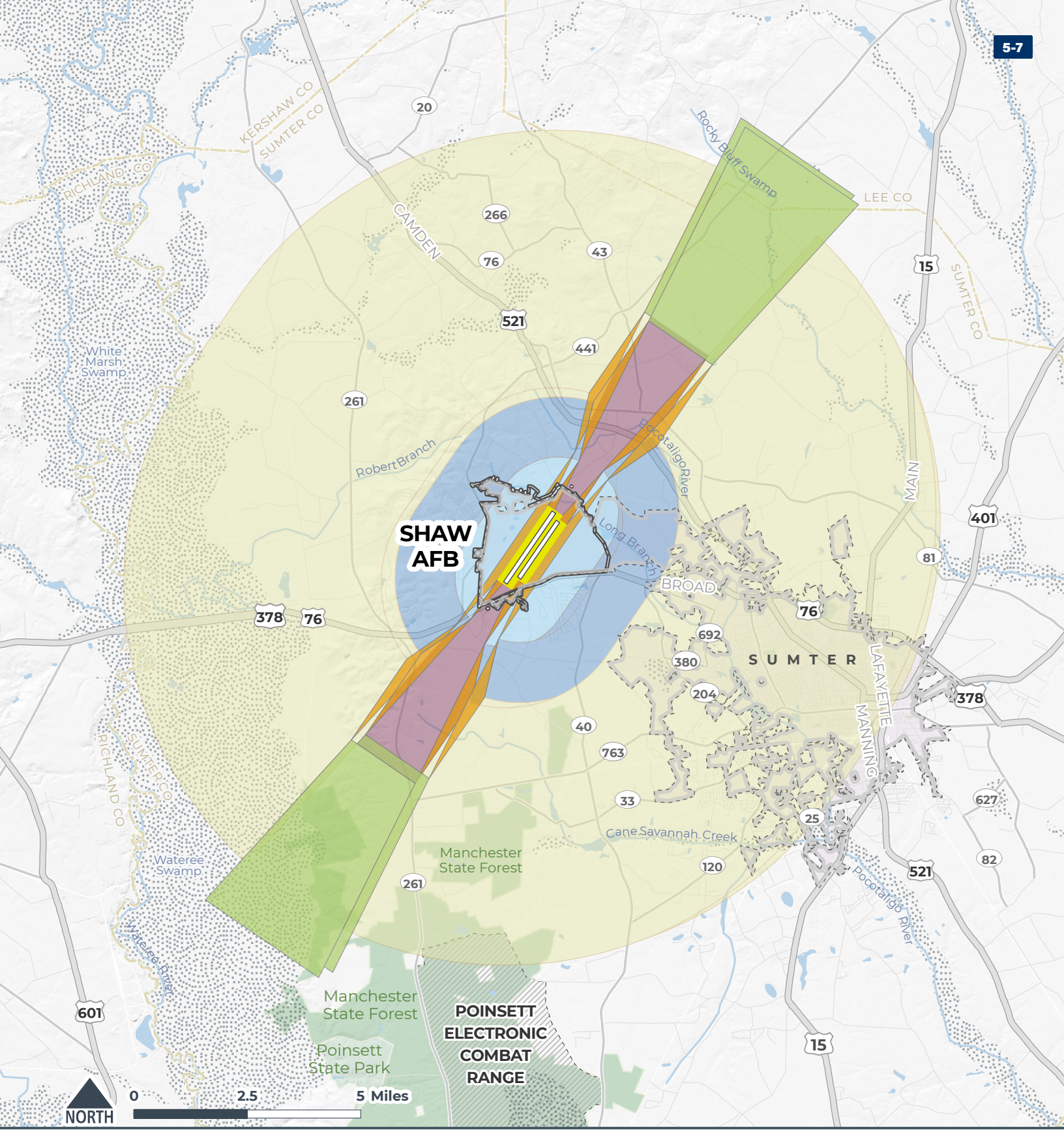


A. PRIMARY SURFACE
B. CLEAR ZONE SURFACE
C. APPROACH-DEPARTURE CLEARANCE SURFACE (SLOPE) (50:1 RATIO)
D. APPROACH-DEPARTURE CLEARANCE SURFACE (HORIZONTAL)
E. INNER HORIZONTAL SURFACE (150 FT. ELEVATION)
F. CONICAL SURFACE (20H:1V)
G. OUTER HORIZONTAL SURFACE (500 FT. ELEVATION)
H. TRANSITIONAL SURFACE (7H:1V)

TABLE 5-2

Descriptions of Imaginary Surfaces for Military Airfields with Class B Runways

Primary Surface	An imaginary surface symmetrically centered on the runway, extending 200 feet beyond each runway end that defines the limits of the obstruction clearance requirements near the landing area. The width of the primary surface is 2,000 feet, or 1,000 feet on each side of the runway centerline.
Clear Zone Surface	An obstruction-free surface (except for features essential for aircraft operations) on the ground symmetrically centered on the extended runway centerline beginning at the end of the runway and extending outward 3,000 feet. The CZ width is 3,000 feet (1,500 feet to either side of runway centerline).
Approach-Departure Clearance Surface	An imaginary surface symmetrically centered on the extended runway centerline, beginning as an inclined plane (glide angle) at the end of the primary surface (200 feet beyond each end of the runway), and extending for 50,000 feet. The slope of the approach-departure clearance surface is 50:1 until it reaches an elevation of 500 feet above the established airfield elevation. It then continues horizontally at this elevation to a point 50,000 feet from the starting point. The width of this surface at the runway end is 2,000 feet, flaring uniformly to a width of 16,000 feet at the end.
Inner Horizontal Surface	This imaginary surface is an oval plane at a height of 150 feet above the established airfield elevation. The inner boundary intersects with the approach-departure clearance surface and the transitional surface. The outer boundary is formed by scribing arcs with a radius of 7,500 feet from the centerline of each runway end and interconnecting these arcs with tangents.
Conical Surface	An inclined imaginary surface extending outward and upward from the outer periphery of the inner horizontal surface for a horizontal distance of 7,000 feet to a height of 500 feet above the established airfield elevation. The slope of the conical surface is 20:1. The conical surface connects the inner and outer horizontal surfaces.
Outer Horizontal Surface	An imaginary surface that is located 500 feet above the established airfield elevation and extends outward from the outer periphery of the conical surface for a horizontal distance of 30,000 feet.
Transitional Surface	An imaginary surface that extends outward and upward at an angle to the runway centerline and extended runway centerline at a slope of 7:1. The transitional surface connects the primary and the approach-departure clearance surfaces to the inner horizontal, the conical, and the outer horizontal surfaces.



- Primary Surface
- Approach/Departure Clearance Surface (Horizontal)
- Transitional Surface (7:1)
- Approach/Departure Clearance Surface (50:1)
- Inner Horizontal Surface
- Conical Surface (20:1)
- Outer Horizontal Surface
- Runway
- Shaw AFB
- Municipal Area

FIGURE 5-4

Imaginary Surfaces and Transition Planes for Shaw AFB

5.3 HAZARDS TO AIRCRAFT FLIGHT ZONE

Certain types of development, particularly vertical obstructions and those that attract wildlife, pose hazards to flight operations and pilot safety. To ensure that flight safety is maintained, the Air Force requests particular attention to compatible land use planning within the Hazards to Aircraft Flight Zone, an area that incorporates the imaginary surfaces that are shown on **Figure 5-4.** Unlike noise zones and safety zones, the HAFZ does not have recommended land use compatibility tables. Instead, it is a consultation zone recommending that project applicants and local planning bodies consult with the Air Force to ensure the project is compatible with Air Force operations. These land use and activity compatibility considerations include:

Height

Tall objects can pose significant hazards to flight operations or interfere with navigational equipment (including radar). City and county agencies involved with approvals of permits for construction should require developers to submit calculations and construction documents which show that projects meet the height restriction criteria of *14 Code of Federal Regulations (CFR) 77.17* for the specific airfield described in the AICUZ Study. City and county agencies may also consider requiring a "Determination of No Hazard" issued by the FAA for any tall objects within this zone.

Construction cranes may be present in the municipalities near Shaw AFB due to new development projects. The City and County will notify Shaw AFB of any temporary vertical obstructions like the cranes within the HAFZ. Shaw AFB has an internal process to ensure that pilots are aware of and avoiding the obstructions.

It is important to maintain communication between localities and the base about vertical obstructions outside of the HAFZ. The region's airspace, including the airspace over the Poinsett ECR, low-level military airspace, military training routes, and special use airspace, are crucial to conducting Shaw AFB's missions in support of training and readiness.

Wind turbines are tall enough to encroach upon low-level flying routes and can introduce man-made changes to an established range environment, potentially diminishing the ability to conduct required operations and training and can impact aircraft subsystems with respect to the radio frequency, electro-optical, and infrared spectrum. Wind turbines also cause clutter impacts on ground-based and airborne radar systems, radio interference, and overflight restrictions.

While wind turbines are not expected within the boundaries of Shaw AFB, there are areas in the vicinity of Shaw AFB that are currently undeveloped or agricultural in nature that could be viable locations for wind energy developments in the future. Localities should notify the DoD Siting Clearinghouse and coordinate with Shaw AFB as soon as possible whenever wind, solar, transmission, or other alternative energy projects are proposed in the region. There are no permanent vertical obstructions that pose an issue to flight operations around Shaw AFB.

Visual Interference

Industrial or agricultural sources of smoke, dust, and steam in the airfield vicinity can obstruct a pilot's vision during takeoff, landing, or other periods of low-altitude flight. Close coordination between the installation and landowners can often mitigate these concerns. For example, irrigating before plowing can greatly reduce dust concerns. There are no current issues with smoke, dust, or steam in the vicinity of the Shaw AFB airfield.

Light Emissions

Bright lights, either direct or reflected, in the airfield vicinity can impair a pilot's vision, especially at night. A sudden flash from a bright light causes a spot or "halo" to remain at the center of the visual field for a few seconds or more, rendering a person virtually blind to all other visual input. This is particularly dangerous for pilots at night when the flash can diminish the eye's adaptation to darkness. The eyes partially recover from this adaptation in a matter of minutes, but full adaptation typically requires 40 to 45 minutes. Specific examples of light emissions that can interfere with the safety of nearby aviation operations include:

- **Lasers that emit in the visible spectrum,** which can be potentially harmful to a pilot's vision during both day and night.
- **The increasing use of energy-efficient LED lighting,** which poses potential conflicts in areas where pilots use night vision goggles (NVGs). NVGs can exaggerate the brightness of these lights, interfering with pilot vision.
- **The use of red LED lights to mark obstructions** can produce an unintended safety consequence: red LED lights are not visible on most NVG models, rendering them invisible to NVG users.

There have not been any reported recent incidents of light emissions that have affected pilot safety.

Bird/Wildlife Aircraft Strike Hazard (BASH)

Wildlife represents a significant hazard to flight operations. Birds in particular are drawn to different habitat types found in the airfield environment, including hedges, grass, brush, forest, water, and even the warm pavement of the runways. Due to the speed of the aircraft, collisions with wildlife can happen with considerable force. Although most bird and animal strikes do not result in crashes, they can cause structural and mechanical damage to aircraft as well as loss of flight time. Most aircraft collisions occur below 2,000 feet. **To reduce the potential of a BASH incident, the Air Force recommends that land uses and natural features that attract birds not be located near installations** with an active air operations mission. These land uses and natural features include, but are not limited to:

- Waste disposal operations
- Wastewater treatment facilities
- Transfer stations
- Landfills
- Golf courses
- Wetlands
- Stormwater ponds
- Dredge disposal sites

Shaw AFB has few land uses that cause recurring BASH-related challenges that attract birds and other wildlife. Tall trees at the end of the runways and BASH issues caused by the three on-base golf course ponds are known issues that are well managed by Shaw AFB and U.S. Department of Agriculture (USDA) personnel. Large bird and animal strikes rarely occur within the vicinity of the airfield. Deer and small wildlife occasionally enter the airfield environment, but these are rare occurrences. Wing Safety and Civil Engineers work well together to close any holes in the airfield fence to preclude animals from entering the airfield.

Shaw AFB Wing Safety, Civil Engineers, Natural Resources, and the BASH Manager, which is a USDA-managed position, mitigate any on-base BASH-related concerns using a variety of strategies including removal and depredation.

The base has an agreement with the Glass Top mining company to manage BASH concerns on their property off the south end of the airfield. Although birds do not typically congregate around the mining area, there are migratory birds that occasionally gather at the site. The company conducts depredation as needed and notifies the base ahead of time when they do so.

Solar panels can also attract birds due to their visual similarity to water and can provide nesting habitat for birds as well. Proposals for solar panel developments should be considered for their proximity to the Shaw AFB airfield and low-level airspace.

Birds and raptors in search of food or rodents will flock to landfills, increasing the probability of BASH occurrences near these facilities. One can also use design modifications to reduce the attractiveness of these types of land uses to birds and other wildlife. While there are several recycling centers in the region, none attract enough birds or animals to interfere with Shaw AFB flight operations.

Radio Frequency/ Electromagnetic Interference

The American National Standards Institute defines electromagnetic interference (EMI) as any electromagnetic disturbance that interrupts, obstructs, or otherwise degrades or limits the effective performance of electronics/electrical equipment.

- **EMI can be induced intentionally**, as in forms of electronic warfare, or unintentionally, because of spurious emissions and responses, such as high-tension line leakage and industrial machinery. In addition, EMI may be caused by atmospheric phenomena, such as lightning or precipitation static.
- **New generations of military aircraft are highly dependent on complex electronic systems** for navigation and critical flight and mission-related functions. Consequently, communities should use care when siting any activities that create EMI. Community activities that create EMI are typically low-level emitters; however, when combined, they can have an additive effect.
- **EMI also affects consumer devices,** such as cell phones, FM radios, television reception, and garage door openers. In some cases, the source of interference occurs when consumer electronics use frequencies set aside for military use.

There have been no recent reported issues with EMI at Shaw AFB.

Drones/Unmanned Aircraft Systems (UAS)

The use of drones near military airfields poses a serious flight safety hazard due to the potential for a mid-air collision between military aircraft and small- to medium-sized drones. The FAA maintains specific guidance about where operators can fly drones (i.e., UAS). Currently, non-DoD drone operations are not permitted within certain zones surrounding military bases. Additional restrictions are in place around airports, sports stadiums, and security sensitive areas. For more information on drone use in and around DoD airfields, visit the FAA's website at: www.faa.gov/uas/getting_started/b4ufly.

- **In 2015, the FAA created a new statutory requirement that applies to all privately owned, unmanned aircraft that weigh more than 55 pounds.** The FAA's goal is to allow the "opportunity to educate new aircraft users before they fly, so that they know the airspace rules and understand that they are ultimately accountable" and responsible for incidents that may occur because of their aircraft.
- **Presently, users are required to register aircraft meeting the aforementioned requirements** in a national database. The registration is web-based, and registrants are required to provide $5 per application. This registration is valid for a period not to exceed three years.
- **The FAA distinguishes between recreational UAS flyers and commercial operators** and has a process for operation of these aircraft. Due to the ever-changing environment, drone operators should visit the FAA website (www.faa.gov/uas) to ensure they have the most up-to-date guidance on how to operate legally and safely.


6
Rembert
521
Wedgefield
18
Swan
Lake Iris
Gardens

6. LAND USE COMPATIBILITY ANALYSIS

CZs, APZs, and noise zones, shown on **Figure 6-1,** make up the AICUZ footprint for an air installation. This footprint defines the minimum recommended area within which land use controls are needed and requested to enhance the health, safety, and welfare of those living or working near a military airfield and to preserve the flying mission. The AICUZ footprint, combined with the guidance and recommendations set forth in the AICUZ Study, are the fundamental tools necessary for the planning process to achieve overall land use compatibility. The Air Force recommends that local and regional governments adopt the AICUZ noise zones, CZs, APZs, and HAFZ into planning studies, regulations, and processes to promote compatible development around installations.

6.1 LAND USE COMPATIBILITY GUIDELINES AND CLASSIFICATIONS

To establish long-term compatibility for lands near military air installations, the DoD has created land use compatibility recommendations based on the *Federal Highway Administration's (FHWA) Standard Land Use Coding Manual (SLUCM).* These guidelines are used by DoD personnel for on-installation planning and for engaging with the local community to foster compatible land use development off-installation. **Table A-1 of Appendix A** shows the suggested land use compatibility guidelines within the CZs and APZs. **Table A-2 of Appendix A** provides land use compatibility recommendations within aircraft noise zones.

Section 6.4 presents the compatibility analysis and concerns within noise zones and APZs associated with Shaw AFB.

6.2 PLANNING AUTHORITIES, STAKEHOLDERS, AND POLICIES

This section presents information for each governing body that has land use jurisdictions near Shaw AFB, including descriptions of existing and future land uses, relevant stakeholder groups, and existing compatible planning policies and regulations.

State of South Carolina Land Use Planning and Zoning

In the State of South Carolina, land use planning and zoning is delegated to municipal and county governments through the **1975 Home Rule Act.** Local governments are empowered to create comprehensive land use plans and may choose to join a joint planning commission to administer and coordinate their implementation. Thus, there are neither statewide land use planning regulations nor state-enabling legislation for any type of state or regional land use planning.

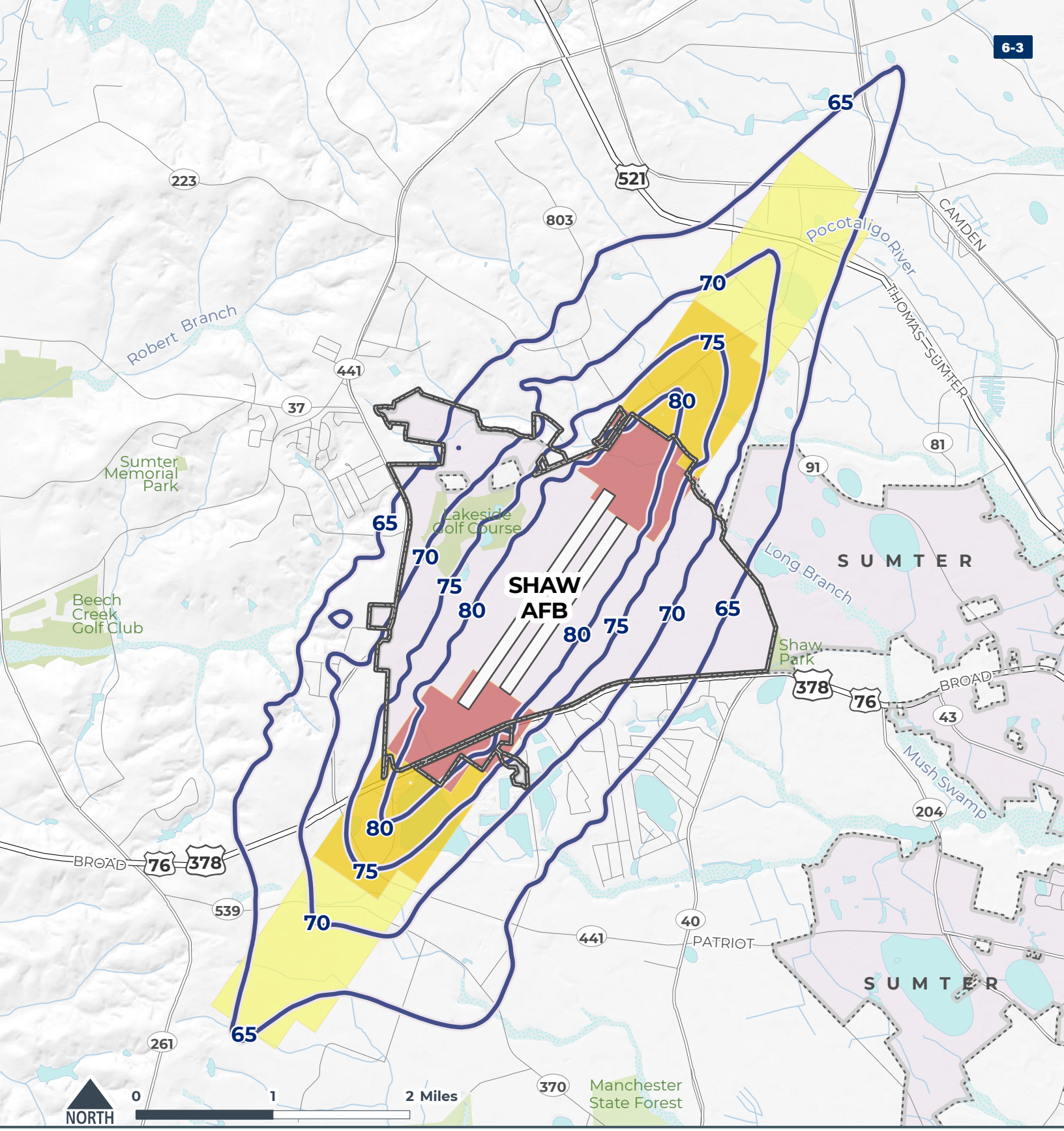
Section 6-29-1630 of the South Carolina Code includes regulations for planning departments or entities regarding land use decisions within federal military installation overlay zones or areas within 3,000 feet of such installations. It requires that, prior to public hearings, the planning department must request a written recommendation from the federal military installation commander. Additionally, the incorporation of identified boundaries and restrictions for military installations is under the designation of local governments.

State of South Carolina Military Coordination Act

This act is part of the Federal Defense Facilities Utilization Integrity Protection Act of 2004, which is found in state code 6-29-1610. This act establishes statutory notice and comment requirements for land use and zoning decisions made to federal defense facilities, including Shaw AFB's imaginary surface hazard areas.

South Carolina Military Base Task Force (MBTF)

The Military Base Task Force, mandated by **South Carolina Executive Order 2001-31,** is composed of the South Carolina Adjutant General, local elected government officials, and community members. This group monitors national trends and statewide efforts related to mission sustainment and military value and matters related to encroachment. Since its establishment in 2001, the MBTF has played a pivotal role in championing significant military legislation, such as the Workforce Enhancement and Military Recognition Act. The MBTF also holds a leadership position within the Veterans Policy Advisory Committee.



2024 AICUZ Contours (dB)
Clear Zone (CZ)
Accident Potential Zone (APZ-I)
Accident Potential Zone (APZ-II)
Runway
Shaw AFB
Municipal Area

FIGURE 6-1
2024 Shaw AFB Composite AICUZ Footprint

Midlands Area Joint Installation Consortium (MAJIC)

MAJIC was formed in 2007 to protect training resources at Shaw AFB and four other South Carolina military installations. Its focus is to prevent encroachment that could cause noise, dust, and smoke complaints from military exercises. Through the Readiness and Environmental Protection Integration (REPI) Program, MAJIC has implemented conservation easements, received funding totaling almost $10 million, and protected over 22,000 acres of land. MAJIC is also currently working with local landowners to discourage encroachment and incompatible land uses.

Santee-Lynches Regional Council of Governments

The Santee-Lynches Regional Council of Governments is a consortium of local governments in a four-county region that includes Sumter County and the City of Sumter. The Council of Governments works with communities on issues of regional significance, including transportation, water quality, hazard mitigation, and economic development. Maintaining and protecting Shaw AFB is an economic development priority for the Council of Governments.

City and County of Sumter

The City and County of Sumter have a long history of supporting the Shaw AFB mission by implementing zoning ordinances and comprehensive plans that promote compatible land uses around the installation. Planning, zoning, and development matters in the City of Sumter and Sumter County are jointly managed by one planning department. This department provides guidance for long-term growth and assistance for technical planning and zoning.

Zoning

Zoning is one of the local government's most powerful tools for supporting Shaw AFB. The City-County zoning ordinance applies to properties in the city and county, including properties adjacent to Shaw AFB. There are several zoning districts in the Sumter City-County zoning ordinance that specifically promote compatibility with Shaw AFB's flying and range operations:

- **The Airfield Compatibility District (ACD) and Range Compatibility District (RCD)** designations limit the number of people concentrated per hour and types of land uses within the district. Permitted land uses vary according to the APZ and DNL overlays; for instance, no residential construction is permitted within APZ I or II but is permitted in the various noise zones within the ACD beyond the APZs.

Certain types of industrial/manufacturing uses are permitted within the APZs, depending on the types of emissions that they produce, as are certain types of commercial uses, depending on the number of people who are typically present on site. Service uses (e.g., warehouses, offices) can be permissible if they do not attract large amounts of people. Most forms of recreation or cultural activities are not permitted in the APZs, with a few exceptions (e.g., parks, golf). Open land and resource production are generally permissible in all APZs, but there are restrictions on uses that attract wildlife.

- **The Density Dispersion Zone (DDZ)** is an overlay district in the zoning ordinance that is applied both inside and outside the ACD. While it does not prohibit residential development altogether, it discourages population density within the ACD by increasing minimum lot sizes and setbacks.
- **Per local ordinance (Sumter County Article 5.b.1),** developers who wish to construct solar arrays within 5 NM of Shaw AFB must notify the Shaw AFB/Poinsett ECR Military Wing Commander of their intent to develop a solar energy system. Shaw AFB/Poinsett ECR will be given 21 days to submit comments, which will then be submitted with the developer's conditional use application. The developer has the burden of proof to demonstrate that the solar array will not have a significant impact on aviation operations.

Building Permits

The building department is also a joint department for the City and County. The department is responsible for inspecting buildings and reviewing plans for compliance with residential and commercial codes. Sumter City-County does not have a formal process to

review building plans for noise attenuation standards. For many years, the preferred building material was brick, so noise was not an issue, but in the last 10-15 years use of vinyl siding has increased, which reduces noise attenuation. The building department requires that all plats of record have a stamp that indicates the land is within a noise notification zone.

Planning Coordination

Although there is no formal plan review process between Shaw AFB and Sumter City-County, Sumter planning staff send rezoning and redevelopment applications to Shaw AFB for review via the joint City-County Planning Commission listserv. Shaw AFB reviews major subdivision applications within the Military Planning Protection Area prior to City-County approval.

Comprehensive Planning

The City and County maintain a joint comprehensive plan that addresses the city and unincorporated areas of the county. It is a policy document used by city leaders, developers, business owners, and citizens to make decisions about future growth, development, policy, and capital improvements. The Sumter 2040 Comprehensive Plan was adopted in 2019 and reflects a 20-year planning horizon.

The State of South Carolina requires localities to update their comprehensive plans every five years and to be rewritten every 10 years. The 2040 comprehensive plan update reflects changes in population and housing that have occurred since the 2030 plan was completed in 2009. One of the plan's overarching goals is "To protect Shaw AFB and Poinsett Range, its facilities and its mission, from unwanted and incompatible development encroachment."

The *Sumter 2040 Comprehensive Plan* establishes a Military Protection Planning Area as a future land use category, which is intended to protect Shaw AFB from incompatible land uses and reduce impacts of noise contours and APZs to citizens. The area discourages high concentrations of people by limiting allowable land uses, prohibiting public water-sewer utility extensions, supporting land conservation practices, and establishing noise attenuation standards for all new facilities.

MILITARY PLANNING PROTECTION AREA

This future land use category encompasses lands surrounding Shaw AFB and Poinsett ECR. Land use controls here are designed to limit certain types of development that are incompatible with military operations, and Shaw AFB can submit input on development proposals in this area.

There are parcels around Shaw AFB that are categorized as the Rural Development Area land use category in the comprehensive plan.

The comprehensive plan also supports compatible land uses around Shaw AFB by guiding future development towards designated suburbs, Priority Investment Planning Areas, and within the Sumter City downtown core, areas that are already served by public sewer and water utilities, and away from rural areas that are not currently served by utilities.

In 2016, the City and County worked together to complete a Joint Land Use Study (JLUS) to promote responsible land use, accommodate compatible growth and economic development, protect public safety and quality of life, and sustain the mission of the Air Force in the region for the long term. The City and County have proactively pursued adopting the recommendations of the JLUS in their zoning ordinances and 2040 Comprehensive Plan, including adjusting the boundaries of the Military Protection Planning Area, requiring noise level reduction (NLR) standards to be adopted for all new housing within the Military Protection Planning Area, requiring noise hazard signage in subdivisions within the ACD zoning district, and coordinating with Shaw AFB on redevelopment and rezoning proposals.

Sumter City and County have also acquired over 3,000 acres of land surrounding the base to keep development from encroaching on the installation.

6.3 LAND USE AND PROPOSED DEVELOPMENT

Local zoning ordinances and land use plans serve as indicators of projected development and potential growth areas in a community. This AICUZ Study evaluates the zoning and land uses applied to parcels within the Shaw AFB AICUZ footprint to determine land use compatibility conditions. Land use and zoning geographic information system (GIS) data used to inform this analysis were obtained from the City and County of Sumter.

Local land and zoning codes commonly, but not always, categorize land use around the following broad categories:

- **Residential.** Designations and zoning for family and personal living including rural/low-density development (e.g., large lot single-family dwellings and mobile and manufactured housing), medium-density developments (e.g., small lot single-family dwellings, duplexes, triplexes, and quadplexes), and high-density developments (e.g., apartment complexes, condominiums, and residential towers).
- **Retail, Service, and Commercial.** Includes food establishments, entertainment, indoor recreation, retail sales and personal services, vehicle sales and services, big box establishments, strip malls, and hotels and lodging.
- **Office.** Includes semi-professional and professional office uses (medical, financial, administrative, etc.).
- **Industrial:** Includes manufacturing uses (e.g., textiles, food, printing, chemicals, professional), light industrial uses (e.g., vehicle storage, sign making, craftsman, and skilled trades like carpentry and welding), heavy industrial uses (e.g., asphalt and concrete batching, wrecking and salvage yards, petrochemical refineries, heavy equipment, seaports), warehousing and freight uses, and waste-related industries.
- **Public, Civic, and Institutional.** Includes school uses (primary, secondary and post-secondary), day care centers, hospitals, government uses (e.g., fire and rescue, police, libraries), places of worship, and parks and open space (passive and active, natural features such as wetlands, floodplains, and forests).
- **Agricultural.** Includes crop, livestock, and poultry farming uses; forestry and timber farming uses; and aquaculture uses.
- **Master and Planned Unit Development (MPUD and PUD).** Includes areas of planned development or growth, which can include various mixed uses and or densities; it can also include conservation areas.
- **Mixed Use.** A blend of multiple uses (residential, commercial, office, cultural, institutional, and/or industrial) may be proposed.
- **Transportation/Utility.** Includes rights of way uses and major and minor utility uses (e.g., water utilities, sewage and waste utilities, electric utilities).

The specific zoning and land use categories used by each local government may vary; in order to streamline the analysis of land use compatibility surrounding Shaw AFB, these detailed categories are consolidated into the broader categories below:

- **Residential.** Includes all types of residential activity, such as single- and multi-family residences and rural residential and mobile homes.
- **Commercial.** Includes offices, retail stores, hospitality/restaurants, and commercial establishments.
- **Industrial.** Includes manufacturing, warehouses, and other similar uses.
- **Public/Quasi-Public.** Includes publicly owned lands and utilities and land to which the public has access, including public buildings, schools, churches, cemeteries, and hospitals.
- **Open/Agriculture/Low Density.** Includes passive open space, agricultural areas, and areas with low-density residential activity.
- **Undesignated.** Includes undeveloped parcels and some parcels that had no indicated value or were listed as "undesignated" or "vacant."

It then falls upon the community (base) planner to rectify the discrepancies between the DoD's use of SLUCM standards and all the relevant local jurisdiction's land use typologies in order to provide a meaningful analysis. **Appendix A, Land Use Compatibility Tables,** provides further descriptions of the SLUCM land use categories along with notes on general allowable uses for Shaw AFB surrounding jurisdictions.

The land use compatibility analysis performed as part of this AICUZ Study follows DoD and Air Force guidance to determine whether land uses surrounding Shaw AFB are compatible with air operations. Local management plans, policies, ordinances, and zoning regulations were evaluated to determine the type and extent of land use allowed in specific areas.

Because the City and County do not maintain existing land use data, there is no formal evaluation of the actual land uses present within the AICUZ footprint, which may not adhere to their zoning classifications or designated planning or permitted uses. However, the existing land uses within the footprint are well known to base and local government planners and do not vary considerably from parcel to parcel. They are mostly low-density residential, agricultural, open space, or industrial in nature.

6.3.1 CURRENT ZONING

All land surrounding Shaw AFB is zoned. **Figure 6-3** overlays the 2024 Shaw AFB AICUZ Study noise contours, CZs, and APZs on current generalized zoning in the vicinity of Shaw AFB (for details on how the generalized zoning layer was created, see **Appendix C**).

Most of the land within the southern APZ I is zoned as Industrial. In the northern APZ I, the land is mostly zoned as Open Space/Agricultural/Low Density, with some Industrial zoning on the east side of the APZ I zone.

Land within APZ II is currently zoned as Industrial, Open Space/Agricultural/Low Density, Commercial, and Residential. South of the runways, the area within APZ II is mostly zoned Open Space/Agricultural/Low Density, with some Industrial zoning in the northwest corner of the zone. North of the runways, the area within APZ II is mostly zoned as Open Space/Agricultural/Low Density, with some Residential zoning in the northeast corner, and Commercial zoning along the major roadways within the zone.

The majority of parcels that are near the installation and outside of the city limits are zoned for Open Space/Agricultural/Low Density and Residential; within the city limits, zoning is predominantly Residential and Commercial.

There is commercially zoned land immediately adjacent to the Shaw AFB perimeter to the south and southwest along major roadways. There is further commercial zoning north of the installation along US-521 and east within the City of Sumter. Commercial zones near Shaw AFB are Limited Commercial, which is smaller and less intense of a use, and General Commercial, which permits larger and more intense development.

There are Industrial areas immediately adjacent to the Shaw AFB perimeter to the northeast at the edge of the runways to Stamey Livestock Road and a large tract of land to the south along US-378. This Industrial area encompasses lands bordered by Kings Highway to the west, Cane Savannah Road and Patriot Parkway to the south, Mush Swamp Creek to the east and US-378 to the north. There is further Industrial zoning south of the installation along St. Paul's Church Road north of the intersection with Patriot Parkway. Industrial zones near Shaw AFB include Light Industrial/Warehouse and Heavy Industrial. The Light Industrial/Warehouse zone permits wholesaling, distribution, storage, processing, and light manufacturing, while the Heavy Industrial zone permits much more intense manufacturing uses.

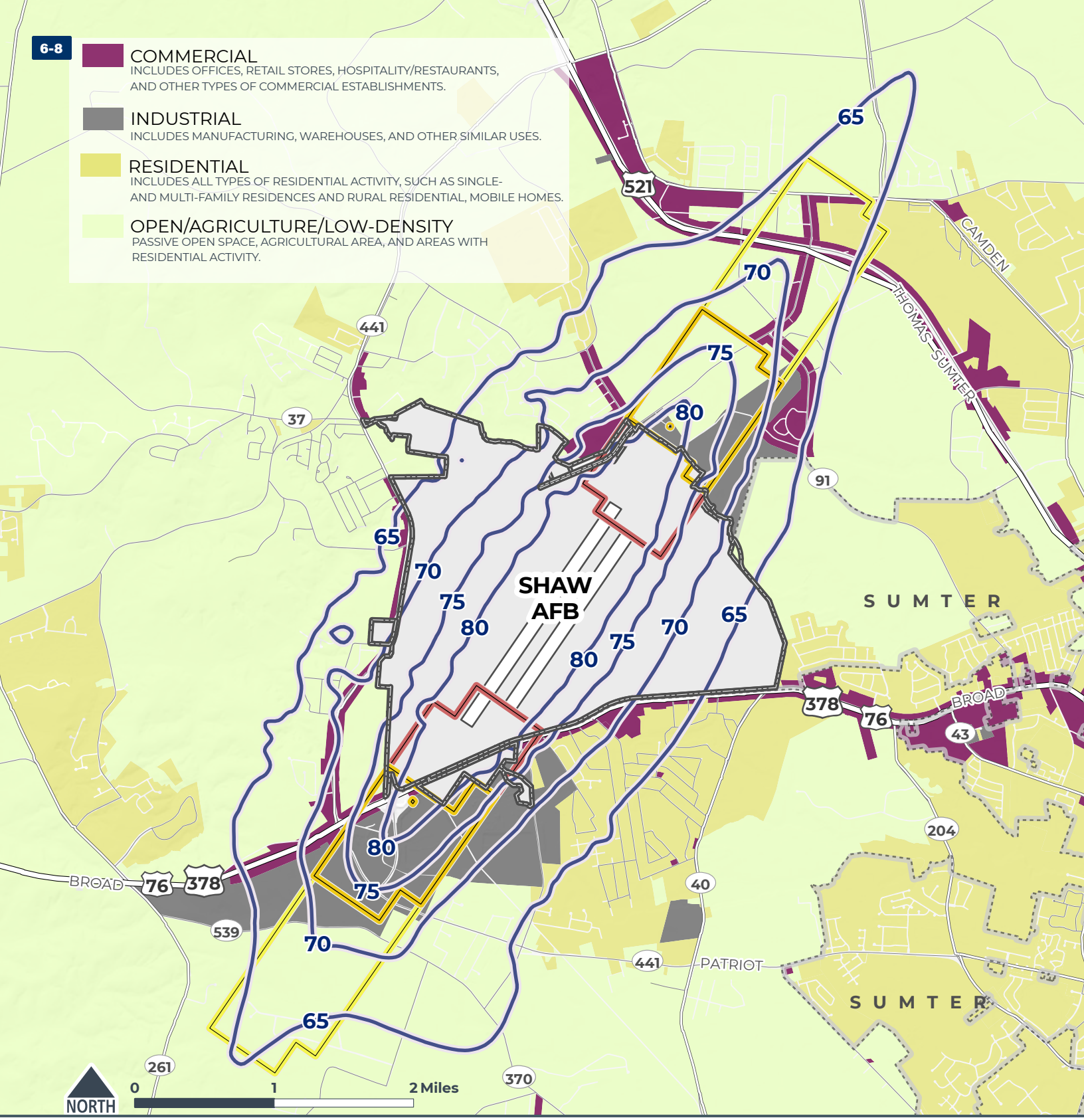


FIGURE 6-2

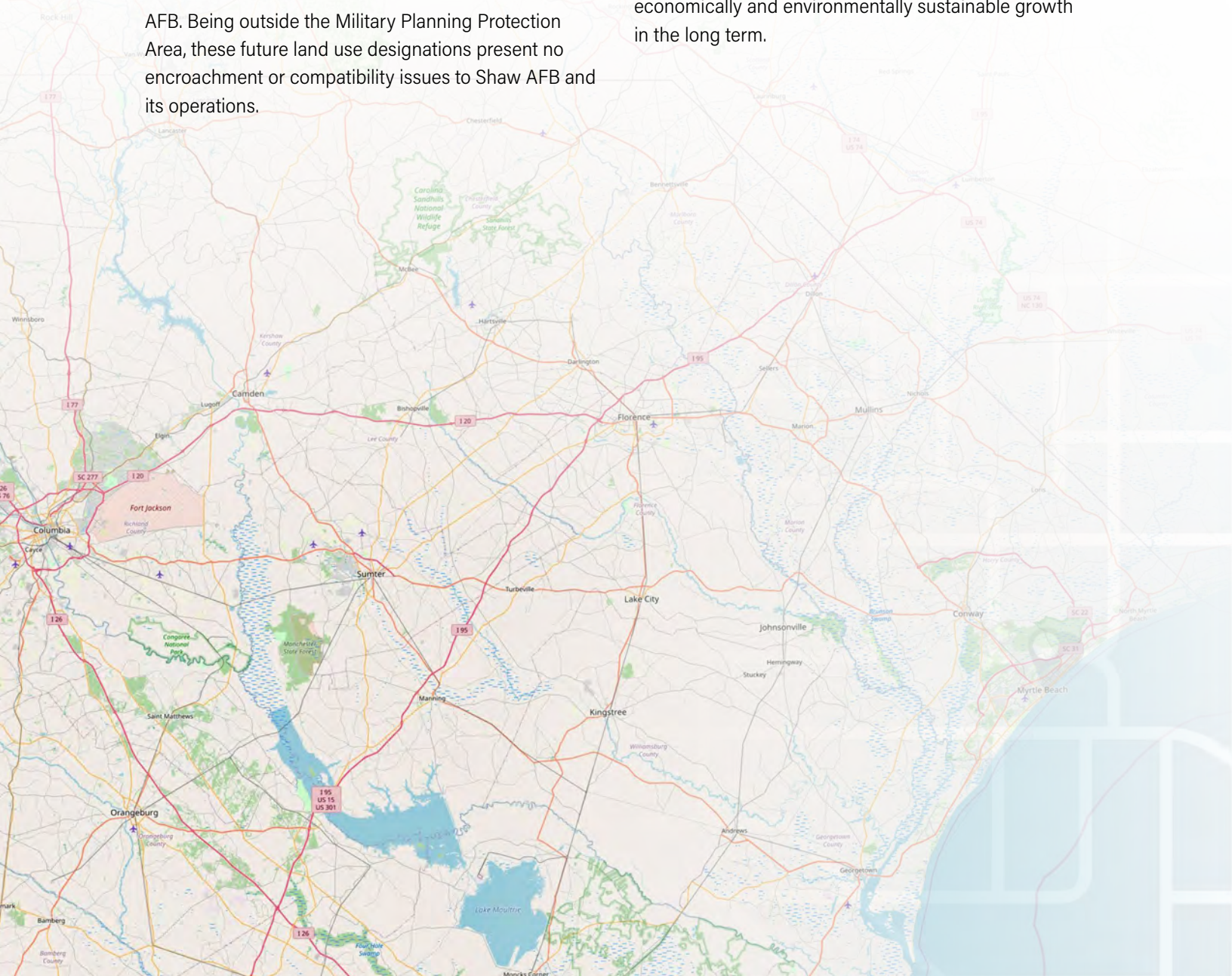
Existing Zoning and 2024 Shaw AFB AICUZ Study Noise Contours, CZs, and APZs

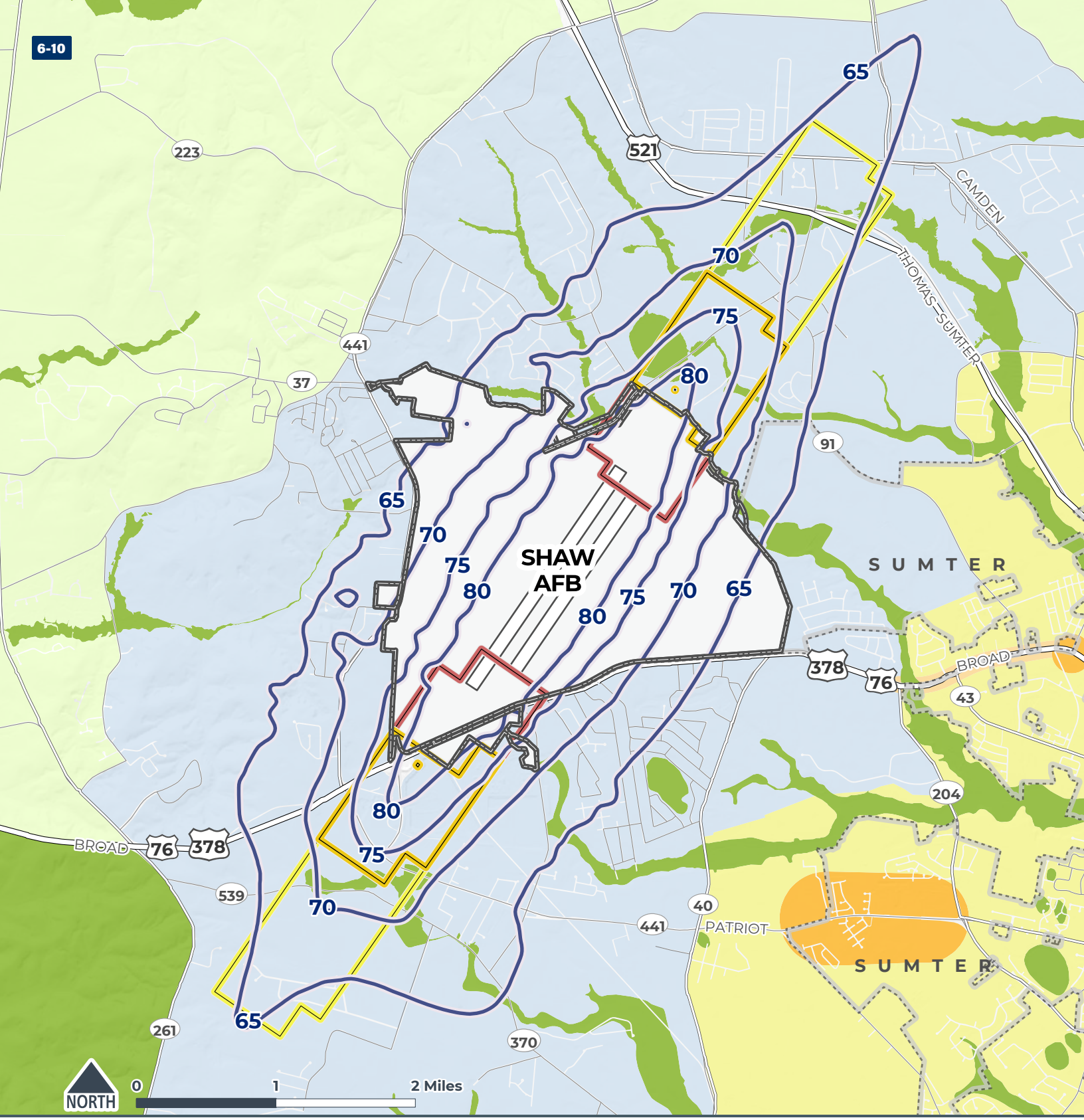
6.3.2 FUTURE LAND USE

Figure 6-3 shows generalized future land use surrounding Shaw AFB area that was determined by the Sumter 2040 Comprehensive Plan. The land use within the noise and safety zones is predominantly the Military Protection Planning Area, with some Conservation Planning Areas present to the north and south of the installation.

Land outside the Military Protection Planning Area and the Sumter city limits is primarily designated as Rural Development Area and Conservation Development Area in the Sumter 2040 Comprehensive Plan. Within the city limits to the east, there are zones for Priority Commercial Corridor and Priority Commercial Mixed Use near the eastern and southeastern limits of Shaw AFB. Being outside the Military Planning Protection Area, these future land use designations present no encroachment or compatibility issues to Shaw AFB and its operations.

Prior to the enaction of supportive land use regulations, residential growth occurred along the major thoroughfares between the City of Sumter and Shaw AFB. If this development had continued in this pattern, it would have presented significant encroachment and land use compatibility issues for Shaw AFB. However, the recent *Sumter Comprehensive Plans (2030 and 2040)* use land use designations to discourage additional incompatible development near the installation, instead encouraging greater density toward the city and where it can be best served by existing infrastructure. This ultimately benefits both the community and Shaw AFB by enabling the base to fulfill its mission while the community pursues economically and environmentally sustainable growth in the long term.





- 2024 AICUZ Contours (dB)
- Clear Zone (CZ)
- Accident Potential Zone (APZ-I)
- Accident Potential Zone (APZ-II)
- Runway
- Shaw AFB
- Municipal Area
- Conservation Planning Area
- Military Protection Planning Area
- Priority Commercial Corridor Area
- Priority Commercial Mixed Use Area
- Rural Development Area
- Suburban Development Area

FIGURE 6-3

Future Land Use and 2024 Shaw AICUZ Study Noise Contours, CZs, and APZs

6.4 COMPATIBILITY CONCERNS

6.4.1 LAND USE ANALYSIS

Land use describes how land is developed and managed. It is characterized by the dominant function occurring in the area. To compare land uses across jurisdictions that use different classification schemes, this analysis established generalized categories that refer to common land use types (e.g., commercial, industrial, residential) rather than specific types (e.g., high-density residential, medium-density residential, low-density residential). These generalized categories are therefore not exact representations of the local community's land use designations, but they allow for a high-level comparison of land use compatibility at the regional scale.

The DoD recommends that the compatibility analysis portion of the AICUZ studies reference the generalized land use categories described in the SLUCM standards **(Tables A-1 and A-2 of Appendix A). Table 6-1** shows the list of these categories in the left column. In the compatibility analysis, each parcel's land use is classified into one of the four categories:

1. **Compatible**
2. **Compatible with Restrictions**
3. **Incompatible**
4. **Incompatible with Exceptions**

The conditionally compatible land use (i.e., categories 2 and 4) may require other modifications to be deemed compatible, such as noise attenuation measures in the design and construction of structures (in high noise zones) or density limitations (in the APZs).

TABLE 6-1

Generalized Land Use Categories and Noise/Safety Compatibility[1]

	NOISE ZONES (dB DNL)						APZs		
GENERALIZED LAND USE CATEGORY	<65	65-70	70-75	75-80	80-85	85+	CZ	APZ I	APZ II
Residential	Yes	No[2]	No[2]	No	No	No	No	No	No[3]
Commercial	Yes	Yes	Yes[4]	Yes[4]	No	No	No	Yes[4]	Yes[4]
Industrial	Yes	Yes	Yes	Yes	Yes[4]	No	No	Yes[4]	Yes[4]
Public/Quasi-Public	Yes	Yes[4]	Yes[4]	Yes[4]	No	No	No	No	Yes[4]
Open/Agriculture/Low Density	Yes	Yes[4]	Yes[4]	Yes[4]	Yes[4]	Yes[4]	No	Yes[4]	Yes[4]

Key: COMPATIBLE | COMPATIBLEWITH RESTRICTIONS | INCOMPATIBLE | INCOMPATIBLE WITH RESTRICTIONS

Adapted from *Air Force Handbook (AFH) 32-7084.*

1 This generalized table demonstrates the land compatibility guidelines. Refer to **Appendix A** for use in determining land use compatibility.

2 Residential land uses within the greater than 65 dB DNL noise zone are considered incompatible. However, if residential uses are considered essential, noise-attenuation measures should be incorporated into the building structures.

3 Residential land uses in APZ II are considered incompatible, with the exception of when residential development is limited to less than two dwellings per acre.

4 Compatible with restrictions indicates that some mitigation measures are needed for these uses to ensure full compatibility with air operations. **See Appendix A,** Land Use Compatibility Tables, for more information.

6.4.2 ZONING COMPATIBILITY CONCERNS

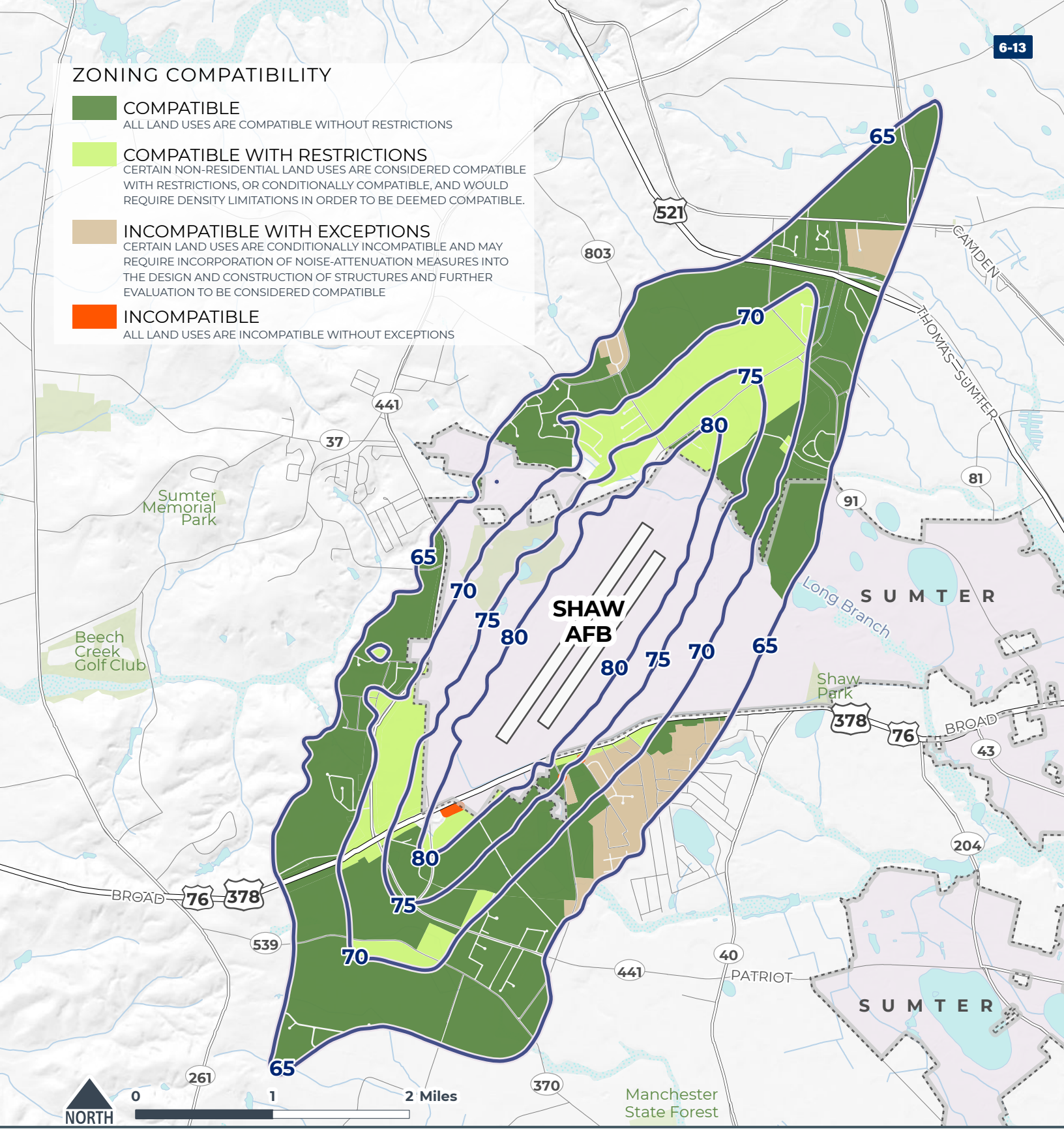
As shown in **Table 6-2 and Figure 6-4,** the vast majority of zoning use acreage within noise zones is compatible with air operations. Approximately 5,490 acres—or 93% of the total acreage within the noise zones for Shaw AFB—are considered compatible or compatible with restrictions with aircraft operations. Compatible land uses within the noise zones include commercial (572.70 acres), industrial (1,231.13 acres), and open/agricultural/low-density (3,685.87 acres).

There are a total of 434.58 acres of land surrounding Shaw AFB that are classified as incompatible or incompatible with exceptions, including commercial uses in the 80+ dB DNL noise zone (2.92 acres) and residential uses in the 65-74 dB DNL noise zone (431.66 acres). The residential zoning in the 65-74 dB DNL noise zone corresponds to neighborhoods that existed prior to the City and County enacting compatible land use policies; these include the mobile/manufactured home neighborhoods on Broad Street and Cherryvale Drive. New manufactured/mobile home park developments are no longer permitted in the area around Shaw AFB based on current zoning ordinances, but pre-existing neighborhoods have been grandfathered in. A small commercial development south of US-378 is located within the 80 dB DNL noise zone and is considered incompatible.

TABLE 6-2
Off-installation Zoning Acreage within Noise Zones

DESIGNATION	GENERALIZED LAND USE CATEGORY [1]	65-69 dB	70-74 dB	75-79 dB	80+ dB	TOTAL
Incompatible or Incompatible with Exceptions	Residential	380.45	51.21	—	—	**431.66**
	Commercial	—	—	—	2.92	**2.92**
	Industrial	—	—	—	—	**—**
	Public/Quasi-Public	—	—	—	—	**—**
	Open Space/Agriculture/Low Density	—	—	—	—	**—**
	Transportation/Utility	—	—	—	—	**—**
Compatible or Compatible with Restrictions	Residential	—	—	—	—	**—**
	Commercial	353.80	152.61	66.29	—	**572.70**
	Industrial	344.28	534.23	282.81	69.81	**1,231.13**
	Public/Quasi-Public	—	—	—	—	**—**
	Open/Agriculture/Low Density	2,755.08	711.91	202.51	16.37	**3,685.87**
	Transportation/Utility	—	—	—	—	**—**
SUB-TOTAL	**Incompatible**	**380.45**	**51.21**	**—**	**2.92**	**434.58**
	Compatible	**3,453.16**	**1,398.75**	**551.61**	**86.18**	**5,489.70**
TOTAL		**3,833.61**	**1,449.96**	**551.61**	**89.10**	**5,924.28**

1 Refer to **Appendix A** for Details.



2024 AICUZ Contours (dB)

Runway

Shaw AFB

Municipal Area

FIGURE 6-4

Existing Zoning Compatibility within Noise Contours

It is worth noting that there are nearly 70 acres of incompatible industrial zoned land within the 80+ dB DNL noise zone on the south side of the base that are home to a concrete plant. This use existed prior to the enactment of compatible land use policies and was therefore also grandfathered in. Industrial uses are considered compatible with restrictions; it is important for the base to continue coordinating with the owner of this parcel in order to prevent plant activities from interfering with Shaw AFB air operations.

As shown in **Table 6-3 and Figure 6-5,** the majority of zoning designations within CZs and APZs are compatible with air operations. Approximately 1,960 acres—or 94% of the total acreage within the CZs and APZs for Shaw AFB—are considered compatible or compatible with restrictions, including commercial (161.5 acres), industrial (629.66 acres), and open/agricultural/low-density (1,168.37 acres) zoned parcels.

There are around 120 acres of zoned parcels that are considered incompatible or incompatible with exceptions, including commercial (4.62 acres), industrial (35.29 acres), and residential (79.96 acres).

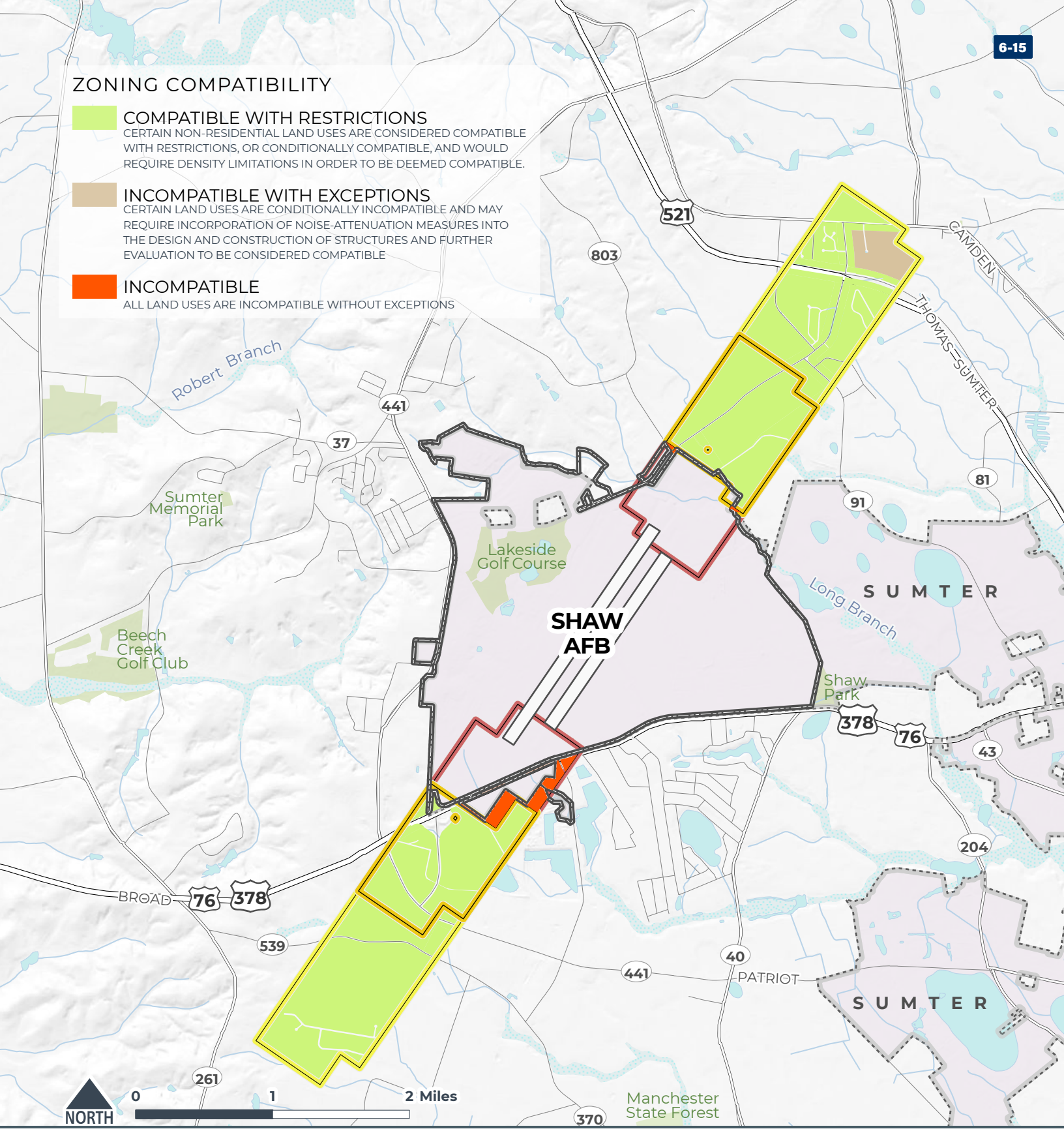
The industrial zoning designation located within the CZ to the south of the base covers an existing mining operation east of Shaw Drive. There is also an 80-acre residential zoned development within APZ II that has manufactured/mobile homes at a density greater than what would be considered compatible. This type of land use is legally nonconforming (grandfathered); new development of this type is now prohibited.

TABLE 6-3

Off-installation Zoning Acreage within Clear Zones and Accident Potential Zones

DESIGNATION	GENERALIZED LAND USE CATEGORY [1]	CZ	APZ I	APZ II	TOTAL
Incompatible or Incompatible with Exceptions	Residential	—	—	79.96	**79.96**
	Commercial	4.62	—	—	**4.62**
	Industrial	35.29	—	—	**35.29**
	Public/Quasi-Public	—	—	—	**—**
	Open/Agriculture/Low Density	—	—	—	**—**
	Transportation/Utility	—	—	—	**—**
Compatible or Compatible with Restrictions	Residential	—	—	—	**—**
	Commercial	—	18.08	143.42	**161.5**
	Industrial	—	516.64	113.02	**629.66**
	Public/Quasi-Public	—	—	—	**—**
	Open Space/Agriculture/Low Density	—	298.14	870.23	**1,168.37**
	Transportation/Utility	—	—	—	**—**
SUB-TOTAL	**Incompatible**	**39.91**	**—**	**79.96**	**119.87**
	Compatible	**—**	**832.86**	**1,126.67**	**1,959.53**
TOTAL		**39.91**	**832.86**	**1,206.63**	**2,079.4**

1 Refer to **Appendix A** for Details.



Clear Zone (CZ)

Accident Potential Zone (APZ-I)

Accident Potential Zone (APZ-II)

Runway

Shaw AFB

Municipal Area

FIGURE 6-5

Existing Zoning Compatibility within CZs and APZs

TABLE 6-4
Off-installation Future Land Use Acreage within Noise Zones

DESIGNATION	GENERALIZED LAND USE CATEGORY [1]	65-69 dB	70-74 dB	75-79 dB	80+ dB	TOTAL
Incompatible or Incompatible with Exceptions	Residential	—	—	—	—	—
	Commercial	—	—	—	—	—
	Industrial	—	—	—	—	—
	Public/Quasi-Public	—	—	—	—	—
	Open/Agriculture/Low Density	3,833.59	1,451.20	552.99	89.96	**5,927.74**
	Transportation/Utility	—	—	—	—	—
Compatible or Compatible with Restrictions	Residential	—	—	—	—	—
	Commercial	—	—	—	—	—
	Industrial	—	—	—	—	—
	Public/Quasi-Public	—	—	—	—	—
	Open Space/Agriculture/Low Density	—	—	—	—	—
	Transportation/Utility	—	—	—	—	—
SUB-TOTAL	**Incompatible**	**3,833.59**	**1,451.20**	**552.99**	**89.96**	**5,927.74**
	Compatible	**—**	**—**	**—**	**—**	**—**
TOTAL		**3,833.59**	**1,451.20**	**552.99**	**89.96**	**5,927.74**

1 Refer to **Appendix A** for Details.

6.4.3 FUTURE LAND USE COMPATIBILITY CONCERNS

The two types of future land uses that fall under the Shaw AFB AICUZ footprint are the Military Planning Protection Area and the Conservation Planning Area. These future land use categories were designed to discourage density, particularly residential density, around Shaw AFB and natural areas. For this analysis, both land use designations were assigned to the open space/agricultural/low-density generalized land use category, representing about 5,298 acres total.

Table 6-4 and Figure 6-6 show the results of the future land use compatibility analysis within the Shaw AFB AICUZ noise zones. Both future land use categories allow for low-density residential development, which is incompatible in all of the 65+ dB DNL noise zones. Consequently, though open space/agricultural/low-density uses can be compatible in some noise zones, these future land uses are actually incompatible or incompatible with exceptions within the Shaw AFB noise zones. The exceptions refer to agricultural uses and other open space uses that could be compatible within the 65-75 dB DNL noise zones. There are very few land uses that are compatible at 75+ dB DNL, hence the incompatible results in those noise zones.

The Air Force AICUZ guidelines state that if residential uses must occur in the 65-74 dB DNL noise, they would benefit from noise level reduction measures. Fortunately, the 2040 Comprehensive Plan guidance does require NLR measures for all new construction in the Military Protection Planning Area district. Residential land uses are incompatible within the 75+ dB DNL noise zones regardless of the NLR measures in place.

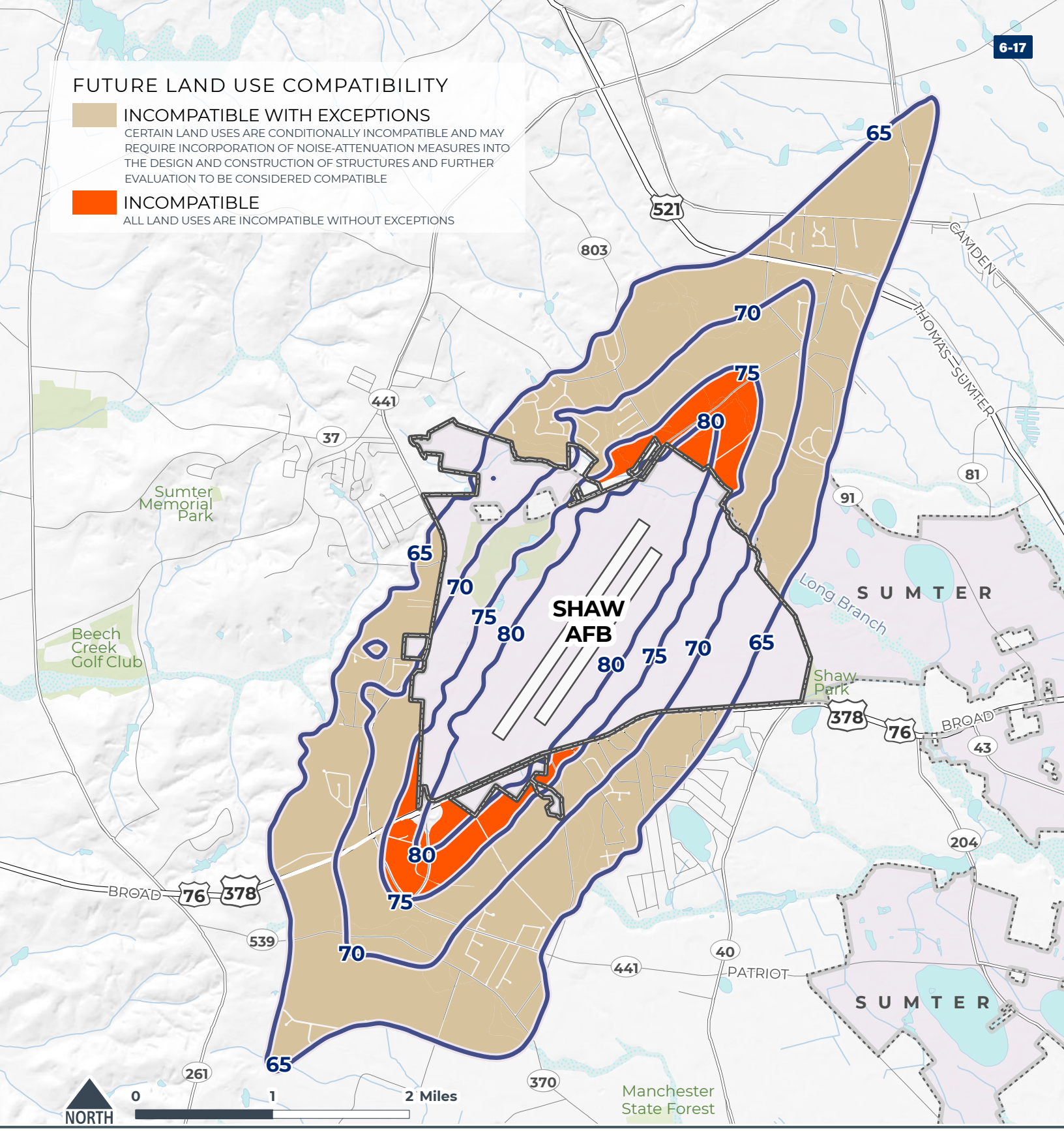


FIGURE 6-6
Future Land Use Compatibility within Noise Contours

Though this analysis identifies the future land uses in the AICUZ noise zones to be incompatible and incompatible with exceptions, it is likely that the ACD zoning district would help prevent most new incompatible development within these high noise zones. However, unless there are updates to the Sumter City and County zoning or comprehensive plan, some parcels in the 75+ dB DNL noise zones will not be adequately protected from incompatible development.

As shown in **Table 6-5 and Figure 6-7,** all future land uses within the APZs are considered compatible or compatible with restrictions, but incompatible within the CZs. This amounts to 2,041.91 acres of compatible or conditionally compatible land uses (98%) and 40.49 acres of incompatible land uses (2%).

Open space/agricultural/low-density uses, and low-density residential uses at less than one dwelling unit per two acres, are considered compatible within APZ II. Sumter City and County's ACD zoning ordinance has restrictions on specific uses that are not allowed within APZs I and II that align to the Air Force AICUZ guidance, so future land uses in APZ I are considered compatible with restrictions. These restrictions include limiting the maximum number of people on site per day, prohibiting residential uses, and preventing land use types that attract wildlife or produce smoke, glint, or glare.

TABLE 6-5

Off-installation Future Land Use Acreage within Clear Zones/Accident Potential Zones

DESIGNATION	GENERALIZED LAND USE CATEGORY [1]	CZ	APZ I	APZ II	TOTAL
Incompatible or Incompatible with Exceptions	Residential	–	–	–	–
	Commercial	–	–	–	–
	Industrial	–	–	–	–
	Public/Quasi-Public	–	–	–	–
	Open/Agriculture/Low Density	40.49	–	–	**40.49**
	Transportation/Utility	–	–	–	–
Compatible or Compatible with Restrictions	Residential	–	–	–	–
	Commercial	–	–	–	–
	Industrial	–	–	–	–
	Public/Quasi-Public	–	–	–	–
	Open Space/Agriculture/Low Density	–	833.93	1,206.98	**2,040.91**
	Transportation/Utility	–	–	–	–
SUB-TOTAL	**Incompatible**	**40.49**	**–**	**–**	**40.49**
	Compatible	**–**	**833.93**	**1,206.98**	**2,040.91**
TOTAL		**40.49**	**833.93**	**1,206.98**	**2,081.40**

1 Refer to **Appendix A** for Details.

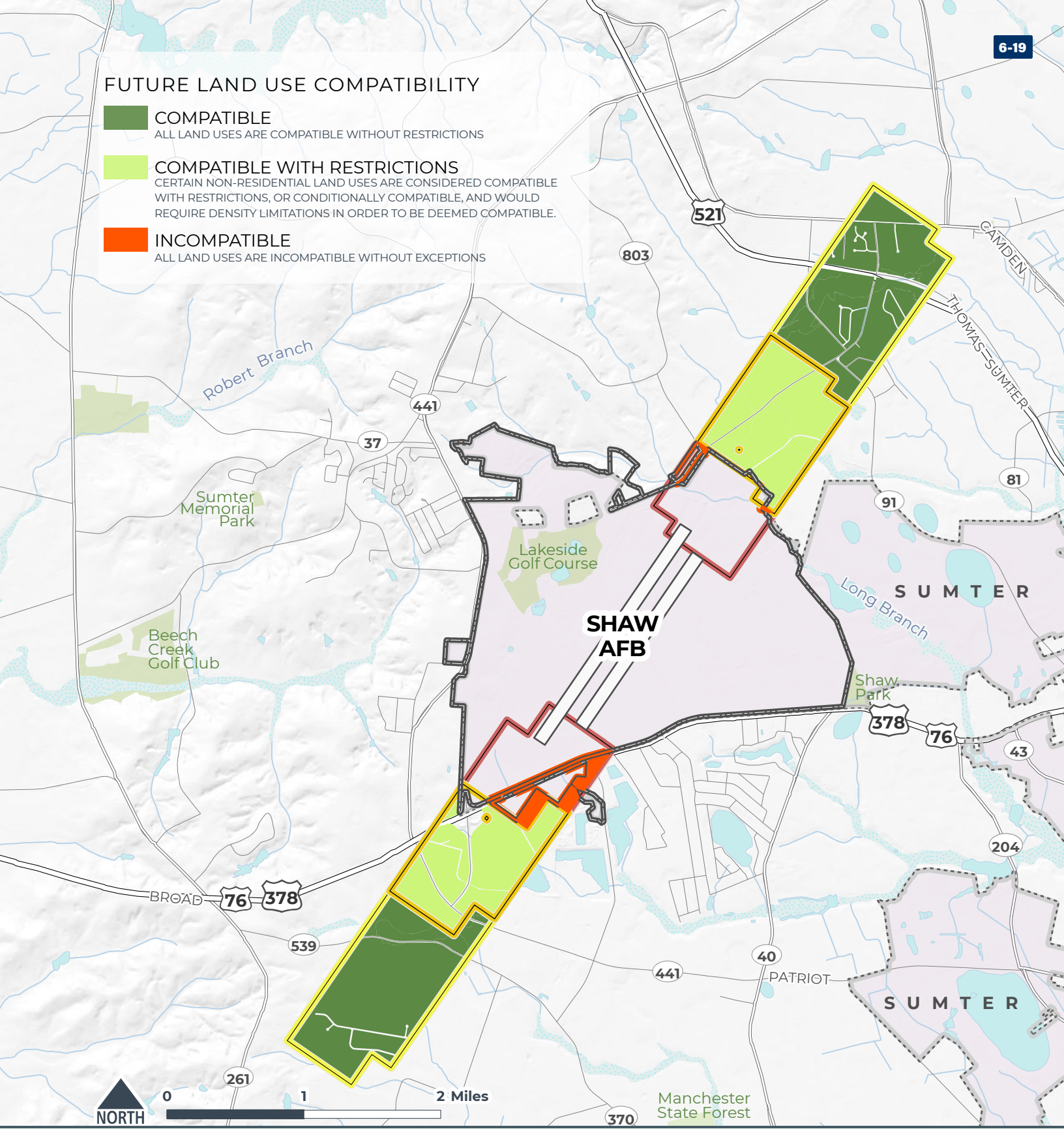


FIGURE 6-7
Future Land Use Compatibility within CZs and APZs

Unfortunately, the ACD does not specify any additional restrictions for the CZs. This means that incompatible land uses proposed for parcels within the CZs could be approved because they align to the allowed land uses within the Military Planning Protection Area and Conservation Planning Area designations (e.g., commercial, agricultural, industrial, and low-density residential). The only compatible land use within the CZs is vacant land.

6.4.4 FUTURE GROWTH AREAS AND POTENTIAL DEVELOPMENT PROJECTS AROUND SHAW AFB

Future projects in the vicinity of Shaw AFB, both in and outside of the designated AICUZ footprint, that merit consideration from a land use compatibility standpoint include the following:

1. **Solar Arrays.** Several proposals for ground-mounted solar development have been submitted for sites within 1 to 3 miles from Shaw AFB and Poinsett ECR. Solar arrays can occasionally create glint and glare issues for pilots, but this depends on the type of panel, orientation of the panels, and climatic conditions at the time of the flight. Additionally, solar developments can impact existing bird and wildlife migration corridors and other mission activities. Sumter City and County revised their solar ordinance in December 2023 to ensure that future projects remain compatible with Shaw AFB and Poinsett ECR air operations. The ordinance applies to photovoltaic solar energy systems located within 5 nautical miles of the center point of the runway for Shaw AFB and Sumter County Airport and the center point of Poinsett ECR. The updated ordinance requires that applicants provide proof that glare produced from the solar development will not adversely impact aviation. The applicant must also notify Shaw AFB of his or her proposal and give Shaw AFB 21 days to review and comment on the application.

2. **Residential Development.** Several proposals for residential developments are anticipated near Shaw AFB and Poinsett ECR stemming from high demand for new housing in the region. Zoning districts in this area range from Agricultural Conservation to General Residential. Depending on the exact location of the proposal, utilities may need to be extended to serve the development. If the utilities are extended into a current Agricultural Conservation zone, the likely rezone would be to an R 15-zoned development, which would allow 15,000-square-foot lots compared to 9,000 square feet in R-9 zones.

   The Comprehensive Plan designates most of the region as either Military Planning Protection or Conservation Planning Areas. These land use districts discourage residential lots less than 15,000-square-foot in size. Many recent residential developments consist of single-family attached and detached dwellings; these are expected to remain as the primary housing types throughout Sumter County.

3. **New Road Project.** A new road project is being considered in northern Sumter County (US-521). If approved, it could spur additional development in that area.

   It is also worth noting that there are several thousand approved residential lots in the City of Sumter, but they are located far outside of the AICUZ footprint, closer to downtown and east of the city.

7. IMPLEMENTATION

Implementation of the AICUZ Study must be a joint effort between Shaw AFB and the surrounding communities. This AICUZ Study provides the best source of information to ensure land use planning decisions made by local municipalities are compatible with a future installation presence. This chapter discusses the roles of all partners in collaborative planning efforts.

7.1 MILITARY ROLE

The AICUZ Program helps local, regional, state, and federal officials protect public health, safety, and welfare by promoting long-term land use that is compatible with military operations. It also protects Air Force operational capability from the effects of incompatible land use. This program helps mitigate noise and safety concerns for the surrounding communities and advises these communities about potential impacts from flight operations on the safety, welfare, and quality of life of their citizens. The Air Force promotes compatible partnerships between its installations and surrounding communities by being a good neighbor.

Shaw AFB is responsible for flight safety, noise abatement, and participation in existing local jurisdictional land use planning processes as part of its AICUZ Program. Air Force policy and guidance requires that installation leadership periodically review existing practices for flight operations and evaluate these factors in relationship to populated areas and other local situations.

Shaw AFB will:

- **Ensure that, wherever possible, air operations planners route flights over sparsely populated areas** to reduce the exposure of lives and property to a potential accident.
- **Periodically review existing traffic patterns, instrument approaches, weather conditions, and operating practices** with relationship to populated areas and other local conditions. The purpose of this review is to limit, reduce, and control the impact of noise from flying operations on surrounding communities.
- **Attend Sumter City and County Planning Commission Council meetings** as needed and coordinate with Sumter City and County planners about development proposals in the region on a monthly basis.
- **Consider establishing a community forum between the installation and surrounding stakeholders** (e.g., landowners, Sumter City and County planning staff) to discuss land use and other issues of concern; the installation anticipates holding these meetings annually.
- **Provide copies of the AICUZ Study** to local, county, and regional planning departments and zoning administrators to aid in the planning process.
- **Provide copies of the AICUZ Study** to appropriate state and federal agencies to raise awareness about the importance of compatible land use planning.
- **Support MAJIC** in pursuing the Sentinel Landscapes designation for the region.

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

7.2 STATE/REGIONAL ROLES

As noted in **Section 6.2,** in the State of South Carolina, land use planning and zoning are delegated to municipal and county governments, which are empowered to create comprehensive land use plans and coordinate local land use plans. Recommendations for working with local governments to encourage compatible land use are discussed below, in **Section 7.3.**

City and County of Sumter

The City and County of Sumter work very well together. The planning department and planning commission are jointly managed by both jurisdictions, which strengthens cooperation efforts to protect Shaw AFB. The installation receives correspondence from Sumter planning staff whenever a development proposal is submitted for review, which increases awareness of potential development activity near the base. Major subdivision applications are sent to Shaw AFB for formal review as well.

Sumter County proactively monitors rezoning requests for land near Shaw AFB. The County Council works to balance the interests of the installation and its missions with the interests of private development. Several land use policies and ordinances are in place to help ensure private development near the base is compatible, including zoning overlay districts and military protection policies.

Santee-Lynches Council of Governments

The Santee-Lynches Council of Governments is a consortium of local governments within a four-county area that includes Sumter County and the City of Sumter. The Council of Governments primarily focuses its efforts on smaller communities in the region, but the relationship with the City and County of Sumter is strong. The Council of Governments keeps Sumter County and the City of Sumter informed about economic development and housing trends, transportation projects, and other planning-related issues relevant to their jurisdictions. Coordination among the Santee-Lynches Council of Governments, Sumter County, the City of Sumter, and Shaw AFB promotes timely and effective information sharing about regional compatible land use trends among these entities.

Readiness and Environmental Protection Integration (REPI) Program

Shaw AFB could continue to pursue funding through existing federal government programs, such as DoD's REPI Program, for protection of mission-sensitive areas. Shaw AFB's REPI strategy is ongoing and is a collaboration with regional stakeholders, particularly MAJIC.

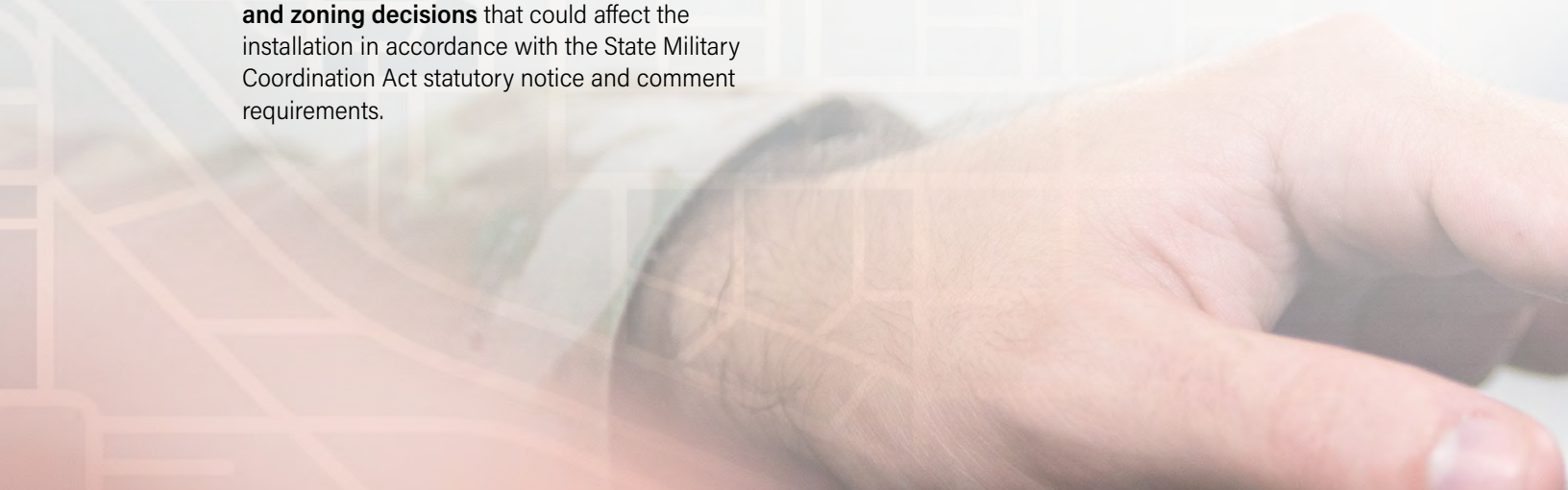
The REPI Program is a key tool used by DoD and its partners to protect the military's ability to train, test, and operate. The DoD created the REPI Program in response to land development and loss of habitat in the vicinity of or affecting its installations, ranges, and airspace that can lead to restrictions or costly and inadequate training and testing alternatives. Through REPI, the DoD works with state and local governments, conservation organizations, and willing private landowners to address these challenges to the military mission and the viability of DoD installations and ranges. The REPI Program has enjoyed broad bipartisan support in Congress and among groups representing state and local officials. Through fiscal year (FY) 2022, the DoD and its partners have spent nearly $89 million on three REPI projects in South Carolina.

Shaw AFB's partnership with MAJIC, Sumter County, and the City of Sumter led to implementation of several recommendations from the installation's JLUS to protect high-priority safety and noise zones.

7.3 LOCAL GOVERNMENT ROLE

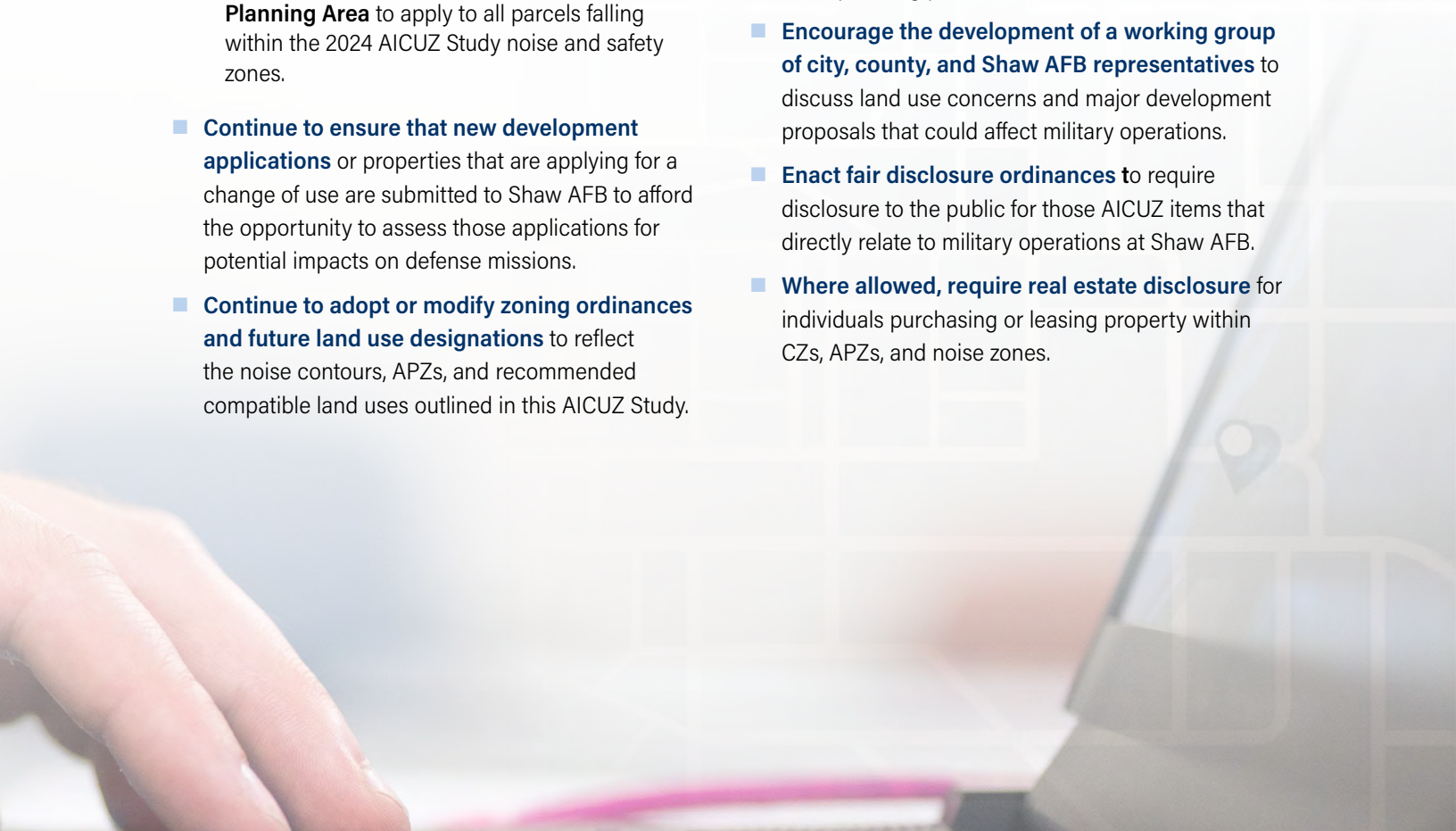
The role of the local government is to enact planning, zoning, and development principles and practices that are compatible with the installation and protect the installation's mission. The residents of the surrounding community have a long history of working with personnel from Shaw AFB. Adoption of 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 protect the integrity of the installation's flying mission:

- **Adopt or continue to support the following recommendations from the 2016 JLUS:**
  - **Evaluate the feasibility of a transfer of development rights (TDR) program** as a market-driven mechanism for private parties to transfer development rights out of the military impact areas and into city and county areas designated for growth.
  - **Remain engaged with the South Carolina Military Base Task Force to monitor national trends** and statewide efforts related to mission sustainment and encroachment.
  - **Evaluate current regulations to ensure proposed renewable energy projects** will not allow intrusions or obstructions in conflict with operations at Shaw AFB.
  - **Update the zoning code to reflect current and anticipated operation areas** susceptible to civilian frequency emissions interference and new technologies; consider restricting land uses that utilize the frequency spectrum.
  - **Continue to notify Shaw AFB about land use and zoning decisions** that could affect the installation in accordance with the State Military Coordination Act statutory notice and comment requirements.
  - **Evaluate whether to prohibit nonconforming uses and structures** from being "replaced, substantially altered, or rebuilt" without complying with ACD and RCD requirements.
  - **Review provisions of the city and county codes for consistency** between military provisions and the most current Air Force Guidance, including alignment of DNL noise zones currently regulated.
  - **Expand road signage for operational awareness** in the ACD and RCD districts.
  - **Publicize federal requirements** related to Unmanned Aircraft Systems in the vicinity of Shaw AFB.
  - **Maintain a community campaign** to increase awareness of the Air Force Mission.
  - **Make noise level reduction construction standards** available to the community.
  - **Publish and publicize sources of radio frequency interference** that civilian land uses and frequency spectrum users may generate that could interfere with operations at Shaw AFB.
  - **Maintain a dedicated webpage** for citizens and businesses seeking information related to incompatible land use.
  - **Maintain a standing Military Planning and Coordination Committee** and develop bylaws.
  - **Prepare a Military Planning and Coordination Agreement** that outlines the roles and commitments to coordination of Shaw AFB and Sumter City and County.



- **Monitor status of anticipated F-35A beddown** at Shaw AFB.
- **Maintain coordination** with the Santee-Lynches Regional Council of Governments.

- **Continue to consider AICUZ policies and guidelines when developing or revising city zoning ordinances and comprehensive plans and use AICUZ overlay maps and Air Force Land Use Compatibility Guidelines (see Appendix A) to evaluate existing and future land use proposals.**
  - **Determine whether to replace the existing Noise Attenuation (NA) Districts** in the *Sumter 2040 Comprehensive Plan Land Use Element* with the updated noise contour data presented in this AICUZ Study or whether to maintain the NA Districts as is. Currently, the 2040 Comprehensive Plan shows noise contours from the 2013 Environmental Impact Statement for the anticipated F-35A beddown, which has not yet been approved for Shaw AFB.
  - **Revise the boundary of the Military Protection Planning Area** to apply to all parcels falling within the 2024 AICUZ Study noise and safety zones.
- **Continue to ensure that new development applications** or properties that are applying for a change of use are submitted to Shaw AFB to afford the opportunity to assess those applications for potential impacts on defense missions.
- **Continue to adopt or modify zoning ordinances and future land use designations** to reflect the noise contours, APZs, and recommended compatible land uses outlined in this AICUZ Study.
- **Monitor proposals for tall structures,** such as wind turbines and communication towers, to ensure that new construction does not pose a hazard to navigable airspace around Shaw AFB. Where appropriate, coordinate with the FAA on the height of structures.
- **Continue to formalize a process whereby the City and County of Sumter consult with Shaw AFB** on planning and zoning actions that have the potential to affect installation operations, particularly with respect to building permit applications for developments within the AICUZ footprint.
- **Continue to review capital improvement plans, infrastructure investments, and other development policies** to ensure they do not encourage incompatible land use patterns near Shaw AFB, with particular emphasis on utility extension and transportation planning.
- **Invite the Air Force leadership to be ex officio members** on boards, commissions, and regional councils addressing long-range development and other planning policies.
- **Encourage the development of a working group of city, county, and Shaw AFB representatives** to discuss land use concerns and major development proposals that could affect military operations.
- **Enact fair disclosure ordinances t**o require disclosure to the public for those AICUZ items that directly relate to military operations at Shaw AFB.
- **Where allowed, require real estate disclosure** for individuals purchasing or leasing property within CZs, APZs, and noise zones.



7.4 COMMUNITY ROLE

Neighboring residents and installation personnel have a long-established history of working together for the mutual benefit of the Shaw AFB mission and local community. Adoption of the following recommendations will strengthen this relationship, protect public health and safety, and help protect the integrity of the installation's defense mission:

Real Estate Professionals and Brokers

- Know where noise zones and CZs/APZs encumber land near the air installation and invite installation representatives to brokers' meetings to discuss the AICUZ Program with real estate professionals.
- Disclose noise impacts to all prospective buyers of properties within areas greater than 65 dB DNL or within the CZs/APZs.
- Require the Multiple Listing Service to disclose noise zones and CZs/APZs for all listings.

Developers

- Know where the noise zones and CZs/APZs encumber land near the air installation. Consult with Shaw AFB on proposed developments within the AICUZ footprint.
- Participate in local discussions regarding existing zoning ordinances and subdivision regulations to support the compatible land uses outlined in this AICUZ Study.

Local Citizens

- Participate in local forums with the installation to learn more about the installation's missions.
- Become informed about the AICUZ Program and learn about the program's goals, objectives, and value in protecting the public's health, safety, and welfare.
- When considering property purchases, ask local real estate professionals, city planners, and installation representatives about noise and accident potential.

While the installation and community are separated by a fence, it is recognized that Shaw AFB activities and operations may affect the community. Likewise, community activities and development decisions can affect Shaw AFB's ability to complete its local hometown mission. The local military and community goals can be mutually achieved through a combination of collaborative planning and partnerships, open communication, and close relationships. The AICUZ Study can encourage important communication that will ensure that the community and its hometown military installation can continue to coexist for many years.

Questions about the AICUZ Program may be directed to the installation **Public Affairs (PA) Office** at **(803) 895-2023** or 20fwpublicaffairs@us.af.mil.


8

8. REFERENCES

DoD. 1978. "Planning in the Noise Environment," Air Force Manual AFM 19-10.

_____. 2019. Unified Facilities Criteria (UFC), Airfield and Heliport Planning and Design, UFC 3-260-01.

Air Force, 2017. Air Force Handbook (AFH) 32-7084, AICUZ Program Manager's Guide.

_____. 2019. Air Force Instruction (AFI) 32-1915, Integrated Installation Planning.

_____. 2024. Environmental Assessment (EA) for Combat Air Forces Adversary Air (ADAIR), Shaw AFB, South Carolina.

APPENDIX A. LAND USE COMPATIBILITY TABLES

Table A-1 provides compatibility recommendations based on historical aircraft mishap locations on or near air installations. The primary objective is to discourage people-intensive land uses in areas of high accident potential.

While the table uses *Standard Land Use Coding Manual (SLUCM)* categories for organization, the categories vary from SLUCM as the coding system does not differentiate based on population density. Some land uses warrant additional evaluation due to the variation of densities of people, intensity of use, or other characteristics that could impact safety of flight.

Floor Area Ratio (FAR) recommendations are included within the table to guide suggested maximum density for non-residential uses. General notes and specific footnotes at the bottom of the table provide additional information and compatibility considerations.

These recommendations are intended to support compatible land use planning both on and off base; they do not constitute a federal determination that any use of land is acceptable or unacceptable under local zoning.

TABLE A-1

Land Use Compatibility Recommendations in APZs and CZs

SLUCM No./LAND USE NAME		CZ[1]	APZ-I[1]	APZ-II[1]	MAXIMUM DENSITY[1]
10	Residential				
	11 HOUSEHOLD UNITS				
11.11	Single Units: Detached	N	N	Y[2]	Maximum density of 2 Du/Ac.
11.12	Single Units: Semi-Detached	N	N	N	
11.13	Single Units: Attached Row	N	N	N	
11.21	Two Units: Side-by-Side	N	N	N	
11.22	Two Units: One Above the Other	N	N	N	
11.31	Apartments: Walk-Up	N	N	N	

CZ: Clear Zone; APZ: Accident Potential Zone

SLUCM No./LAND USE NAME		CZ[1]	APZ-I[1]	APZ-II[1]	MAXIMUM DENSITY[1]
11.32	Apartment: Elevator	N	N	N	
12	Group Quarters	N	N	N	
13	Residential Hotels	N	N	N	
14	Mobile Home Parks or Courts	N	N	N	
15	Transient Lodgings	N	N	N	
16	Other Residential	N	N	N	
	20 MANUFACTURING[3]				
21	Food and Kindred Products; Manufacturing	N	N	Y	Maximum Floor Area Ratio (FAR) 0.56 in APZ II.
22	Textile Mill Products; Manufacturing	N	N	Y	Maximum FAR 0.56 in APZ II.
23	Apparel and Other Finished Products; Products Made From Fabrics, Leather and Similar Materials; Manufacturing	N	N	N	
24	Lumber and Wood Products (Except Furniture); Manufacturing	N	Y	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II.
25	Furniture and Fixtures; Manufacturing	N	Y	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II.
26	Paper and Allied Products; Manufacturing	N	Y	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II.
27	Printing, Publishing, and Allied Industries	N	Y	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II.
28	Chemicals and Allied Products; Manufacturing	N	N	N	

CZ: Clear Zone; APZ: Accident Potential Zone

SLUCM No./LAND USE NAME		CZ[1]	APZ-I[1]	APZ-II[1]	MAXIMUM DENSITY[1]
29	Petroleum Refining and Related Industries	N	N	N	
	30 MANUFACTURING[3] (CONTINUED)				
31	Rubber and Miscellaneous Plastic Products; Manufacturing	N	N	N	
32	Stone, Clay, and Glass Products; Manufacturing	N	N	Y	Maximum FAR 0.56 in APZ II.
33	Primary Metal Products; Manufacturing	N	N	Y	Maximum FAR 0.56 in APZ II.
34	Fabricated Metal Products; Manufacturing	N	N	Y	Maximum FAR 0.56 in APZ II.
35	Professional, Scientific, and Controlling Instruments; Photographic and Optical Goods; Watches and Clocks	N	N	N	
39	Miscellaneous Manufacturing	N	Y	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II.
	40 TRANSPORTATION, COMMUNICATION, AND UTILITIES[3, 4]				
41	Railroad, Rapid Rail Transit, and Street Railway Transportation	N	Y[6]	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II.
42	Motor Vehicle Transportation	N	Y[6]	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II.
43	Aircraft Transportation	N	Y[6]	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II.
44	Marine Craft Transportation	N	Y[6]	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II.
45	Highway and Street Right-of-Way	Y[5]	Y[6]	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II.
46	Automobile Parking	N	Y[6]	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II.

CZ: Clear Zone; APZ: Accident Potential Zone

SLUCM No./LAND USE NAME		CZ[1]	APZ-I[1]	APZ-II[1]	MAXIMUM DENSITY[1]
47	Communication	N	Y[6]	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II.
48	Utilities[7]	N	Y[6]	Y[6]	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II.
48.5	Solid Waste Disposal (Landfills, Incinerators, etc.)	N	N	N	
49	Other Transportation, Communication, and Utilities	N	Y[6]	Y	See Note 6 Below.
	50 TRADE				
51	Wholesale Trade	N	Y	Y	Maximum FAR of 0.28 in APZ I & .56 in APZ II.
52	Retail Trade: Building Materials, Hardware and Farm Equipment	N	Y	Y	See Note 8 Below.
53	Retail Trade: Including, Discount Clubs, Home Improvement Stores, Electronics Superstores, etc.	N	N	Y	Maximum FAR of 0.16 in APZ II.
53	Shopping Centers-Neighborhood, Community, Regional, Super-Regional[9]	N	N	N	
54	Retail Trade. Food	N	N	Y	Maximum FAR of 0.24 in APZ II.
55	Retail Trade: Automotive, Marine Craft, Aircraft, and Accessories	N	Y	Y	Maximum FAR of 0.14 in APZ I & 0.28 in APZ II.
56	Retail Trade: Apparel and Accessories	N	N	Y	Maximum FAR of 0.28 in APZ II.
57	Retail Trade: Furniture, Home, Furnishings and Equipment	N	N	Y	Maximum FAR of 0.28 in APZ II.
58	Retail Trade: Eating and Drinking Establishments	N	N	N	
59	Other Retail Trade	N	N	Y	Maximum FAR of 0.16 in APZ II.

CZ: Clear Zone; APZ: Accident Potential Zone

SLUCM No./LAND USE NAME		CZ[1]	APZ-I[1]	APZ-II[1]	MAXIMUM DENSITY[1]
	60 SERVICES10				
61	Finance, Insurance and Real Estate Services	N	N	Y	Maximum FAR of 0.22 in APZ II.
62	Personal Services	N	N	Y	Office uses only. Maximum FAR of 0.22 in APZ II.
62.4	Cemeteries	N	Y[11]	Y[11]	
63	Business Services (Credit Reporting; Mail, Stenographic, Reproduction; Advertising)	N	N	Y	Maximum FAR of 0.22 in APZ II.
63.7	Warehousing and Storage Services[12]	N	Y	Y	Maximum FAR of 1.0 in APZ I; 2.0 in APZ II.
64	Repair Services	N	Y	Y	Maximum FAR of 0.11 APZ I; 0.22 in APZ II .
65	Professional Services	N	N	Y	Maximum FAR of 0.22 in APZ II.
65.1	Hospitals, Nursing Homes	N	N	N	
65.1	Other Medical Facilities	N	N	N	
66	Contract Construction Services	N	Y	Y	Maximum FAR of 0.11 APZ I; 0.22 in APZ II.
67	Government Services	N	N	Y	Maximum FAR of 0.24 in APZ II.
68	Educational Services	N	N	N	
68.1	Child Care Services, Child Development Centers, and Nurseries	N	N	N	
69	Miscellaneous Services	N	N	Y	Maximum FAR of 0.22 in APZ II.

CZ: Clear Zone; APZ: Accident Potential Zone

SLUCM No./LAND USE NAME		CZ[1]	APZ-I[1]	APZ-II[1]	MAXIMUM DENSITY[1]
69.1	Religious Activities (Including Places Of Worship)	N	N	N	
	70 CULTURAL, ENTERTAINMENT AND RECREATIONAL				
71	Cultural Activities	N	N	N	
71.2	Nature Exhibits	N	Y[13]	Y[13]	
72	Public Assembly	N	N	N	
72.1	Auditoriums, Concert Halls	N	N	N	
72.11	Outdoor Music Shells, Amphitheaters	N	N	N	
72.2	Outdoor Sports Arenas, Spectator Sports	N	N	N	
73	Amusements: Fairgrounds, Miniature Golf, Driving Ranges; Amusement Parks, etc.	N	N	Y[20]	
74	Recreational Activities (Including Golf Courses, Riding Stables, Water Recreation)	N	Y[13]	Y[13]	Maximum FAR of 0.11 in APZ I; 0.22 in APZ II.
75	Resorts and Group Camps	N	N	N	
76	Parks	N	Y[13]	Y[13]	Maximum FAR of 0.11 in APZ I; 0.22 in APZ II.
79	Other Cultural, Entertainment and Recreation	N	Y[11]	Y[11]	Maximum FAR of 0.11 in APZ I; 0.22 in APZ II.
	80 RESOURCE PRODUCTION AND EXTRACTION				
81	Agriculture (Except Livestock)	Y[4]	Y[14]	Y[14]	

CZ: Clear Zone; APZ: Accident Potential Zone

SLUCM No./LAND USE NAME		CZ[1]	APZ-I[1]	APZ-II[1]	MAXIMUM DENSITY[1]
81.5, 81.7	Agriculture-Livestock Farming, Including Grazing and Feedlots	N	Y[14]	Y[14]	
82	Agriculture Related Activities	N	Y[15]	Y[15]	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II, no activity which produces smoke, glare, or involves explosives.
83	Forestry Activities[16]	N	Y	Y	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II, no activity which produces smoke, glare, or involves explosives.
84	Fishing Activities[17]	N[17]	Y	Y	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II, no activity which produces smoke, glare, or involves explosives.
85	Mining Activities[18]	N	Y[18]	Y[18]	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II, no activity which produces smoke, glare, or involves explosives.
89	Other Resource Production or Extraction	N	Y	Y	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II, no activity which produces smoke, glare, or involves explosives.
	90 OTHER				
91	Undeveloped Land	Y	Y	Y	
93	Water Areas[19]	N[19]	N[19]	N[19]	

CZ: Clear Zone; APZ: Accident Potential Zone

Key to Land Use Recommendations

Y **Yes.** Land use and related structures compatible without restrictions.

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

Yx **Yes with restrictions.** The land use and related structures generally are compatible. However, see note(s) indicated by the superscript.

Nx **No with exceptions.** The land use and related structures are generally incompatible. However, see note(s) indicated by the superscript.

General Notes for All Uses

1. A "Yes" or a "No" designation for compatible land use is to be used only for general comparison. Within each, uses exist where further evaluation may be needed in each category as to whether it is clearly compatible, normally compatible, or not compatible due to the variation of densities of people and structures. In order to assist air installations and local governments, general suggestions as to FARs are provided as a guide to density in some categories. In general, land use restrictions that limit occupants, including employees, of commercial, service, or industrial buildings or structures to 25 an acre in APZ I and 50 an acre in APZ II are considered to be low density. Outside events should normally be limited to assemblies of not more than 25 people an acre in APZ I, and maximum assemblies of 50 people an acre in APZ II. Recommended FARs are calculated using standard parking generation rates for various land uses, vehicle occupancy rates, and desired density in APZ I and II. For APZ I, the formula is FAR = 25 people an acre/ (Average Vehicle Occupancy x Average Parking Rate x (43560/1000)). The formula for APZ II is FAR = 50/ (Average Vehicle Occupancy x Average Parking Rate x (43560/1000)).

2. The suggested maximum density for detached single-family housing is two Du/Ac. In a planned unit development (PUD) of single family detached units, where clustered housing development results in large open areas, this density could possibly be increased slightly provided the amount of surface area covered by structures does not exceed 20 percent of the PUD total area. PUD encourages clustered development that leaves large open areas.

3. Other factors to be considered: Labor intensity, structural coverage, explosive characteristics, air-pollution, electronic interference with aircraft, height of structures, and potential glare to pilots.
4. No structures (except airfield lighting and navigational aids necessary for the safe operation of the airfield when there are no other siting options), buildings, or above-ground utility and communications lines should normally be located in Clear Zone areas on or off the air installation. The Clear Zone is subject to the most severe restrictions.
5. Roads within the graded portion of the Clear Zone are prohibited. All roads within the Clear Zone are discouraged, but if required, they should not be wider than two lanes and the rights-of-way should be fenced (frangible) and not include sidewalks or bicycle trails. Nothing associated with these roads should violate obstacle clearance criteria.
6. No above ground passenger terminals and no above ground power transmission or distribution lines. Prohibited power lines include high-voltage transmission lines and distribution lines that provide power to cities, towns, or regional power for unincorporated areas.
7. Development of renewable energy resources, including solar and geothermal facilities and wind turbines, may impact military operations through hazards to flight or electromagnetic interference. Each new development should be analyzed for compatibility issues on a case-by-case basis that considers both the proposal and potentially affected mission.
8. Within SLUCM Code 52, maximum FARs for lumberyards (SLUCM Code 521) are 0.20 in APZ-I and 0.40 in APZ-11; the maximum FARs for hardware, paint, and farm equipment stores, (SLUCM Code 525), are 0.12 in APZ I and 0.24 in APZ II.
9. A shopping center is an integrated group of commercial establishments that is planned, developed, owned, or managed as a unit. Shopping center types include strip, neighborhood, community, regional, and super-regional facilities anchored by small businesses, a supermarket or drug store, discount retailer, department store, or several department stores, respectively.
10. Ancillary uses such as meeting places, auditoriums, etc., are not recommended.
11. Chapels, houses of worship, and other land uses of public gatherings are incompatible within APZ I or APZ II.
12. Big box home improvement stores are not included as part of this category.
13. Facilities must be low intensity, and provide no playgrounds, etc. Facilities such as club houses, meeting places, auditoriums, large classes, etc., are not recommended.
14. Activities that attract concentrations of birds creating a hazard to aircraft operations should be excluded.
15. Factors to be considered: labor intensity, structural coverage, explosive characteristics, and air pollution.
16. Lumber and timber products removed due to establishment, expansion, or maintenance of Clear Zone lands owned in fee will be disposed of in accordance with applicable DoD guidance.
17. Controlled hunting and fishing may be permitted for the purpose of wildlife management.
18. Surface mining operations that could create retention ponds that may attract waterfowl and present bird/wildlife aircraft strike hazards (BASH), or operations that produce dust or light emissions that could affect pilot vision are not compatible.
19. Naturally occurring water features (e.g., rivers, lakes, streams, wetlands) are pre-existing, nonconforming land uses that can attract waterfowl and create a potential BASH challenge. Actions to expand naturally occurring water features or construction of new water features should not be encouraged. If construction of new features is necessary for storm water retention, such features should be designed so that they do not attract waterfowl.
20. Amusement centers, family entertainment centers or amusement parks designed or operated at a scale that could attract or result in concentrations of people, including employees and visitors, greater than 50 people per acre at any given time are incompatible in APZ II.

Table A-2 provides compatibility recommendations based on yearly A-weighted Day-Night Average Sound Level (ADNL) [the 'A' is implied in DNL when discussing aircraft operations] or Community Noise Equivalent Level (CNEL) on and around installations. The primary land use objective is to discourage noise-sensitive land uses in areas of higher noise exposure.

The table is organized based on Standard Land Use Coding Manual (SLUCM) categories; however, it varies from SLUCM as the coding system does not differentiate based on noise-sensitivity. Some uses warrant additional evaluation due to potential for annoyance and activity interference. General notes and specific footnotes at the bottom of the table provide additional information and considerations for compatibility determinations.

These recommendations are intended to support compatible land use planning both on and off-base; they do not constitute a federal determination that any use of land is acceptable or unacceptable under local zoning.

TABLE A-2

Recommended Land Use Compatibility for Noise Zones

LAND USE		SUGGESTED LAND USE COMPATIBILITY				
		DNL OR CNEL				
SLUCM No./LAND USE NAME		65-69 dB	70-74 dB	75-79 dB	80-84 dB	85+ dB
	10 RESIDENTIAL					
11	Household Units	N[1]	N[1]	N	N	N
11.11	Single Units: Detached	N[1]	N1	N	N	N
11.12	Single Units: Semidetached	N[1]	N[1]	N	N	N
11.13	Single Units: Attached Row	N[1]	N[1]	N	N	N
11.21	Two Units: Side-By-Side	N[1]	N[1]	N	N	N
11.22	Two Units: One Above the Other	N[1]	N[1]	N	N	N
11.31	Apartments: Walk-Up	N[1]	N[1]	N	N	N
11.32	Apartment: Elevator	N[1]	N[1]	N	N	N
12	Group Quarters	N[1]	N[1]	N	N	N
13	Residential Hotels	N[1]	N[1]	N	N	N
14	Mobile Home Parks or Courts	N	N	N	N	N
15	Transient Lodgings	N[1]	N[1]	N[1]	N	N
16	Other Residential	N[1]	N[1]	N	N	N

LAND USE		SUGGESTED LAND USE COMPATIBILITY				
		DNL OR CNEL				
SLUCM No./LAND USE NAME		65-69 dB	70-74 dB	75-79 dB	80-84 dB	85+ dB
	20 MANUFACTURING					
21	Food and Kindred Products; Manufacturing	Y	Y[2]	Y[3]	Y[4]	N
22	Textile Mill Products; Manufacturing	Y	Y[2]	Y[3]	Y[4]	N
23	Apparel and Other Finished Products; Products Made from Fabrics, Leather, and Similar Materials; Manufacturing	Y	Y[2]	Y[3]	Y[4]	N
24	Lumber and Wood Products (Except Furniture); Manufacturing	Y	Y[2]	Y[3]	Y[4]	N
25	Furniture and Fixtures; Manufacturing	Y	Y[2]	Y[3]	Y[4]	N
26	Paper and Allied Products; Manufacturing	Y	Y[2]	Y[3]	Y[4]	N
27	Printing, Publishing, and Allied Industries	Y	Y[2]	Y[3]	Y[4]	N
28	Chemicals and Allied Products; Manufacturing	Y	Y[2]	Y[3]	Y[4]	N
29	Petroleum Refining and Related Industries	Y	Y[2]	Y[3]	Y[4]	N
	30 MANUFACTURING (CONTINUED)					
31	Rubber and Misc. Plastic Products; Manufacturing	Y	Y[2]	Y[3]	Y[4]	N
32	Stone, Clay and Glass Products; Manufacturing	Y	Y[2]	Y[3]	Y[4]	N
33	Primary Metal Products; Manufacturing	Y	Y[2]	Y[3]	Y[4]	N
34	Fabricated Metal Products; Manufacturing	Y	Y[2]	Y[3]	Y[4]	N
35	Professional Scientific, and Controlling Instruments; Photographic and Optical Goods; Watches and Clocks	Y	25	30	N	N
39	Miscellaneous Manufacturing	Y	Y[2]	Y[3]	Y[4]	N
	40 TRANSPORTATION, COMMUNICATION AND UTILITIES					
41	Railroad, Rapid Rail Transit, and Street Railway Transportation	Y	Y[2]	Y[3]	Y[4]	N
42	Motor Vehicle Transportation	Y	Y[2]	Y[3]	Y[4]	N
43	Aircraft Transportation	Y	Y[2]	Y[3]	Y[4]	N
44	Marine Craft Transportation	Y	Y[2]	Y[3]	Y[4]	N
45	Highway and Street Right-of-Way	Y	Y	Y	Y	N
46	Automobile Parking	Y	Y	Y	Y	N

LAND USE		SUGGESTED LAND USE COMPATIBILITY				
		DNL OR CNEL				
SLUCM No./LAND USE NAME		65-69 dB	70-74 dB	75-79 dB	80-84 dB	85+ dB
47	Communication	Y	255	305	N	N
48	Utilities	Y	Y[2]	Y[3]	Y[4]	N
49	Other Transportation, Communication and Utilities	Y	255	305	N	N
	50 TRADE					
51	Wholesale Trade	Y	Y[2]	Y[3]	Y[4]	N
52	Retail Trade: Building Materials, Hardware and Farm Equipment	Y	25	30	Y[4]	N
53	Retail Trade: Including Shopping Centers, Discount Clubs, Home Improvement Stores, Electronics Superstores, Etc.	Y	25	30	N	N
54	Retail Trade: Food	Y	25	30	N	N
55	Retail Trade: Automotive, Marine Craft, Aircraft and Accessories	Y	25	30	N	N
56	Retail Trade: Apparel and Accessories	Y	25	30	N	N
57	Retail Trade: Furniture, Home, Furnishings and Equipment	Y	25	30	N	N
58	Retail Trade: Eating and Drinking Establishments	Y	25	30	N	N
59	Other Retail Trade	Y	25	30	N	N
	60 SERVICES					
61	Finance, Insurance and Real Estate Services	Y	25	30	N	N
62	Personal Services	Y	25	30	N	N
62.4	Cemeteries	Y	Y[2]	Y[3]	Y[4,11]	Y[6,11]
63	Business Services	Y	25	30	N	N
63.7	Warehousing and Storage	Y	Y[2]	Y[3]	Y[4]	N
64	Repair Services	Y	Y[2]	Y[3]	Y[4]	N
65	Professional Services	Y	25	30	N	N
65.1	Hospitals, Other Medical Facilities	25	30	N	N	N
65.16	Nursing Homes	N[1]	N[1]	N	N	N

LAND USE		SUGGESTED LAND USE COMPATIBILITY				
		DNL OR CNEL				
SLUCM No./LAND USE NAME		65-69 dB	70-74 dB	75-79 dB	80-84 dB	85+ dB
66	Contract Construction Services	Y	25	30	N	N
67	Government Services	Y[1]	25	30	N	N
68	Educational Services	25	30	N	N	N
68.1	Child Care Services, Child Development Centers, and Nurseries	25	30	N	N	N
69	Miscellaneous Services	Y	25	30	N	N
69.1	Religious Activities (Including Places Of Worship)	Y	25	30	N	N
	70 CULTURAL, ENTERTAINMENT AND RECREATIONAL					
71	Cultural Activities	25	30	N	N	N
71.2	Nature Exhibits	Y[1]	N	N	N	N
72	Public Assembly	Y	N	N	N	N
72.1	Auditoriums, Concert Halls	25	30	N	N	N
72.11	Outdoor Music Shells, Amphitheaters	N	N	N	N	N
72.2	Outdoor Sports Arenas, Spectator Sports	Y[7]	Y[7]	N	N	N
73	Amusements	Y	Y	N	N	N
74	Recreational Activities (Including Golf Courses, Riding Stables, Water Recreation)	Y	25	30	N	N
75	Resorts and Group Camps	Y	25	N	N	N
76	Parks	Y	25	N	N	N
79	Other Cultural, Entertainment and Recreation	Y	25	N	N	N
	80 RESOURCE PRODUCTION AND EXTRACTION					
81	Agriculture (Except Livestock)	Y[8]	Y[9]	Y[10]	Y[10,11]	Y[10,11]
81.5, 81.7	Agriculture: Livestock Farming Including Grazing and Feedlots	Y[8]	Y[9]	N	N	N
82	Agriculture Related Activities	Y[8]	Y[9]	Y[10]	Y[10,11]	Y[10,11]
83	Forestry Activities	Y[8]	Y[9]	Y[10]	Y[10,11]	Y[10,11]

LAND USE		SUGGESTED LAND USE COMPATIBILITY				
		DNL OR CNEL				
SLUCM No./LAND USE NAME		65-69 dB	70-74 dB	75-79 dB	80-84 dB	85+ dB
84	Fishing Activities	Y	Y	Y	Y	Y
85	Mining Activities	Y	Y	Y	Y	Y
89	Other Resource Production or Extraction	Y	Y	Y	Y	Y

Key to Land Use Recommendations

Y **Yes.** Land use and related structures compatible without restrictions.

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

Yx **Yes with restrictions.** The land use and related structures generally are compatible. However, see note(s) indicated by the superscript.

Nx **No with exceptions.** The land use and related structures are generally incompatible. However, see note(s) indicated by the superscript.

General Notes for All Uses

1. General

- **a.** Although local conditions regarding the need for housing may require residential use in these zones, residential use is discouraged in DNL 65-69 and strongly discouraged in DNL 70-74. The absence of viable alternative development options should be determined, and an evaluation should be conducted locally prior to local approvals indicating that a demonstrated community need for the residential use would not be met if development were prohibited in these zones. Existing residential development is considered as pre-existing, non-conforming land uses.
- **b.** Where the community determines that these uses must be allowed, measures to achieve outdoor to indoor NLR of at least 25 decibels (dB) in DNL 65-69 and 30 dB in DNL 70-74 should be incorporated into building codes and be considered in individual approvals; for transient housing, an NLR of at least 35 dB should be incorporated in DNL 75-79.
- **c.** Normal permanent construction can be expected to provide an NLR of 20 dB, thus the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation, upgraded sound transmission class ratings in windows and doors, and closed windows year-round. Additional consideration should be given to modifying NLR levels based on peak noise levels or vibrations.
- **d.** NLR criteria will not eliminate outdoor noise problems. However, building location, site planning, design, and use of berms and barriers can help mitigate outdoor noise exposure particularly from ground level sources. Measures that reduce noise at a site should be used wherever practical in preference to measures that only protect interior spaces.

2. Measures to achieve NLR of 25 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.

3. Measures to achieve NLR of 30 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.

4. Measures to achieve NLR of 35 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.

5. If project or proposed development is noise sensitive, use indicated NLR; if not, land use is compatible without NLR.

6. Buildings are not permitted.

7. Land use is compatible provided special sound reinforcement systems are installed.

8. Residential buildings require an NLR of 25.

9. Residential buildings require an NLR of 30.

10. Residential buildings are not permitted.

11. Land use that involves outdoor activities is not recommended, but if the community allows such activities, hearing protection devices should be worn when noise sources are present. Long-term exposure (multiple hours per day over many years) to high noise levels can cause hearing loss in some unprotected individuals.

B. KEY TERMS

Day-Night Average Sound Level (DNL). DNL (A-weighted when describing aircraft operational noise) is a composite noise metric accounting for the sound energy of all noise events in a 24-hour period. In order to account for increased human sensitivity to noise at night, DNL includes a 10 dB adjustment to events occurring during the acoustical nighttime period (10 p.m. through 7 a.m.). See **Section 4.3** for additional information.

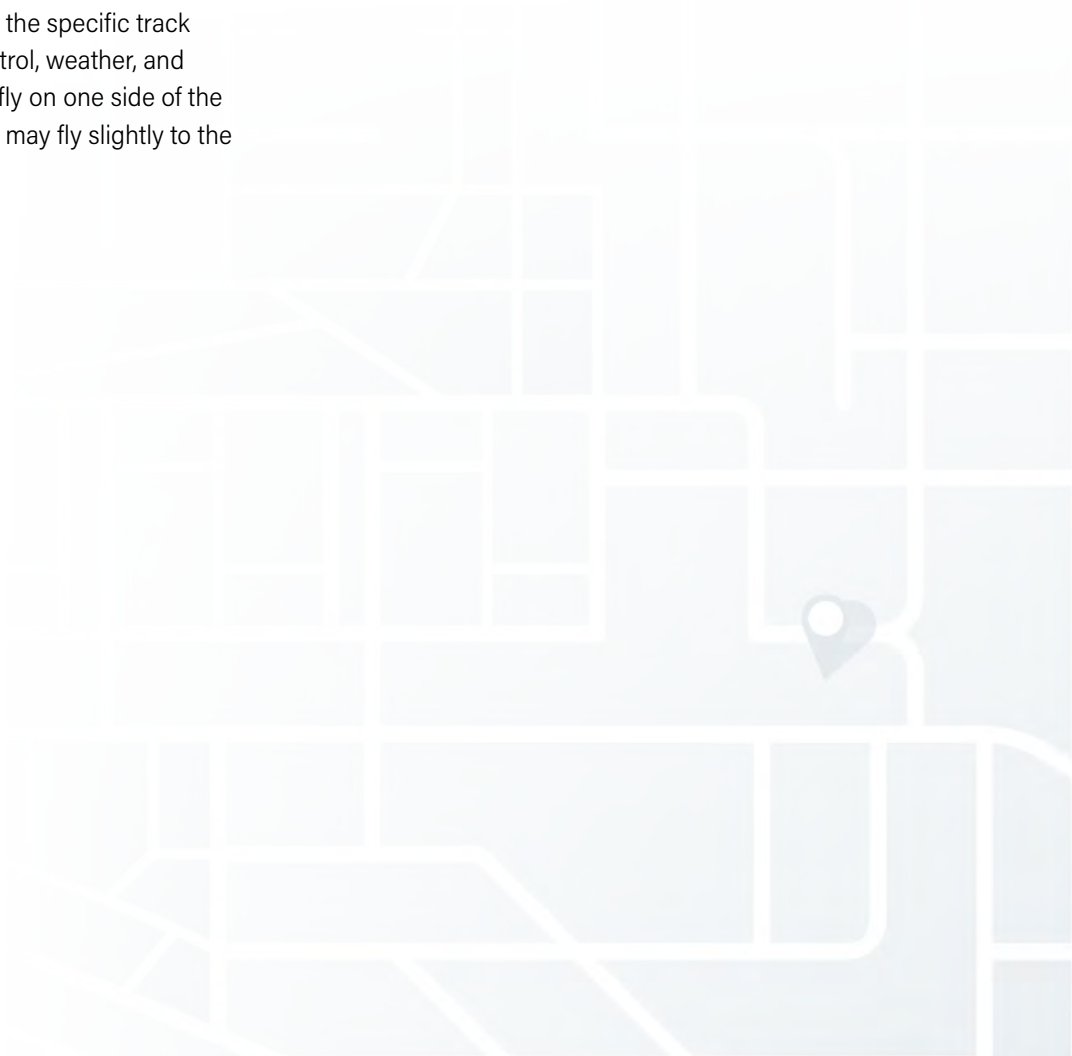
Decibel (dB). Decibel is the unit used to measure the intensity of a sound.

Flight Profiles. Flight profiles consist of aircraft conditions (i.e. altitude, speed, power setting, etc.) defined at various locations along each assigned flight track.

Flight Track. The flight track locations represent the various types of arrivals, departures, and closed patterns accomplished at air installations. The location for each track is representative for the specific track and may vary due to air traffic control, weather, and other reasons (e.g., One pilot may fly on one side of the depicted track, while another pilot may fly slightly to the other side of the track).

Floor Area Ratio (FAR). The relationship between a development's floor area and the size of the land parcel on which the development is situated is quantified by a floor area ratio.

Operation. An aircraft operation is defined as one takeoff or one landing. A complete closed pattern or circuit is counted as two operations because it has a takeoff component and a landing component. 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).

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C. LAND USE AND ZONING COMPARISON

Existing Land Use, Future Land Use, and Zoning Comparison

Appendix C contains the existing land use, zoning, and future land use categories for Sumter City and County. These were the primary sources of the land use compatibility analysis.

TABLE C-1
Land Use and Zoning Comparison

LAND USE/ZONING CATEGORY	AICUZ LAND USE CATEGORY
LAND USE	
Conservation Planning Area	Open/Agricultural/Low-Density
Military Protection Planning Area	Open/Agricultural/Low-Density
ZONING	
AC, Agricultural Conservation	Open/Agriculture/Low-Density
GC, General Commercial	Commercial
GR, General Residential	Residential
HI, Heavy Industrial	Industrial
LI-W, Light Industrial Warehouse	Industrial
LC, Limited Commercial	Commercial
PD, Planned Development	Residential
R-15, Single Family	Residential
R-9, Single Family	Residential

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