JUNE 2022 | FINAL

AIR INSTALLATIONS COMPATIBLE USE ZONES STUDY

VANCE
AIR FORCE BASE
OKLAHOMA

U.S. AIR FORCE

AIR INSTALLATIONS COMPATIBLE USE ZONES (AICUZ) STUDY

VANCE AIR FORCE BASE, OKLAHOMA

June 2022

Prepared for:

71st Flying Training Wing Civil Engineering Flight
Vance Air Force Base

DEPARTMENT OF THE AIR FORCE
71ST FLYING TRAINING WING
VANCE AIR FORCE BASE OKLAHOMA

15 June 2022

MEMORANDUM FOR AREA GOVERNMENTS

FROM: 71 FTW
200 Fields Street
Enid OK 73705

SUBJECT: Air Installations Compatible Use Zones (AICUZ) Study

1. The 2022 AICUZ Study for Vance Air Force Base (AFB) is an update of the AICUZ Study dated 2013. The Air Force initiated the update to include changes to planning noise contours and Air Force policy, as well as changes to municipal land use and zoning data and the introduction of the hazards to aircraft flight zone (HAFZ) area of consultation. 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 Vance 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), and operational noise footprint, and provides recommendations for development that are 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 upon 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 – 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 Vance 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 flights over housing areas and observing quite periods during special events. The Air Force appreciates and values the cooperation of all community stakeholders in implementing the recommendations and guidelines presented in this AICUZ Study update.

JAY A. JOHNSON, Colonel, USAF
Commander

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FIGURES

TABLES

ABBREVIATIONS AND ACRONYMS

AAFES	Army and Air Force Exchange Service
ACUB	Army Compatible Use Buffer
ADNL	Aircraft Day-Night Average Sound Level
AETC	Air Education and Training Command
AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
AFH	Air Force Handbook
AFI	Air Force Instruction
AFRC	Air Force Reserve Command
AGL	Above Ground Level
AICUZ	Air Installations Compatible Use Zones
Air Force	United States Air Force
APPPA	Aircraft Pilot and Passenger Protection Act
APZ	Accident Potential Zone
ATC	Air Traffic Control
BASH	Bird/Wildlife Aircraft Strike Hazard
BRAC	Base Realignment and Closure
CFR	Code of Federal Regulations
CNEL	Community Noise Equivalent Level
COA	Certificate of Authorization
COG	Council of Governments
CY	Calendar Year
CZ	Clear Zone
dB	Decibel
dBA	A-weighted Decibel
DeCA	Defense Commissary Agency
DNL	Day-night Average Sound Level
DoD	Department of Defense
DoDI	Department of Defense Instruction
EMI	Electromagnetic Interference
ENMP	Environmental Noise Management Plan
EPA	United States Environmental Protection Agency
ERDA	Enid Regional Development Alliance
FAA	Federal Aviation Administration
FAR	Floor Area Ratio
FHWA	Federal Highway Administration
FTS	Flying Training Squadron
FTW	Flying Training Wing
GIS	Geographic Information System
HAFZ	Hazards to Aircraft Flight Zone
Hz	Hertz
JLUS	Joint Land Use Study
MAPC	Metropolitan Area Planning Commission
MCA	Military Compatibility Area
mph	miles per hour
MTR	Military Training Route
NAF	Non-Appropriated Funds
NASA	National Aeronautics and Space Administration
NEXRAD	Next-Generation Radar
NLR	Noise Level Reduction
NODA	Northern Oklahoma Development Authority
NVGs	Night Vision Goggles
NWR	National Wildlife Refuge
OG	Operations Group
OSS	Operations Support Squadron
PA	Public Affairs
PPT	Primary Pilot Training
REPI	Readiness and Environmental Protection Integration
SLUCM	Standard Land Use Coding Manual
SOF	Supervisor of Flying
STUS	Student Squadron
SUPT	Specialized Undergraduate Pilot Training
T&G	Touch-and-Go
UAS	Unmanned Aircraft Systems
UFC	Unified Facility Criteria
USAAF	U.S. Army Air Force
USAF	U.S. Air Force
VFR	Visual Flight Rules


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71 OG

1.0 INTRODUCTION

The 2022 Vance Air Force Base (AFB) Air Installations Compatible Use Zones (AICUZ) Study focuses on the flying missions at Vance AFB and Kegelman Air Force Auxiliary Field (Kegelman Auxiliary Field). This update presents and documents changes since the previous study 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 their community-based counterparts increases 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. In addition, 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 Vance 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

Authority for the Air Force AICUZ Program lies in two documents:

- 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 details 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:

- *Vance AFB Air Installation Compatible Use Zone Study, 2009 with 2013 Amendments*
- *Vance AFB Joint Land Use Study, 2018*

1.4 Changes that Require an AICUZ Study Update

This 2022 Vance AFB AICUZ Study replaces the 2013 AICUZ Study Amendment. It provides the installation's flight tracks, CZs, APZs, and noise contour information, presenting an updated description of future military activities prior to the possible beddown of the T-7A aircraft. With this information, the AICUZ Program allows surrounding communities to consider current and potential activities when making land use decisions.

As the DoD aircraft fleet mix and training requirements change over time, flight operations change as well. These changes can affect noise contours and necessitate an AICUZ Study update. In addition, 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 Vance AICUZ Study that necessitate this update include:

- ✓ **Changes in off-installation land use and/or projected land use.** In the nine years since the 2013 AICUZ Study Amendment for Vance AFB was completed, land use, zoning regulations, and comprehensive planning processes in the surrounding municipalities have evolved. An updated AICUZ Study will enhance understanding of where growth is occurring and identify any land use compatibility issues and concerns related to more current aircraft operations at Vance AFB.
- ✓ **Changes in the AICUZ AFI.** AFI 32-1015, Integrated Installation Planning, and AFH 32-7084 were published after the 2009 AICUZ Study and 2013 AICUZ Study Amendment.


60
64
Enid
15
74
eno
Covington
81

2.0 VANCE AFB, OKLAHOMA

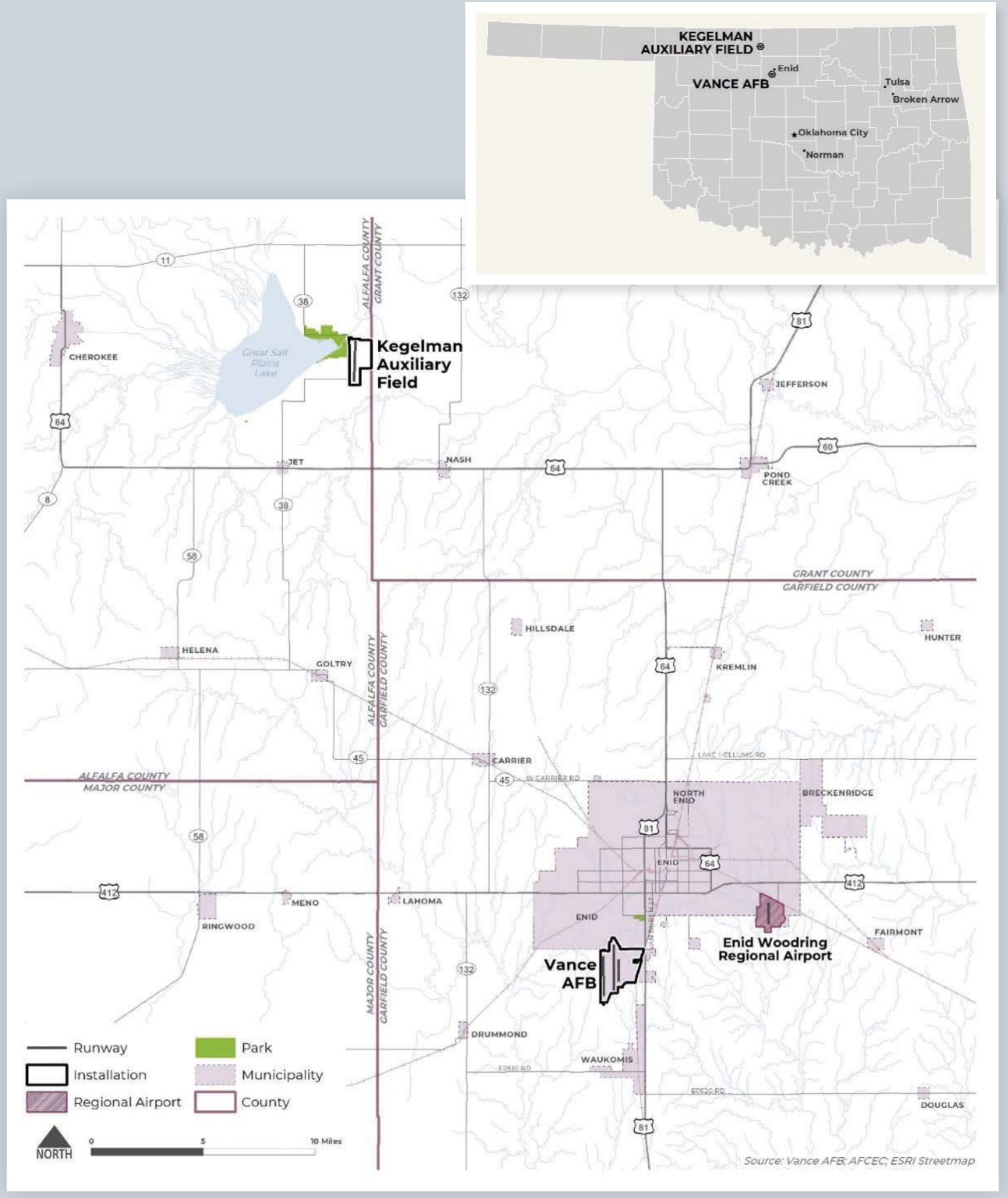
2.1 Location

Situated within the city of Enid and Garfield County, Oklahoma, Vance AFB is about 90 miles north-northwest of Oklahoma City. Vance AFB constitutes 2,122 acres of the southernmost portion of the city of Enid and is about 3 miles north of the town of Waukomis. Vance AFB is roughly bounded by U.S. Route 81 to the east, South Oakwood Road to the west, West Longhorn Trail to the south, and West Southgate Road to the north **(see Figure 2-1).** The U.S. Census estimates the 2019 population of Enid to be almost 50,000 people.

Vance AFB includes the following land holding:

Kegelman Auxiliary Field: Kegelman Auxiliary Field is 45 miles northwest of Vance AFB and 10 miles east of Cherokee, Oklahoma, on the Osage Plains. Adjacent to the Salt Plains National Wildlife Refuge and near the town of Jet, Oklahoma, the field is in eastern Alfalfa County, about 1 mile from the border with Grant County.

Figure 2-1 Regional Setting Vance AFB



2.2 History

Vance AFB was founded by the U.S. Army Air Force (USAAF) in 1941 as the Air Corps Basic Flying School. The base was sited just outside of Enid at the suggestion of community leaders who saw the value of having a military base embedded nearby, even going so far as to raise bonds to construct the necessary infrastructure. The community would again support the installation after the attack on Pearl Harbor. When Project Officer Major Henry Dorr posted guards around the installation without any ammunition for their rifles, the Enid Police Department donated 300 rounds for the sentries. The base was officially renamed as the Enid Army Flying School in 1942, and, just a few months later, as the Enid Army Air Field. In the demobilization after the end of World War II, on January 31, 1947, the War Department inactivated the field.

On August 26, 1948, the newly created U.S. Air Force reopened the installation as a permanent facility. At this time, the 3575th Pilot Training Wing was the host unit of Vance AFB. The Wing was responsible for pilot education and training in multi-engine aircraft. Early mission aircraft included the TB-25 and the AT-6. Originally named Enid AFB, the base was renamed Vance AFB on July 9, 1949, in honor of Lt Col Leon Robert Vance, Jr. Lt Col Vance was an Enid native who posthumously received the Medal of Honor for his leadership during a bombing mission over France on June 5, 1944. Despite experiencing mechanical failures and sustaining enemy fire, his mission effectively distracted the enemy from preparation for the D-Day landings at Normandy the following day.

Lt Col Leon R. Vance, Jr.

Enid Army Air Field

Vance AFB Historic Aircraft

In 1953, with the end of fighting in Korea, Vance AFB again faced budget cuts and a reduced mission. As the school reduced classes and extended the time needed for graduation in the years following, Vance AFB also added new advanced courses, including the B-26 and T-33 pilot training programs. In the early 1960s, Vance AFB became the first Air Force base to use contractors to support the Wing's flying operations. These civilian contractor jobs replaced positions normally fulfilled by active-duty personnel (e.g., maintenance, base operations). The Wing's mission also transitioned from multi-engine to single-engine pilot training. The Wing began implementing the Undergraduate Pilot Training Program and paved the way for the first use of simulated instrument flying before contact flying. The 71st Flying Training Wing absorbed the assets of the inactivated 3575th Pilot Training Wing in 1972 to become the host wing at Vance AFB, taking on the task of training the next generation of Airmen. In subsequent years, despite changes in aircraft and training curriculums, Vance AFB has continued to lead the way in educating and training undergraduate pilots. Most recently this has included the addition of the T-38, T-1A, and T-6 II, but aircraft flown at Vance AFB over the years include:

BT-13	1941-1946
T-33	1956-1964
BT-15	1943-1946
T-37	1961-2006
TB-25	1944-1958
T-38	1964-Present
AT-6	1948-1953
T-41	1965-1973
TB-26	1949-1955
T-1A	1994-Present
T-28	1950-1964
T-6 II	2005-Present

Vance AFB includes nearby Kegelman Auxiliary Field, referred to by students by the callsign "Dogface." The remote airfield was previously administered by Will Rogers Field, Clovis Army Air Field, Woodward Army Air Field, and Liberal

Col Charles Clark "Sonny" Kegelman

Army Airfield prior to the Air Force becoming an independent service in 1947. First known as the Great Salt Plains Auxiliary Field, the field was renamed in 1949 in honor of famed USAAF pilot Col Charles Clark "Sonny" Kegelman. A native of El Reno, Oklahoma, Col Kegelman led the first joint-Allied raid of the Eighth Air Force against Nazi targets in Europe on 4 July 1942.

Perhaps the most important arc in Vance AFB's history is the strong relationship between the installation and Enid residents. In 1995, when Vance AFB was being considered for closure as part of the Base Realignment and Closure (BRAC) process, approximately a third of the surrounding community's population came out and lined the driving route of the BRAC committee members to express support for keeping the installation active. Vance AFB officials credited the community's support as a crucial factor in avoiding closure.

Because of its crucial missions, dedicated personnel, and stalwart community support, Vance AFB has accomplished several historical firsts. Col Eileen Collins was one of first female pilots to graduate from Vance AFB, later going on to become the first woman National Aeronautics and Space

Administration (NASA) space shuttle commander. The class of 2020 included the first female F-35 Lightning II pilot, 2nd Lt Rachel Vander Kolk. Other notable names include pilot training graduate Lt Col Bill "Short Finger" Schwertfeger, a decorated pilot and Vietnam War prisoner of war; Gen Lloyd Newton, the first African American Thunderbirds pilot who later served as the 71st Wing Commander and Commander of Headquarters Air Education and Training Command; Gen Richard Myers, former Chairman of the Joint Chiefs of Staff; and Gen Ronald Fogelman, former Chief of Staff of the Air Force.

2.3 Mission

The mission of Vance AFB is to "Deliver world-class pilots, develop resilient Airmen and families, deploy ready Airmen, and demonstrate our culture."

Vance AFB serves as the headquarters for the 71st Flying Training Wing (FTW) and supports several other Guard and Reserve tenants. The installation is the northernmost Specialized Undergraduate Pilot Training (SUPT) base in the Air Education and Training Command (AETC) and is responsible for training Air Force and allied student pilots for worldwide deployment and Aerospace Expeditionary Force support. SUPT is divided into three phases that cover 52 weeks: Phase I preflight, Phase II fundamentals, and Phase III mission. The wing operates over 200 aircraft, flies more than 50,000 sorties annually, and logs more than 74,000 flying hours in the T-1A Jayhawk, T-6A Texan II, and T-38C Talon. More than 300 U.S. Air Force and allied student pilots graduate from pilot training at Vance each year.

With the second busiest airfield in the Air Force, Vance AFB also plays a crucial role in training air traffic controllers. Many air traffic controllers report to Vance AFB for their first operational air traffic control (ATC) assignment, where they are trained to control aircraft from several control positions in radar approach control and the tower.

The 71st FTW has four flying squadrons, plus a student squadron that handles student personnel manning.

- ✓ 3rd Flying Training Squadron (FTS) flies T-1s, of which there are 38.
- ✓ 8th FTS and 33rd FTS fly T-6s, of which there are 99.
- ✓ 25th FTS flies T-38s, of which there are 63.

The 5th FTS, which is an Air Force Reserve Command unit, is also assigned to Vance AFB as a Reserve associate squadron, meaning they are present at Vance AFB to support the 71st FTW's education and training missions. Because of this partnership, the 5th FTS uses 71st FTW aircraft rather than operating or maintaining its own aircraft.

One Army Reserve unit and two Army National Guard units are assigned to the Armed Forces Reserve Center at Vance AFB. These units only conduct ground missions and therefore do not have aircraft and are not affected by Vance AFB air operations.

Maj. Gen. Douglas L. Raaberg

2.4 Host and Tenant Organizations

71st Flying Training Wing, Air Education and Training Command (AETC)

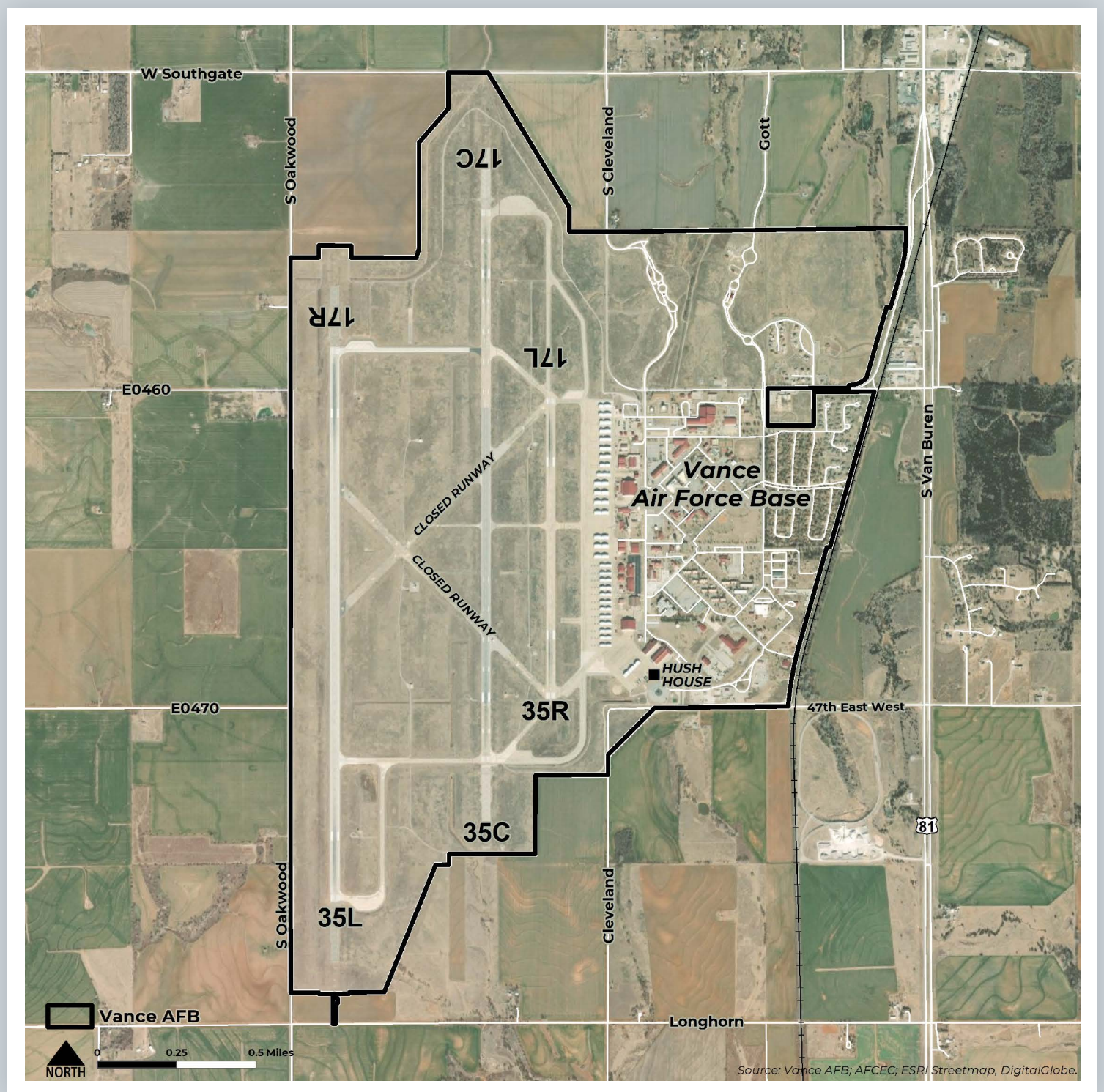
As the host organization for Vance AFB, the 71st FTW provides mission support and medical services to Vance AFB personnel in addition to maintaining its educational and training missions.

The mission of the 71st FTW is to "deliver world-class pilots, develop resilient Airmen and families, deploy ready Airmen and demonstrate our culture." The Wing is responsible for training Air Force and allied student pilots for worldwide deployment and Aerospace Expeditionary Force support. The 71st FTW includes the Operations Group, the Mission Support Group, and the Medical Group, as well as the Wing Staff Agencies.

71st Operations Group (OG): The 71st OG is responsible for all flying activities in the 71st FTW, conducting Specialized Undergraduate Pilot Training for over 300 U.S. Air Force and allied student pilots each year. The group operates more than 200 aircraft, flies more than 50,000 sorties, and logs more than 74,000 flying hours on an annual basis. The group comprises the 3rd FTS, 8th FTS, 25th FTS, 33rd FTS, 71st Operations Support Squadron, and 71st Student Squadron.

5th Flying Training Squadron, Air Force Reserve Command (AFRC)

As an associate reserve unit, the 5th FTS trains pilots and pilot instructors alongside the active-duty members of the 71st FTW.


W Southgate
S Oakwood
S Cleveland
Gott
17C
17R
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E0460
Vance
Air Force Base
S Van Buren
CLOSED RUNWAY
CLOSED RUNWAY
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S Oakwood
Cleveland
Vance AFB
Longhorn
0
0.25
0.5 Miles
NORTH
Source: Vance AFB; AFCEC; ESRI Streetmap, DigitalGlobe.

2.5 Airfield Environment

2.5.1 Vance AFB Airfield

Vance AFB has three north-south-oriented runways on the western side of the installation. Runway 35R/17L is 5,024 feet long and 150 feet wide. Runway 35C/17C is 9,217 feet long and 150 feet wide. Runway 35L/17R is 9,217 feet long and 150 feet wide. Each runway is oriented on a magnetic heading at 356.2° to the north and 176.2° to the south. Two permanently decommissioned runways intersect the three operational runways at 45° in the center of the airfield. Immediately east of the runways are 60 sunshades of varying sizes that are used for aircraft storage and maintenance. East of the sunshades are the fire station, base ops, control tower, and other support buildings (see Figure 2-2).

2.5.2 Kegelman Auxiliary Field

Kegelman Auxiliary Field is roughly 30 miles northwest of Vance AFB, adjacent to the Great Salt Plains Lake, the Great Salt Plains State Park, and near the Salt Plains National Wildlife Refuge. It comprises 1,066 acres of land and has one runway, a fire station, personnel offices, and a Next-Generation Radar (NEXRAD) tower. Before the establishment of the Air Force as an independent service, Kegelman Auxiliary Field was administered by Will Rogers Field, Clovis Army Airfield, Woodward Army Air Field, and Liberal Army Airfield. Kegelman Auxiliary Field is currently under control of the 71st FTW. Vance AFB students and instructors use Kegelman Auxiliary Field to practice touch-and-go landings in the T-6A Texan II aircraft. Since the last AICUZ was published in 2013, the Kegelman Auxiliary Field runway was extended to provide an emergency alternate divert location for T-38s. The land immediately surrounding the airfield is sparsely developed. Farmland surrounds the field to the south and east, and parkland is to the west and north **(see Figure 2-3).**

2.5.3 Enid Woodring Regional Airport

The 71st FTW also conducts missions at Enid Woodring Regional Airport, a civilian airport about 10 miles east of Vance AFB. Its proximity to the installation makes it a convenient place for training activities **(see Figure 2-4)**. The 71st FTW benefits from this partnership by having access to additional runways to fulfill training requirements, and the airport benefits from fuel sales to the Air Force. Woodring's runway was extended to accommodate T-38 operations, serving as another example of beneficial military-municipal cooperation.

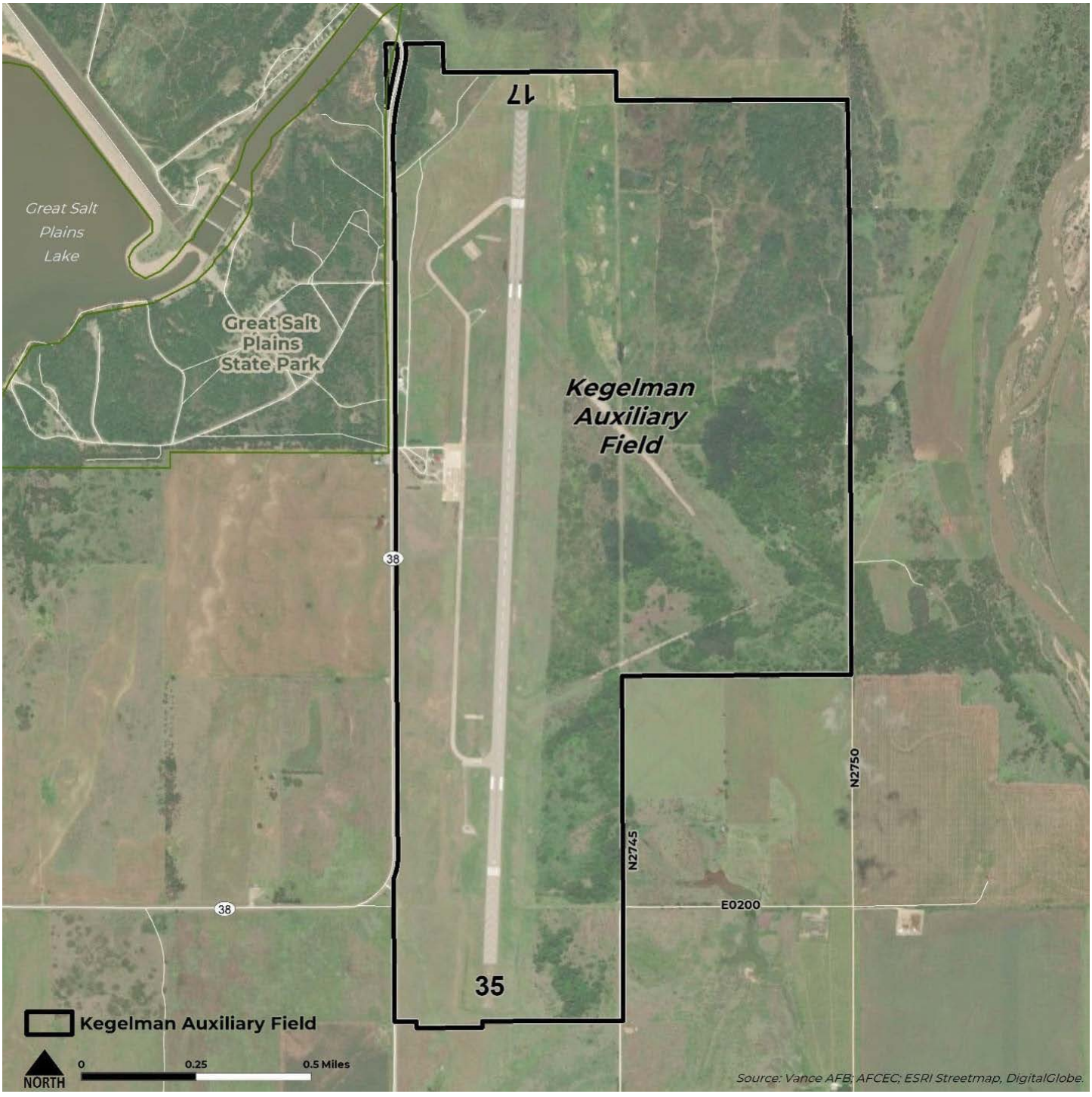
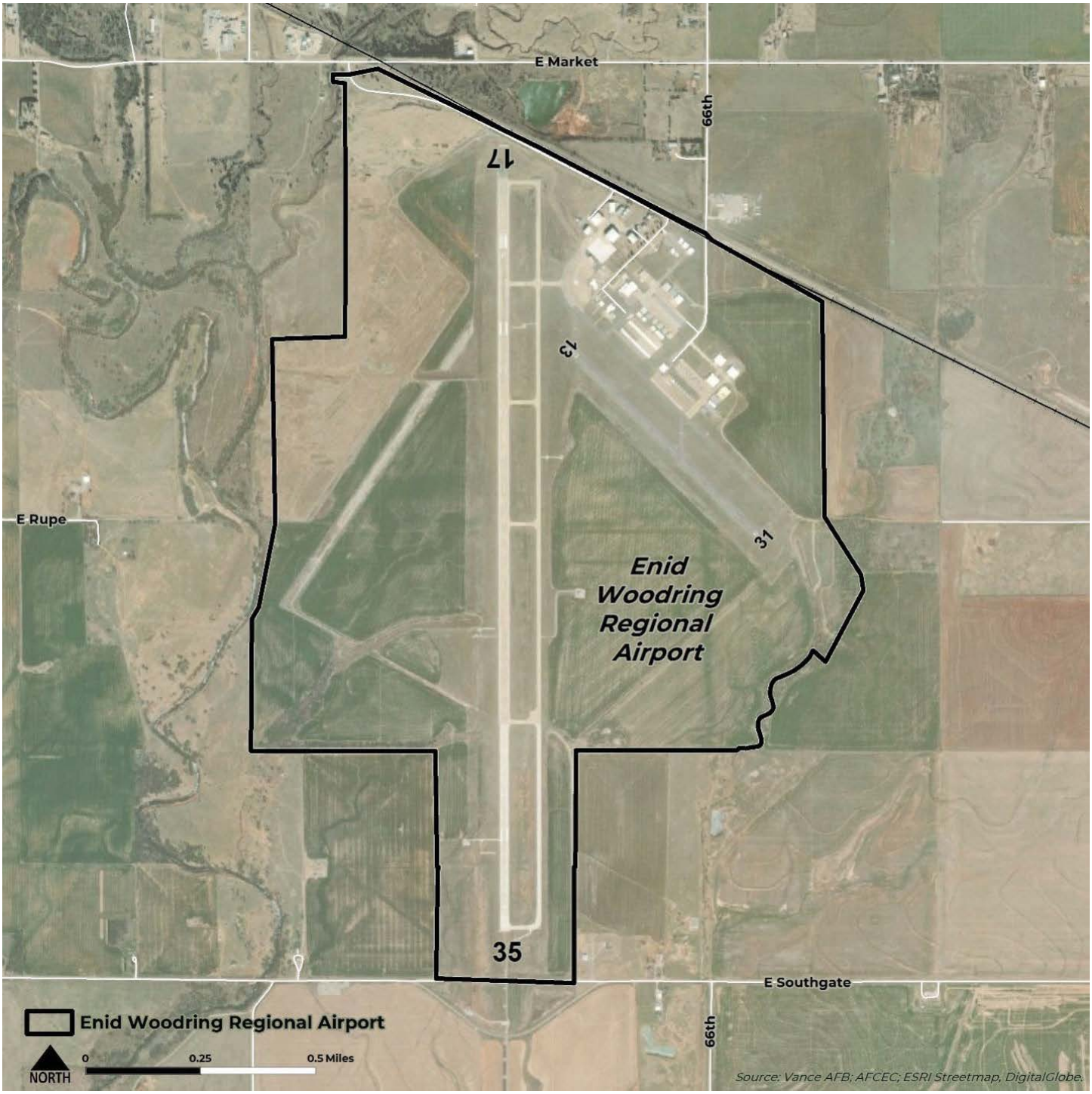

Great Salt Plains Lake
Great Salt Plains State Park
Kegelman Auxiliary Field
17
35
38
38
N2745
N2750
E0200
Kegelman Auxiliary Field
NORTH
0
0.25
0.5 Miles
Source: Vance AFB; AFCEC; ESRI Streetmap, DigitalGlobe.

Figure 2-4 Enid Woodring Regional Airport Diagram



2.6 Local Economic Impacts

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 increased demand for local goods and services and increased household spending by military and civilian employees.

Vance AFB is one of the largest employers in northwest Oklahoma, making its economic footprint enormously important for the region and the state. Based on the 2019 Economic Impact Statement from Vance AFB, the installation's economic impact on the Enid, Oklahoma, area was estimated at over $380 million.

Tables 2-1 and 2-2 show the number of military and civilian personnel employed by Vance AFB, as well as how many dependents and retirees are supported by the base. Vance AFB employs almost 1,400 active-duty and reserve military personnel and supports around 700 dependents living in the local area. The base also employs around 1,200 federal civilian employees, non-appropriated fund (NAF) civilian employees, contractors, and private business employees. There are an estimated 3,000 military retirees in the local area.

Table 2-1 Total Military Personnel and Dependents by Classification and Housing (Total Persons)

Classification	On-installation	Off-installation Residents	Total
Active Duty	218	1,155	1,373
Reserve/Air National Guard	7	109	116
Dependents	— [1]	— [1]	684
Total			2,173

Source: Vance AFB Economic Resource Impact Statement, 2019.

[1] Data Not Available

Table 2-2 Total Civilian Personnel by Appropriated and Non-Appropriated Funds (Total Persons)

Appropriated Fund Civilians	Total
(Air Force) General Schedule	284
Other civilians	750
Sub-Total	**1,034**
Non-Appropriated Fund AF Civilians	**Total**
Civilian Non-Appropriated Fund	78
AAFES Civilians	7
DeCA Civilians	32
Other Contract Civilians	39
Sub-Total	**156**
Total	**1,190**

Source: Vance AFB Economic Resource Impact Statement, 2019

Table 2-3 Annual Military Payroll by Category (Millions of Dollars)

Appropriated Fund Civilians	Total
Active Duty	$114.49
Reserve/Air National Guard	$6.60
Total	**$121.09**

Source: Vance AFB Economic Resource Impact Statement, 2019

Table 2-4 Annual Civilian Payroll by Appropriated and Non-Appropriated Funds (Millions of Dollars)

Appropriated Fund Civilians	Total
General Schedule	$26.00
Other Civilians	Not Available
Sub-Total	**$26.00**
Non-Appropriated Fund AF Civilians	**Total**
Civilian NAF	$1.70
AAFES Civilians	$0.21
DeCA Civilians	$1.37
Other Contract Civilians	$0.28
Sub-Total	**$3.56**
Total	**$29.56**

Source: Vance AFB Economic Resource Impact Statement, 2019
AAFES: Army and Air Force Exchange Service; DeCA: Defense Commissary Agency

Table 2-5 Summary of Construction, Contracts, and Expenditures for Materials, Equipment, and Supplies (Millions of Dollars)

Expense Category	Amount
Printing and Related Support Activities	$.0034
Rental and Leasing Services and Lessors of Intangible Assets	$0.65
Warehousing and Storage	$0.012
Educational Services	$8.86
Temporary Duty	$1.00
Broadcasting and Telecommunications	$0.46
Data Processing, Internet Publishing, and Other Information Services	$0.084
Ambulatory Healthcare Services	$4.60
Hospitals	$4.12
Waste Management and Remediation Services	$0.44
Utilities	$1.82
Other Retail	$2.70
Other Transportation and Support Activities	$0.067
Other Services	$89.51
Construction	$16.50
Sub-Total	**$130.83**
Local Purchases of Goods And Services Produced Outside Local Area	**Amount**
Computer and Electronic Product Manufacturing	$0.53
Other Retail	$4.75
Sub-Total	$5.28
Total Annual Expenditure	**$136.11**

Source: Vance AFB Economic Resource Impact Statement, 2019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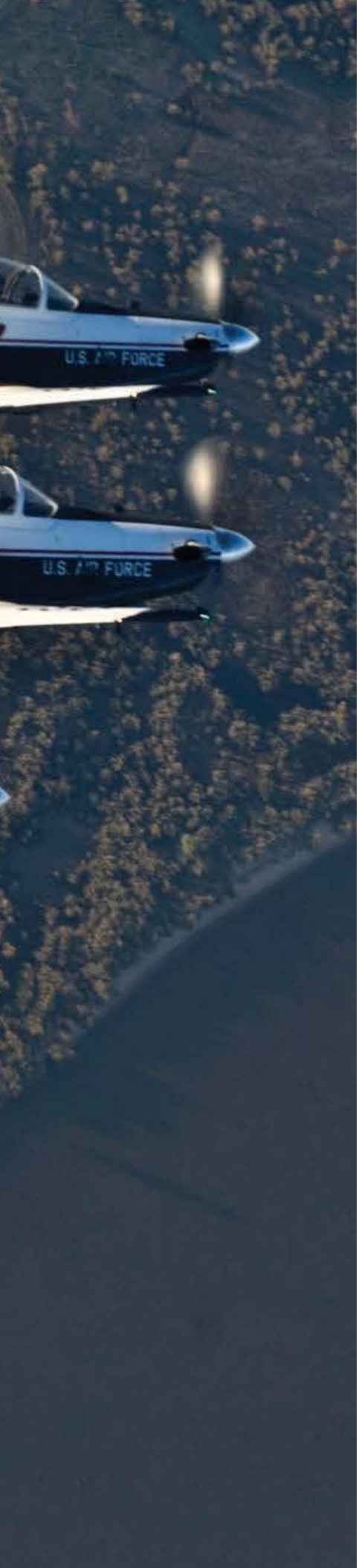


3.0 AIRCRAFT OPERATIONS

Aircraft operations are the primary source of noise associated with a military air installation. The level of noise exposure relates to a number of variables, including the aircraft type, engine power setting and afterburner use, altitude flown, direction of the aircraft, flight track, temperature, relative humidity, frequency, and time of operation (day/night). This chapter discusses the aircraft based at or transient to Vance AFB and Kegelman Auxiliary Field, the types and number of operations conducted at the airfields, and the runways and flight tracks used to conduct the operations.

3.1 Aircraft Types

The primary type of aircraft operating at Vance AFB and Kegelman Auxiliary Field are fixed-wing training aircraft. Aircraft permanently based at Vance AFB are the most common aircraft conducting flight operations at the installation. There are no aircraft permanently assigned to Kegelman Auxiliary Field. Aircraft that are not permanently assigned to the installation but conduct operations from the installation on an occasional basis are referred to as "transient" aircraft. Below are brief descriptions of assigned aircraft and the most common transient aircraft at Vance AFB.

3.1.1 Permanently Assigned Aircraft

T-1A Jayhawk

The T-1A Jayhawk is a medium-range, twin-engine jet trainer used in the advanced phase of specialized undergraduate pilot training for students selected to fly airlift or tanker aircraft. It is also used to support navigator training for the U.S. Air Force, Navy, Marine Corps, and international services. The swept-wing T-1A is a military version of the Beech 400A. It has cockpit seating for an instructor and two students and is powered by twin turbofan engines capable of an operating speed of 538 miles per hour (mph).

T-6A Texan II

The T-6A Texan II is a single-engine, two-seat primary trainer designed to train Primary Pilot Training (PPT) students in basic flying skills common to U.S. Air Force pilots. Produced by Raytheon Aircraft, the T-6A Texan II is a military trainer version of Raytheon's Beech/Pilatus PC-9 Mk II. The T-6A has a Pratt & Whitney Canada PT6A-68 turbo-prop engine that delivers 1,100 horsepower. Because of its excellent thrust-to-weight ratio, the aircraft can perform an initial climb of 3,100 feet (944.8 meters) per minute and can reach 18,000 feet (5,486.4 meters) in less than six minutes. The T-6A is used to train PPT students, providing the basic skills necessary to progress to one of four training tracks: the bomber-fighter track, the airlift-tanker track, the turboprop track, and the helicopter track.

T-38C Talon

The T-38C Talon is a twin-engine, high-altitude, supersonic jet trainer used in a variety of roles because of its design, economy of operations, ease of maintenance, high performance, and exceptional safety record. AETC is the primary user of the T-38 for SUPT. Advanced SUPT students fly the T-38C in aerobatics, formation, night, instrument, and cross-country navigation training. Air Combat Command, Air Force Materiel Command, and NASA also use the T-38A in various roles. The T-38 has swept wings, a streamlined fuselage and tricycle landing gear with a steerable nose wheel. The T-38 needs as little as 2,300 feet (695.2 meters) of runway to take off and can climb from sea level to nearly 30,000 feet (9,068 meters) in one minute. T-38s modified by the propulsion modernization program have approximately 19 percent more thrust, reducing takeoff distance by 9 percent.

The T-38Cs at Vance AFB are anticipated to eventually be replaced by T-7A Red Hawk aircraft.

3.1.2 Transient Aircraft

Common transient aircraft at Vance AFB include fighter, bomber, transport, and refueling aircraft. Transient aircraft at Vance AFB have included:

- ✓ C-12 Huron
- ✓ C-17 Globemaster III
- ✓ C-21A
- ✓ CH-47D Chinook
- ✓ F-22 Raptor
- ✓ T-38C Talon

These aircraft constitute a very small percentage of operations at Vance AFB. There are no transient aircraft reported at Kegelman Auxiliary Field.

3.2 Maintenance Operations

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. Two key tasks in maintaining aircraft are low- and high-powered engine maintenance runs. Vance AFB may conduct low-power engine maintenance runs on aprons, ramps or in hangars to functionally check the operation of engines or other aircraft systems.

Aircraft maintainers may conduct engine maintenance runs at power settings ranging from idle to maximum power. Maintainers typically conduct low- to mid-range-powered engine maintenance runs on aircraft parking ramps or just outside of maintenance hangars. High-powered engine maintenance runs are typically conducted in test cells (for out-of-frame engine testing) and in acoustical enclosures, commonly referred to as "hush houses" (i.e., buildings specifically designed to muffle engine noise during in-frame testing).

Figure 3-1 shows the locations of where the majority of run-ups are conducted at the Vance AFB airfield, including several test cells and a hush house. No run-ups are conducted at Kegelman Auxiliary Field. Noise associated with these operations is included in the noise analysis for the Vance AFB noise contours.

Vance AFB does not have set quiet hours for engine testing. Engine runs over 70 percent power are typically conducted inside hush houses.

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 of flight operations and land use. This chapter discusses typical flight operations for aircraft based at or visiting Vance 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.

This AICUZ Study considers operations conducted at both Vance AFB and Kegelman Auxiliary Field. Vance AFB operations include both based and transient military aircraft, but there are no transient aircraft operations at Kegelman Auxiliary Field.

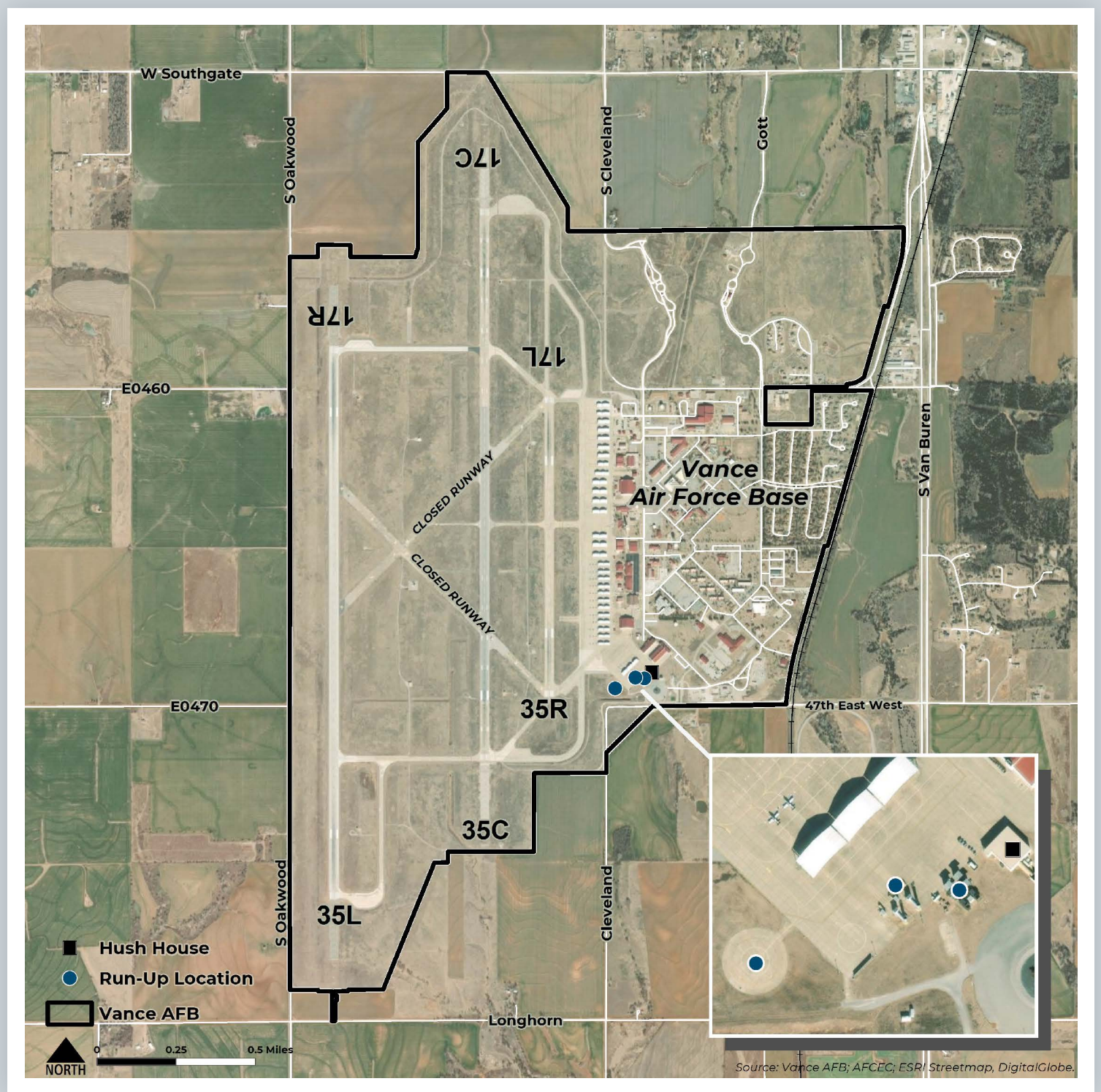
The following list highlights typical operations utilized during normal or increased flight operations. Each flight track utilized is designed to maximize flight operations and, when possible, minimize the effects of noise.

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

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.

Other pattern flight tracks shown in **Figures 3-12 and 3-13** include the outside downwind and simulated flame out patterns.

Figure 3-1 Run-Up Locations for Vance AFB



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.

VFR Arrival to Initial: 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 pilot lowers the landing gear and flaps and then performs a second 180-degree descending turn toward the runway centerline to land.

Closed Pattern: The closed pattern 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 closed pattern consists of two portions, a takeoff/departure and an approach/landing; a complete closed 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 of 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 a number of 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 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.

3.4 Annual Aircraft Operations

Total annual operations account for each departure and arrival, including those conducted as part of a pattern operation. **Figure 3-2** provides the number of aircraft operations that have occurred at Vance AFB from 2011-2020, including assigned and transient aircraft.

Source: Vance AFB ATC

Figure 3-2 Summary of Vance AFB Flight Operations for Calendar Years (CYs) 2019–2020

Data for the 10-year period show aircraft operations at Vance AFB have remained relatively consistent, with no major spikes or dips until 2019 and 2020. At this time, ATC at Vance AFB began using dual local controls to track operational counts. Even though the counts increased 2018 to 2019, there were no major mission or operational changes – the traffic was just being counted differently, and the 2019 and 2020 volumes were consistent with 2018 traffic volumes. The average annual number of operations for years 2011 through 2018 was 57,593. Operations in 2018 were the highest since 2011, with over 72,500 operations recorded. In 2016, the fewest operations occurred, with just under 47,500 operations recorded.

A vast majority (99 percent) of flight operations at Vance AFB take place during acoustical daytime (defined as taking place from 7:00 a.m. to 10:00 p.m.), while only 1 percent occurs during acoustical nighttime (defined as taking place from 10:00 p.m. to 7:00 a.m.). **Table 3-1** provides a summary of day-night flight operations at Vance AFB.

Kegelman Auxiliary Field has a non-towered, uncontrolled airfield. There are no historical operations data available for the auxiliary field.

All flight operations (100 percent) at Kegelman Auxiliary Field take place during acoustical daytime (defined as taking place from 7:00 a.m. to 10:00 p.m.). No flight operations occur during acoustical nighttime (defined as taking place from 10:00 p.m. to 7:00 a.m.). **Table 3-2** provides a summary of day-night flight operations at Kegelman Auxiliary Field.

3.5 Runway Utilization and Flight Tracks

3.5.1 Runway Utilization

The frequency with which aircraft utilize a runway involves a variety of factors including, but not limited to:

- ✓ Airfield environment (layout, lights, runway length)
- ✓ Direction of prevailing winds
- ✓ Location of natural terrain features (rivers, lakes, mountains, and other features)
- ✓ Wildlife activity
- ✓ Number of aircraft in the pattern
- ✓ Preference of a runway for the purpose of safety and noise abatement

Table 3-1 Summary of Day-Night Flight Operations Vance AFB

Operation Time Of Day	Arrival	Departure	Closed Patterns	Combined Operations
Day	99%	100%	99%	99%
Night	1%	0%	1%	1%

Table 3-2 Summary of Day-Night Flight Operations Kegelman Auxiliary Field

Operation Time Of Day	Arrival	Departure	Closed Patterns	Combined Operations
Day	100%	100%	100%	100%
Night	0%	0%	0%	0%

The Supervisor of Flying (SOF) establishes the runway in use. Aviation planners adjust the pattern procedures to maximize air traffic flow efficiency. **Tables 3-3 and 3-4** list the percentages of how frequently each runway at Vance AFB and Kegelman Auxiliary Field are used, respectively, based on 2014 operational data collected by the Air Force Civil Engineer Center.

3.5.2 Flight Tracks

Each runway has designated flight tracks that provide for the safety, consistency, and control of an airfield. Flight tracks depict where aircraft fly in relation to an airfield. They are for departures, arrivals, and for pattern procedures, and are designated for each runway to facilitate operational safety, noise abatement, aircrew consistency, and the efficient flow of air traffic within the tower's controlled airspace. Aircraft flight tracks are not set "highways in the sky." While we show flight tracks as lines on the map, they are actually bands of airspace. Aircraft de-confliction, configuration, pilot technique, takeoff weight, and wind all affect the actual path taken on any given flight. **Figures 3-3 and 3-4** present the departure flight tracks for Vance AFB and Kegelman Auxiliary Field, respectively; **Figures 3-5 and 3-6** present the arrival flight tracks for Vance AFB and Kegelman Auxiliary Field, respectively; and **Figures 3-7 and 3-8** present the pattern flight tracks for Vance AFB and Kegelman Auxiliary Field, respectively.

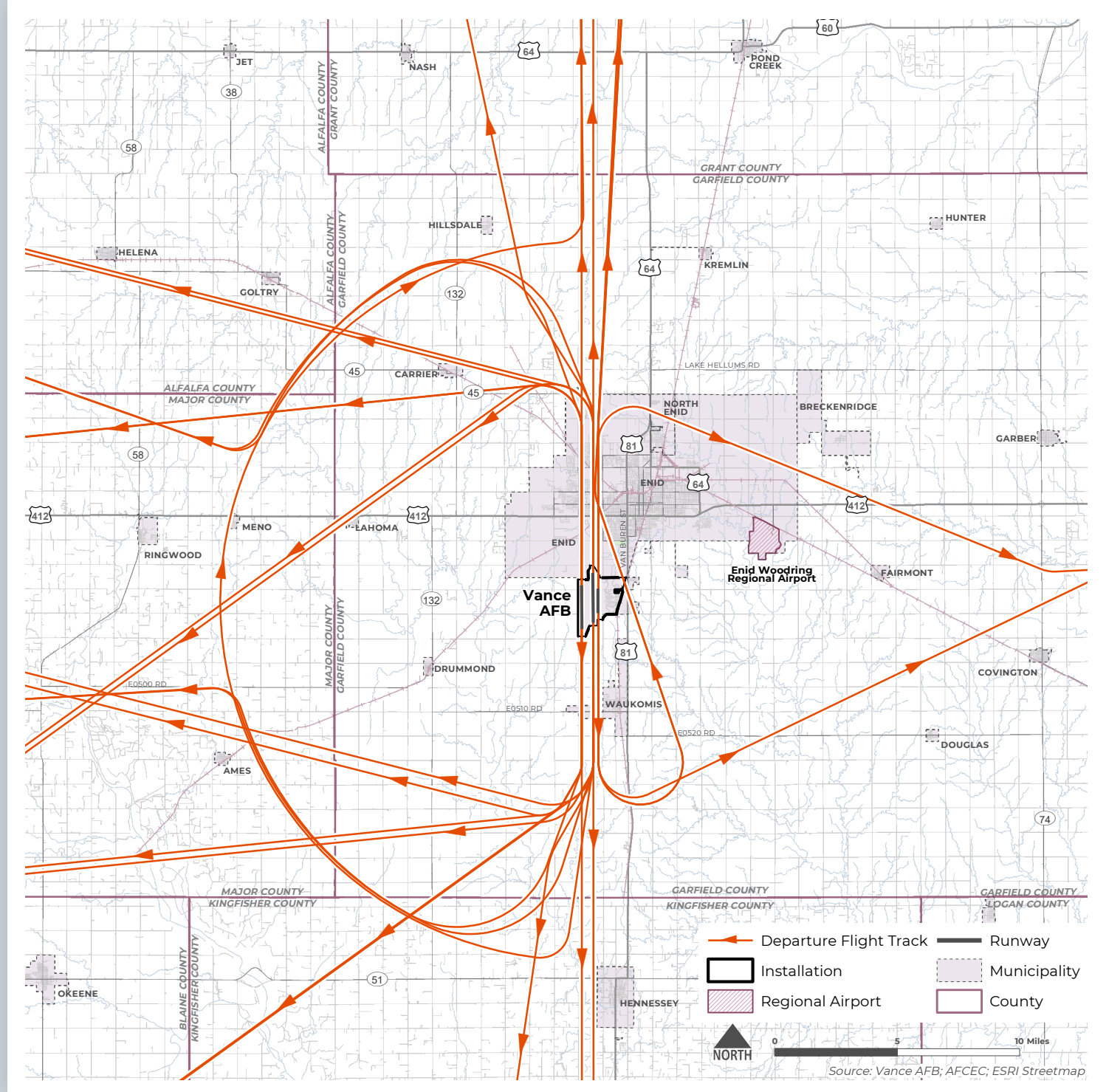
Table 3-3 Current Runway Usage and Flight Routing at Vance AFB

Runway Direction	Utilization
Runway 17C Arriving from the north and/or departing to the south	7%
Runway 17R Arriving from the north and/or departing to the south	20%
Runway 17L Arriving from the north and/or departing to the south	34%
Runway 35C Arriving from the south and/or departing to the north	4%
Runway 35R Arriving from the south and/or departing to the north	23%
Runway 35L Arriving from the south and/or departing to the north	13%

Table 3-4 Current Runway Usage and Flight Routing at Kegelman Auxiliary Field

Runway Direction	Utilization
Runway 17 Arriving from the north and/or departing to the south	60%
Runway 35 Arriving from the south and/or departing to the north	40%

Figure 3-3 Vance AFB Departure Flight Tracks



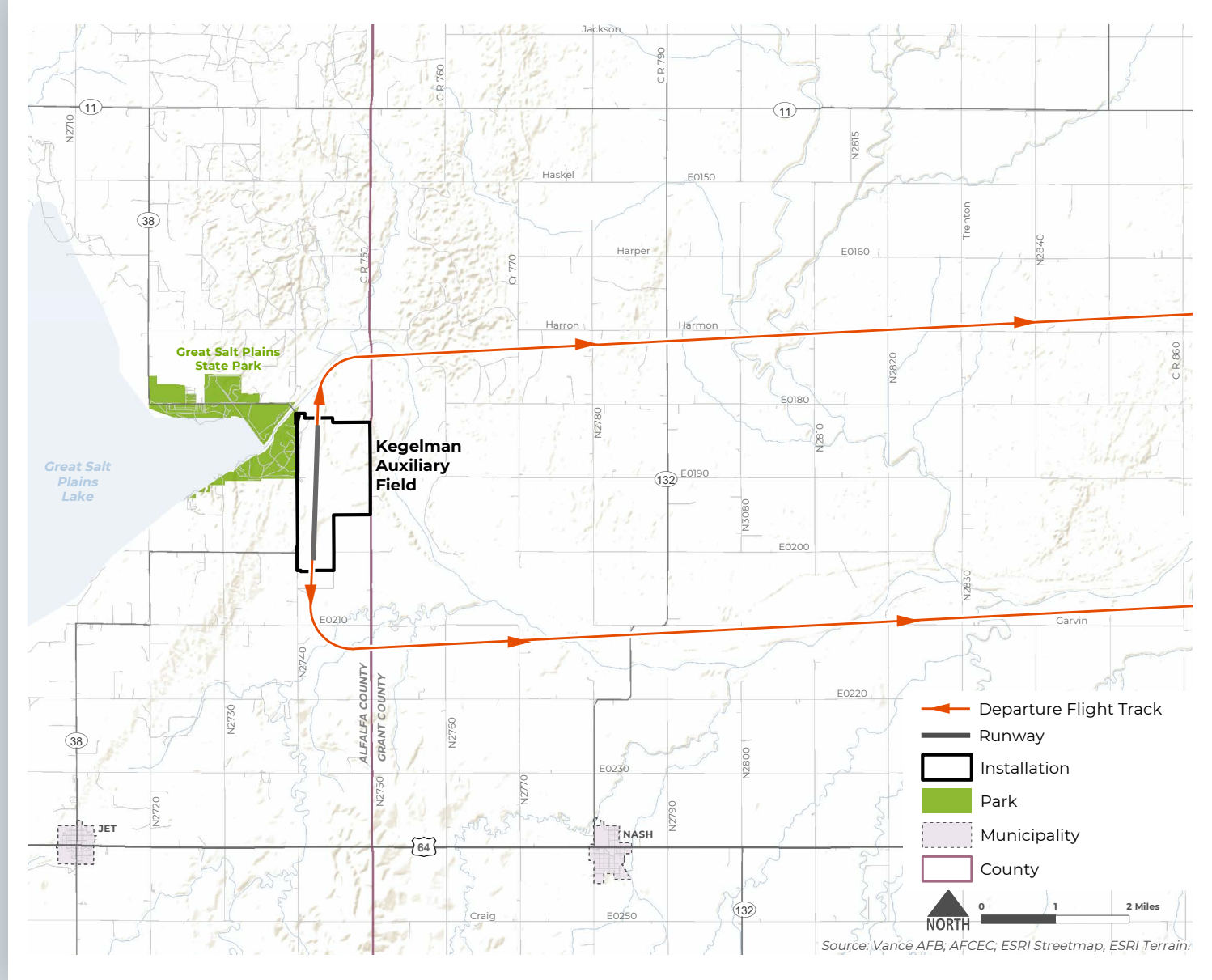
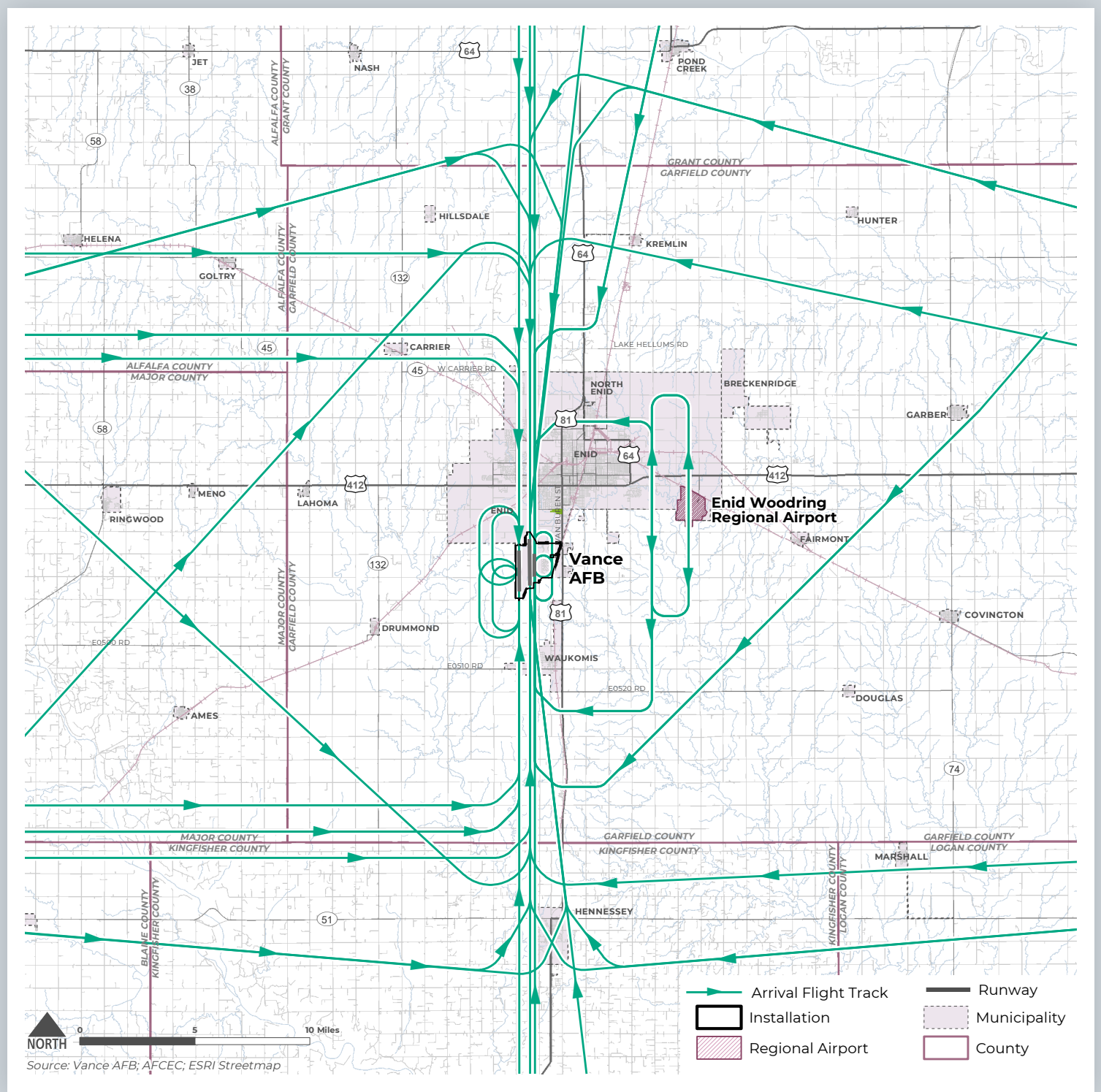
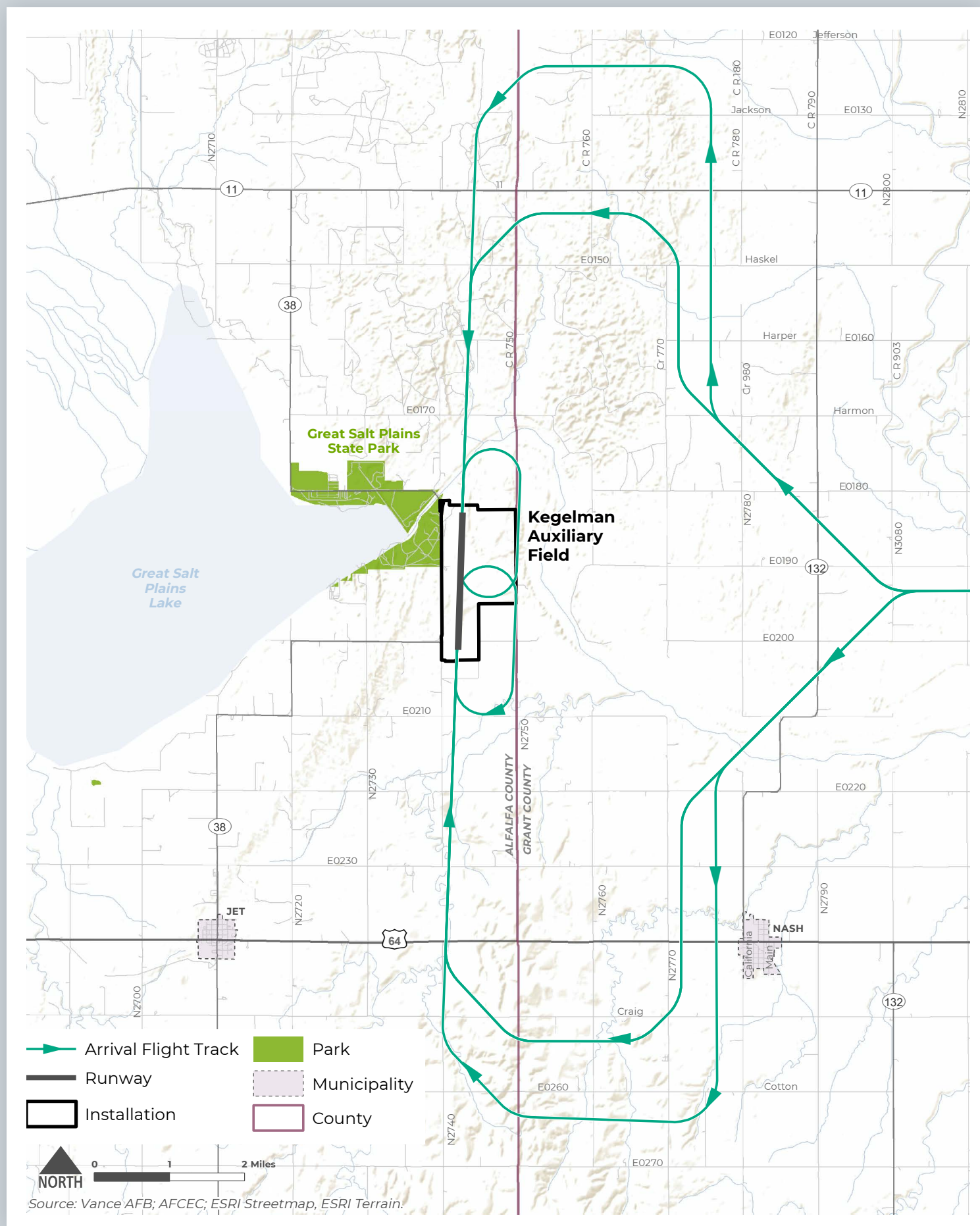

Jackson
Haskel
Harper
Harron
Harmon
Garvin
Craig
Great Salt Plains State Park
Great Salt Plains Lake
Kegelman Auxiliary Field
ALFALFA COUNTY
GRANT COUNTY
JET
NASH
C R 760
C R 790
C R 750
Cr 770
N2710
N2815
N2840
N2820
C R 860
N2780
N2810
N3080
N2830
N2740
N2730
N2760
N2750
N2770
N2790
N2800
N2720
E0150
E0160
E0180
E0190
E0200
E0210
E0220
E0230
E0250
Trenton
11
38
132
64
Departure Flight Track
Runway
Installation
Park
Municipality
County
NORTH
0
1
2 Miles
Source: Vance AFB; AFCEC; ESRI Streetmap, ESRI Terrain.

Figure 3-5 Vance AFB Arrival Flight Tracks

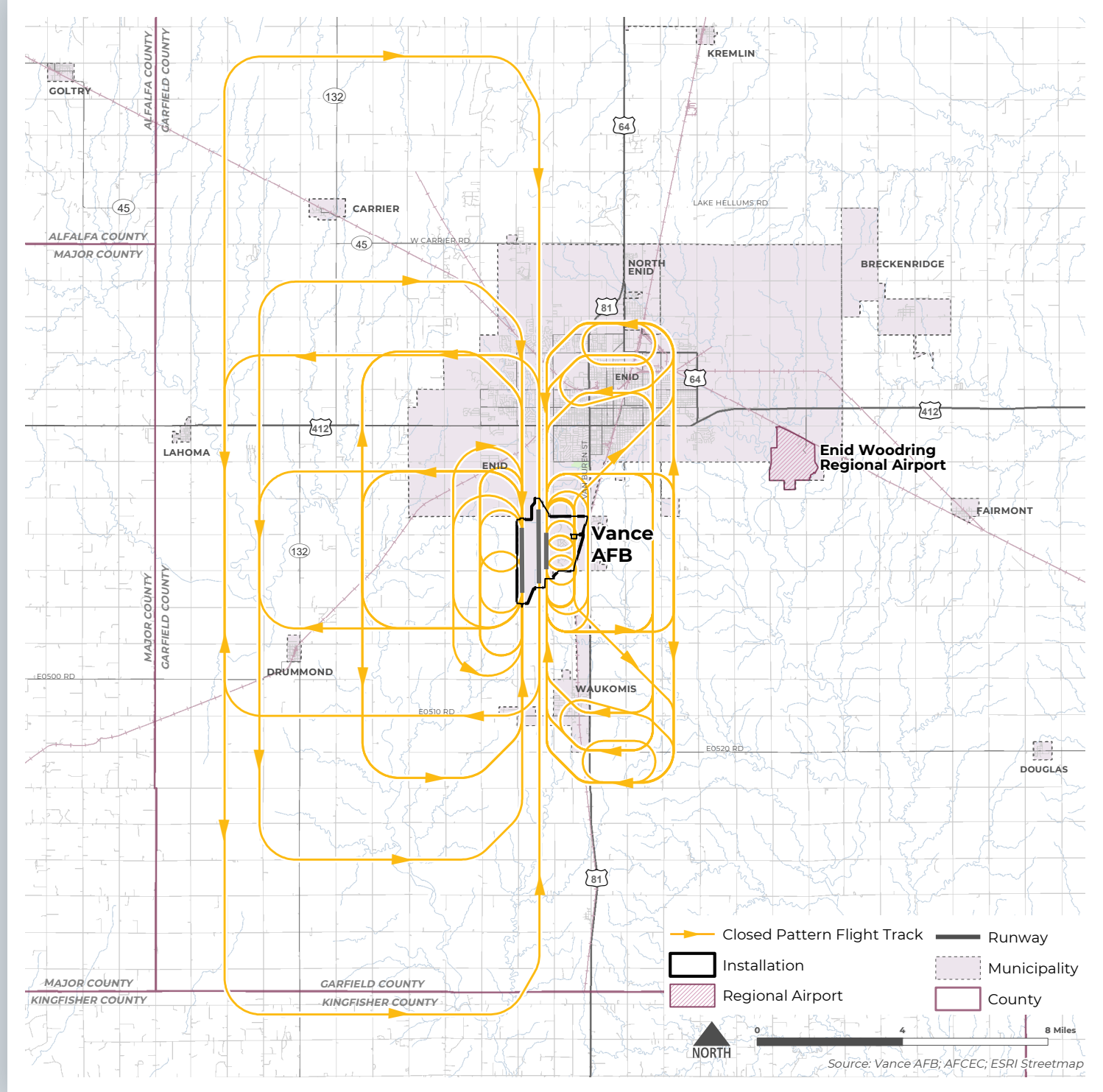


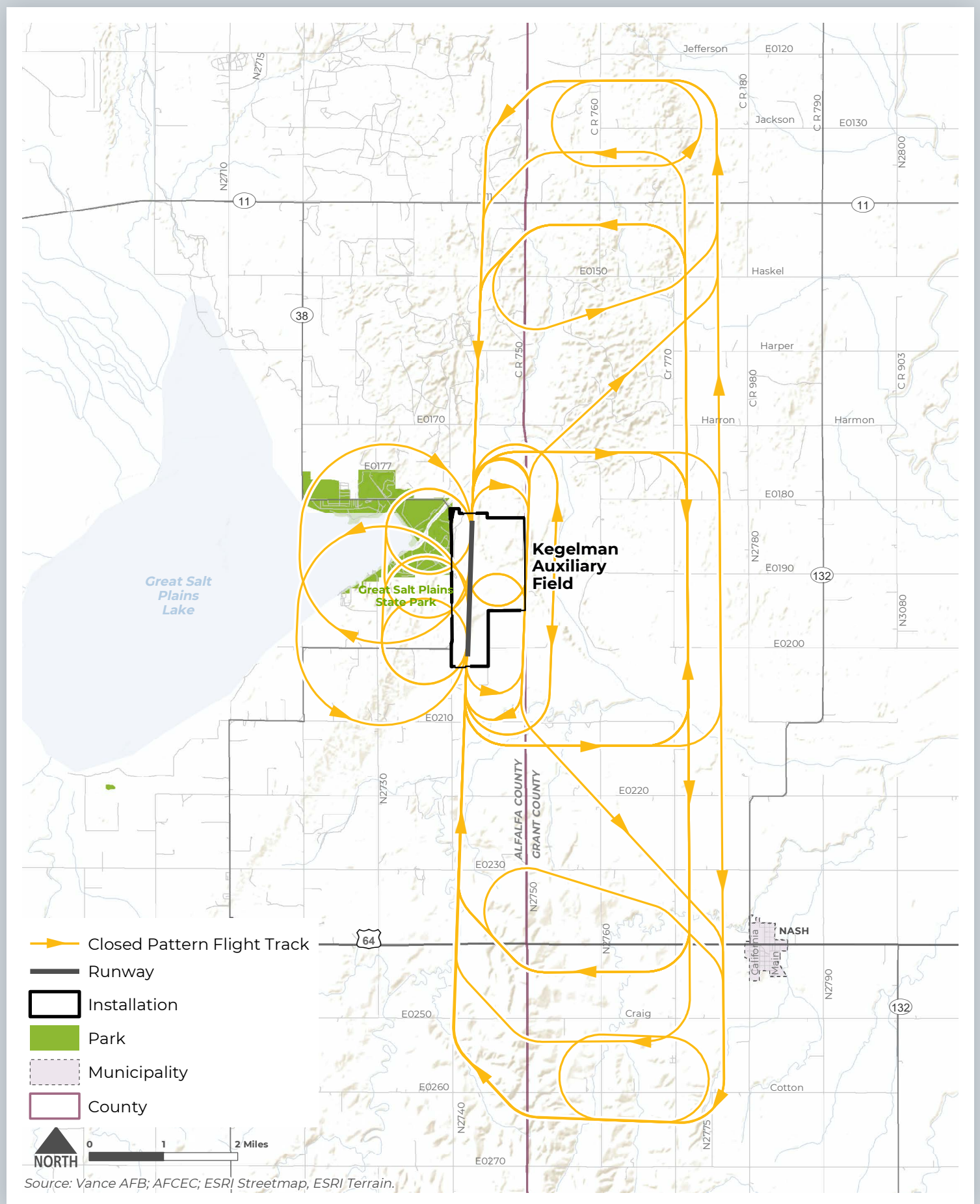
Source: Vance AFB; AFCEC; ESRI Streetmap



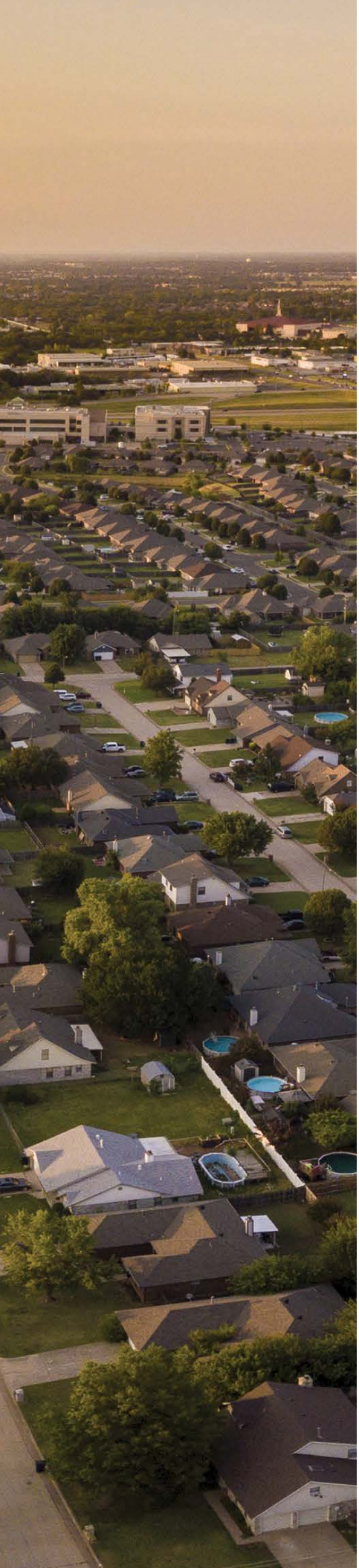
Source: Vance AFB; AFCEC; ESRI Streetmap, ESRI Terrain.

Figure 3-7 Vance AFB Pattern Flight Tracks





Source: Vance AFB; AFCEC; ESRI Streetmap, ESRI Terrain.



4.0 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 factors in local land use planning. Because noise from aircraft or ranges may affect areas around the installation, the Air Force has defined noise zones using the guidance provided in the Air Force Handbook (AFH 32-7084) The AICUZ Program Manager's Guide

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

4.1 What is Sound/Noise?

Sound consists of vibrations in the air. Many 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, decreasing with distance. If these vibrations reach your eardrum at a certain 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 and interferes with normal activities. Sound has three components: intensity, frequency and duration.

Sound becomes noise when it interferes with normal activities.

- ✓ **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 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 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 we feel as pain.

Figure 4-1 Typical A-Weighted Sound Levels of Common Sounds

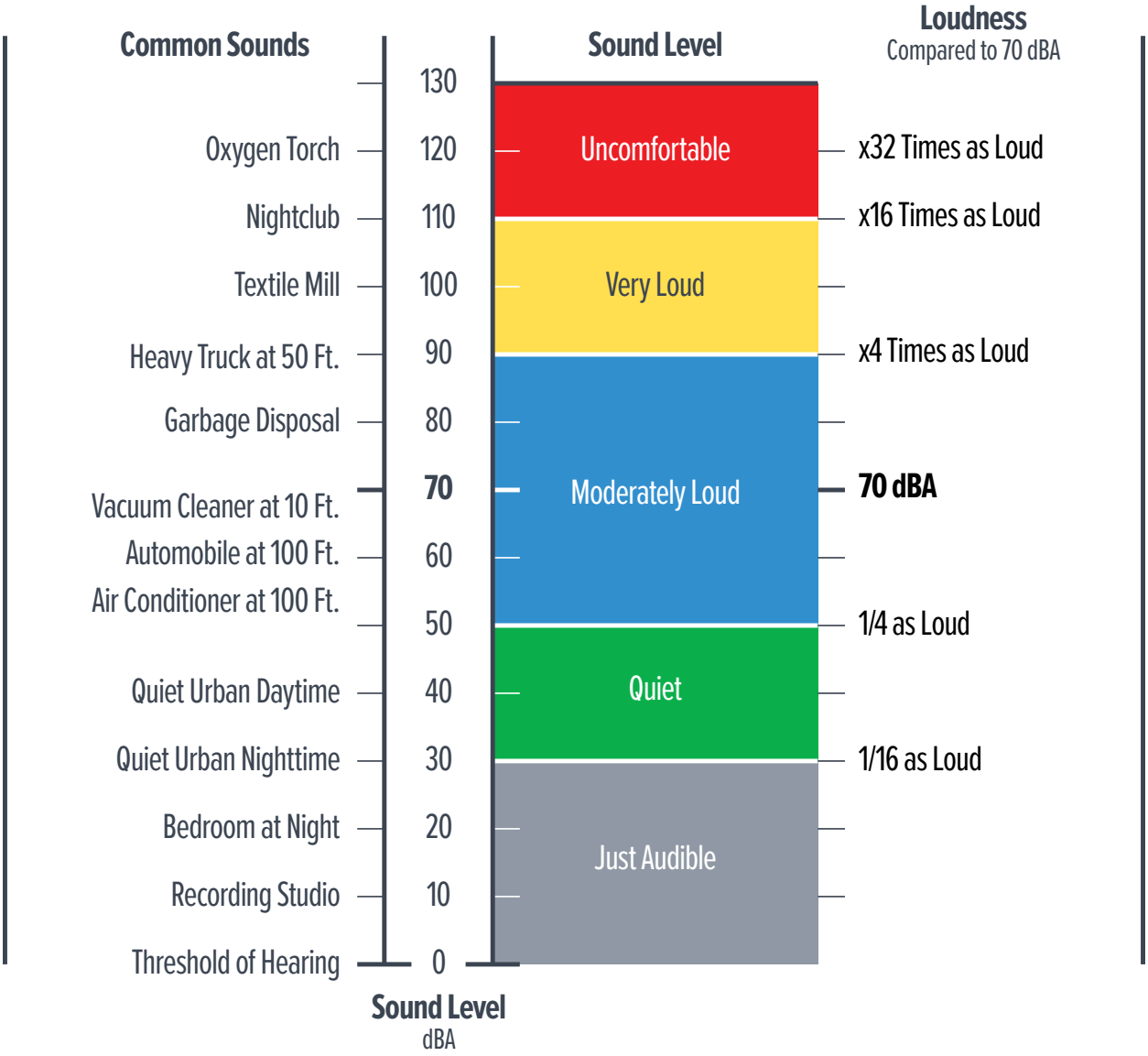


Table 4-1 shows the subjective responses with change in (single event) sound level. While noise energy doubles or halves with every 3 dB change, we do not perceive all this noise energy. It takes a 10 dB increase or decrease for our ears to perceive a doubling or halving of loudness. Please note that these metrics are single event, and you cannot not compare these examples to DNL, which is a cumulative metric.

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 run-up of engines prior to takeoff draw the same interest as a 30-minute maintenance run? 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, or 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 variables adequately in noise analyses, the Air Force uses a metric called "the day-night average sound level (DNL)." The United States Environmental Protection Agency (EPA) created DNL for use throughout the United States.

DNL, when used as a metric for aircraft noise, is "A-weighted" or ADNL. ADNL 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, we drop the "A." In addition, 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 a year's worth of operations and represents the annual average daily aircraft events.

DNL is not a level heard at any given time but 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.

The noise environment at Vance AFB includes noise sources that can be classified as continuous. Continuous noise refers to noise events that have a gradual onset, such as an aircraft taking off, and not necessarily noise that is occurring at a constant level at all times.

4.3.1 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 model for assessing noise exposure from military aircraft operations at air installations, to inform the development of noise contours. When overlaid on local land use maps, noise contours can help identify areas of incompatible land use and assist communities in planning for development around an air installation.

Long-range planning by local land use authorities involves strategies that influence present and future uses of land. Due to the long-range nature of this planning effort, the Air Force provides planning contours—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.

This AICUZ Study uses noise contours developed in 2008 for the 2013 AICUZ Study to serve as planning contours until the anticipated beddown of the T-7A at Vance AFB. **Tables 4-2 and 4-3** detail theoperations modelled at Vance AFB and Kegelman Auxiliary Field to produce the noise contours for the 2013 AICUZ, respectively, that informed the development of the planning contours being used in this study.

Combined, air operations at both airfields total over 360,000 Operations at Vance AFB and Kegelman Auxiliary Field have not changed significantly since 2013, and the Air Force expects future operational totals to remain consistent with only slight increases attributed to future increases in student pilot enrollment.

Table 4-2 Vance AFB Estimated Annual Aircraft Flight Operations

	Arrivals and Departures	Pattern Operations	Totals
T-1	21,212	9,177	30,389
T-6	93,491	115,277	208,768
T-38C	30,688	33,989	64,677
Based	145,391	158,443	303,834
Transient	1,299	0	1,299
Combined	**146,690**	**158,443**	**305,133**

Note: Each “closed pattern operation” includes one arrival and one departure.

Table 4-3 Kegelman Auxiliary Field Estimated Annual Aircraft Flight Operations

	Arrivals and Departures	Pattern Operations	Totals
T-6	16,709	39,741	56,450
Based	16,709	39,741	56,450
Transient	0	0	0
Combined	**16,709**	**39,741**	**56,450**

Note: Each “closed pattern operation” includes one arrival and one departure.

4.3.2 Vance AFB Aircraft Noise Contours

The 2022 Vance AFB noise contours are presented in **Figure 4-2.** The 65 dB DNL noise contour extends approximately 2.7 miles beyond the northern boundary of the installation (approximately 1.6 miles to the northeast and 1.8 miles to the northwest), reaching into the city of Enid. To the south, the 65 dB DNL contour stretches beyond the southern boundary of the installation 5 miles into Garfield County. The western boundary of the 65 dB DNL noise contour extends about 0.6 miles beyond the western boundary of Vance AFB, and the easternmost point of the 65 dB DNL noise contour extends beyond the eastern boundary of the installation about 1 mile.

The greater than 75 dB DNL noise zone overlays approximately 2,350 acres of off-base land, with the northern and southern ends of the zone extending almost directly north and south from Runway 17C/35C. These lands are largely agricultural in use but zoned as single-family residential.

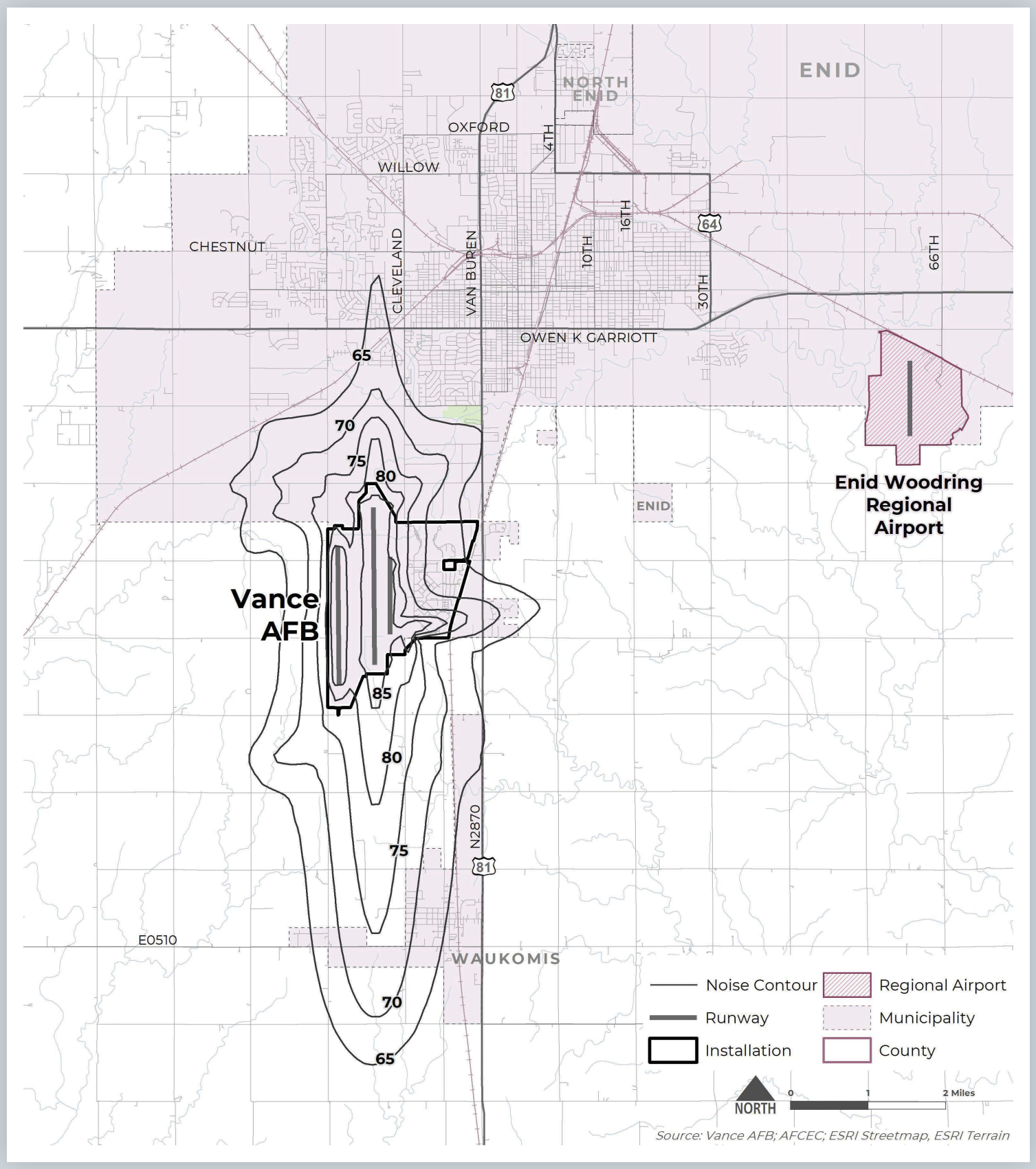
Table 4-4 presents the off-installation land acreage and estimated population within the Vance AFB planning contours. The Air Force generates population estimates based upon 2014-2018 American Community Survey 5-year Estimates from the Census Bureau. This is done using data at the census-block level using a geometric proportion method to determine the estimated population within each noise zone. This method assigns population based on the portion of a census block that falls within a given noise contour and assumes the population across the census blocks is evenly distributed. It is important to note, however, that sound associated with aircraft operations extends beyond the plotted 65 dB DNL noise contours.

Table 4-4 Off-Installation Land Area and Estimated Population within Noise Zones for the 2022 AICUZ Noise Contours at Vance AFB

Noise Zone (dB DNL)	Acres	Estimated Population
65-69	5,264.3	1,958
70-74	3,209.3	428
75-79	1,705.7	18
80-84	592.2	0
85+	57.6	0
Total (65+)	**10,829.1**	**2,404**

Source: U.S. Census Bureau

Figure 4-2 2022 Vance AFB AICUZ Noise Contours



Vance AFB operations expose approximately 10,829.1 acres and 2,404 people to sound levels of 65 dB DNL or greater. About 81% of the estimated exposed population is located within the 65 to 69 dB DNL noise zone. Around 1,700 acres of land fall within the 75 to 79 dB DNL noise zone, 592 within the 80 to 84 dB DNL noise zone, and 58 within the greater than 85 dB DNL noise zone. Based on an inspection of aerial imagery, the greater than 80 dB noise zone contains approximately five structures outside of the installation boundary.

For purposes of this AICUZ Study, previous noise contours from the 2006 AICUZ study have been kept in place pending updated noise measurements based on the possible beddown of the T-7 airframe.

4.3.3 Kegelman Auxiliary Field Aircraft Noise Contours

The 2022 Kegelman Auxiliary Field noise contours are shown in **Figure 4-3.** The 65 dB DNL noise contour extends 0.5 miles beyond the northern boundary of the auxiliary field, reaching into Alfalfa County. To the south, the 65 dB noise contour stretches beyond the southern boundary of the installation 0.5 miles into Alfalfa County. The western and eastern boundaries of the 65 dB DNL noise contour extend only 0.2 miles out from the runway centerline and do not extend beyond the boundaries of the auxiliary field.

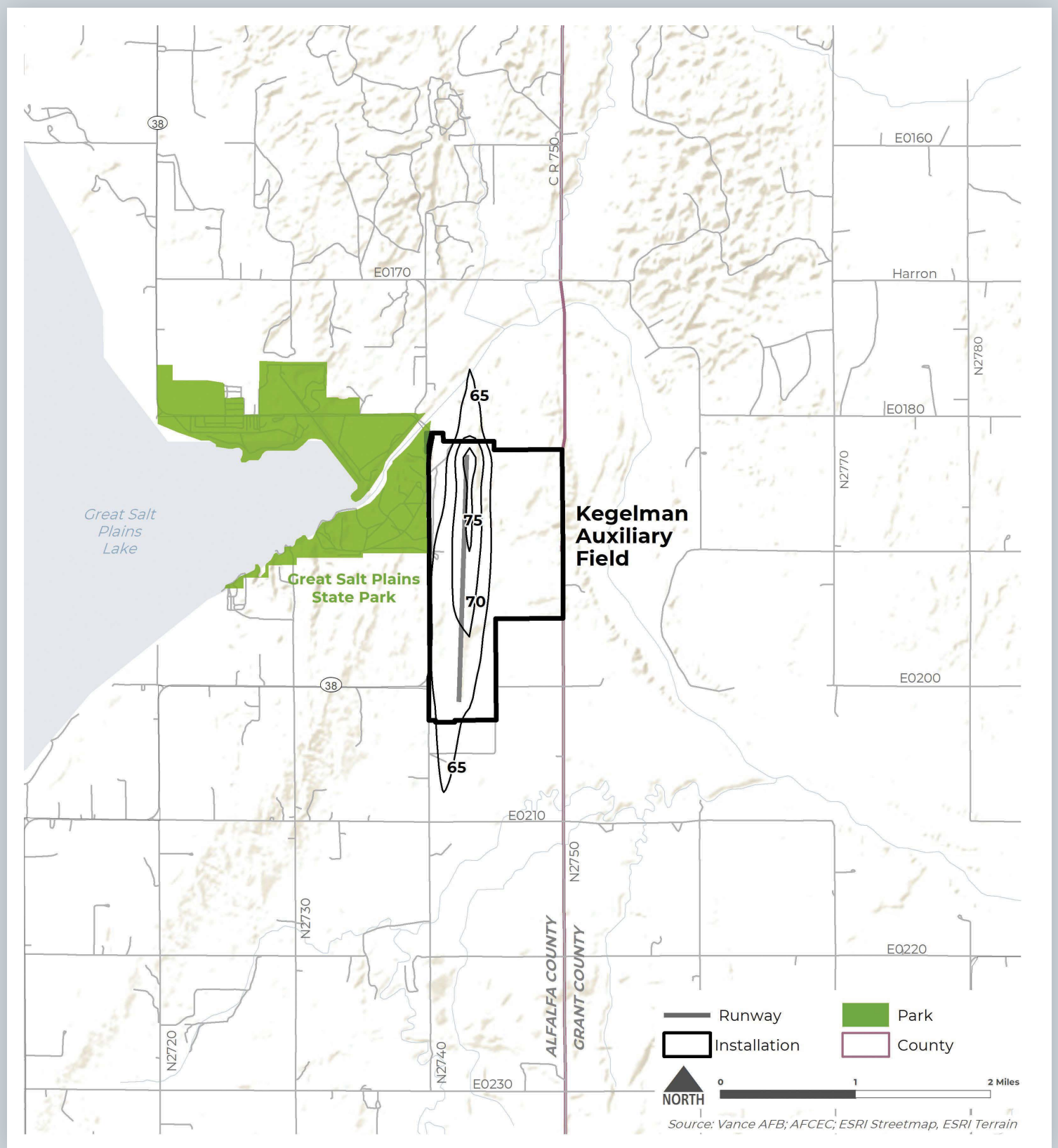
Table 4-5 Off-Installation Land Area and Estimated Population within Noise Zones for the 2022 AICUZ Noise Contours at Kegelman Auxiliary Field

Noise Zone (dB DNL)	Acres	Estimated Population
65-69	77.6	0
70-74	1.9	0
Total (65+)	**79.5**	**0**

Source: U.S. Census Bureau

Table 4-5 presents the off-installation land acreage and estimated population within the Kegelman Auxiliary Field planning contours. The operational noise exposes approximately 80 acres to sound levels of 65 dB DNL or greater. No areas outside the Kegelman Auxiliary Field boundary are exposed to noise levels higher than 75 dB DNL, and no residents live within the affected areas.

Figure 4-3 2022 Kegelman Auxiliary Field AICUZ Noise Contours



4.4 Noise Abatement

The Air Force recognizes that sound from military operations may cause concern for people living 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 while maintaining operational requirements. The various strategies, techniques, and procedures, documented in the Vance AFB Instruction 13-204 – Airfield Operations (March 2020) are aimed at protecting the installation's neighbors and structures from the harmful effects of noise and vibrations.

Vance AFB noise abatement procedures include the following:

- ✓ **All aircraft** will not overfly Vance AFB housing during low closed patterns.
- ✓ **Quiet-period restrictions** are established to minimize interference between flying operations and official ceremonies. A "sterile quiet period" requires no ground or pattern operations be in progress but flying operations away from the airfield may continue. A "non-sterile quiet period" restricts Runway 17L/35R from takeoffs, patterns, or landings. T-6s and T-38s may start and taxi during this period. T-38s cannot use Runway 17C/35C but may depart Runway 17R/35L during this period. T-1 operations are not restricted.

Installation leadership periodically reviews flight operations and their potential impact on surrounding communities. This requirement facilitates the planning, designation, and establishment of flight tracks over sparsely populated areas and/or waterways as often as practicable to balance operational safety and reduce noise exposure levels in surrounding communities.

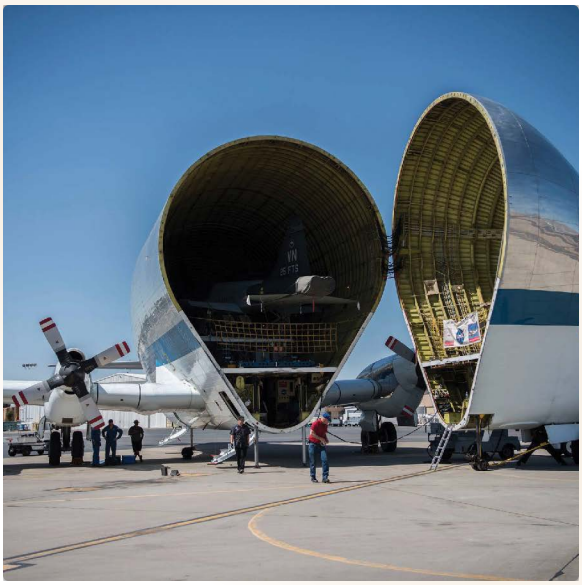
4.5 Noise Complaints

At times, military operations may generate noise complaints. The Air Force evaluates all noise complaints to ensure future operations, when possible, do not generate unacceptable noise. Concerned citizens are encouraged to contact the Vance AFB Public Affairs (PA) Office with any noise complaints. You can reach the PA Office at 580-213-5250.

The Public Affairs Office at Vance AFB manages social media accounts and responses to noise complaints. The base receives few complaints on an annual basis, but when they do, the command post will ask the complaint to be sent through email for clarity and documentation purposes. The 71st FTW PA Office will investigate and has an excellent procedure in place to mitigate community concerns.

Vance AFB also posts information on the installation website, including alerts about upcoming aircraft operations that are able to be shared publicly:

- ✓ **Website: https://www.vance.af.mil/**
- ✓ **Facebook: https://www.facebook.com/71FTW**



5.0 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 community, 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 established a flight safety program that designates areas of accident potential around its air installations to assist in preserving the health, safety, and welfare of residents living nearby. This AICUZ Study provides the information needed, in part, to reach this shared safety goal.

Identifying safety issues 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 military conducted studies of historical military accident and operations data. 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 CZs and APZs as areas where an aircraft accident is most likely to occur if an accident were to take place; 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 runways at Vance AFB (17L/35R, 17C/35C, and 17R/35L) and Kegelman Auxiliary Field (17/35) are all Class B runways. The CZs and APZs for Class B runways are described in the bullets below and are depicted on **Figure 5-1:**

- ✓ **Clear Zone:** At the end of all active DoD runways is an area known as the clear zone. The CZ for Class B runways has an area of 3,000 feet square centered on the end of the runway. All active runways have CZs and should remain undeveloped.
- ✓ **APZ I:** Beyond the CZ is APZ I. 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 by 7,000 feet in length along the extended runway centerline.

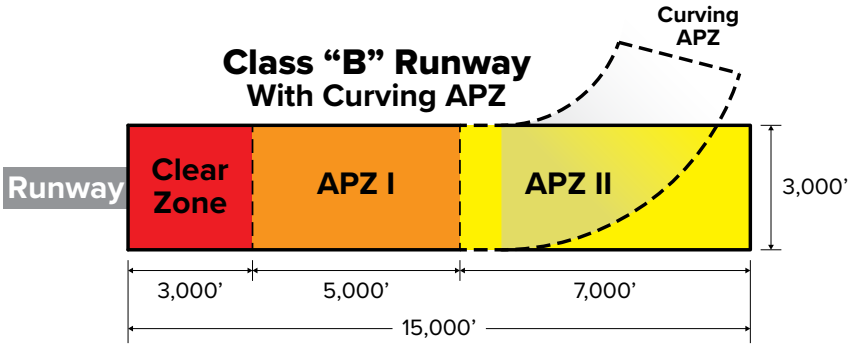


Figure 5-1 Runway Clear Zones and Accident Potential Zones for Class B Runways

While the APZs extend outward from the ends of the runway along the extended runway centerline, the installation may add a curved APZ when over 80 percent of the operations follow a curved arrival or departure path.

Within the CZ, the only land uses that are compatible 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.

5.1.1 Vance AFB Runway Clear Zones and Accident Potential Zones

There are three Class B parallel runways at Vance AFB. **Figure 5-2** depicts the CZs and APZs for Runways 17L/35R, 17C/35C, and 17R/35L. The CZs and APZs for all runways are straight, reflecting the installation's most prevalent operations, and are unchanged from the 2013 AICUZ Study Amendment.

At Vance AFB, portions of the CZs and all of the APZs extend off the installation property. The CZ and APZ I zones to the north and south of the runways are almost entirely undeveloped agricultural lands, with the exception of a handful of homes in the APZ I zones that existed prior to the City enacting AICUZ-related land use restrictions in these areas. This is also the case for most of the APZ IIs to the north and south; however, there are some developed areas in the APZ II north of Vance AFB that consist of multi-family residential areas and commercial retail, most notably a portion of the Oakwood Mall property.

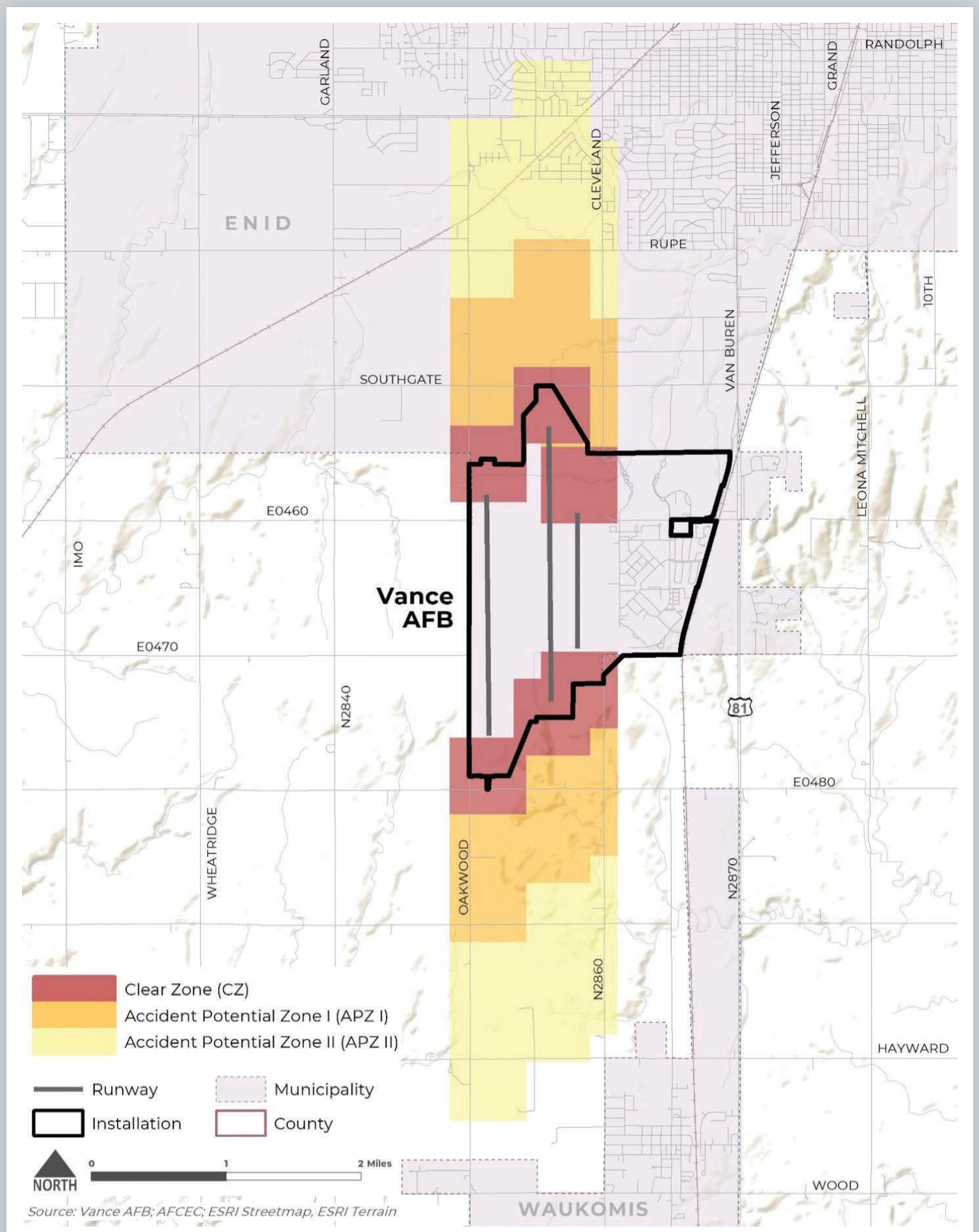
Table 5-1 presents the off-installation land acreage and estimated population within the CZs and APZs. About 540 acres of the CZs fall outside of the installation boundary, but there is no population within these areas. All of the APZ I and II zones are located outside of the Vance AFB boundary. Within these zones, almost all (99.9 percent) of the total population and off-installation acreage fall under APZ II, and only four people reside in APZ I. Chapter 6 discusses land uses and compatibility issues in these areas in further detail.

Table 5-1 Off-Installation Land Area and Estimated Population within the Vance AFB Clear Zones and Accident Potential Zones

Zone	Acres	Population
CZ	541.8	0
APZ I	1,509.5	4
APZ II	2,113.4	2,715
Total	**4,164.7**	**2,719**

Source: U.S. Census Bureau

Figure 5-2 2022 AICUZ Clear Zones and Accident Potential Zones for Vance AFB



5.1.2 Kegelman Auxiliary Field Runway Clear Zones and Accident Potential Zones

There is one Class B runway at Kegelman Auxiliary Field. **Figure 5-3** depicts the CZs and APZs for Runway 17/35. The CZs and APZs for the runway are straight, reflecting the auxiliary field's most prevalent operations, and are unchanged from the 2013 AICUZ Study Amendment.

At Kegelman Auxiliary Field, portions of the CZs and all of the APZs extend off the installation property. The off-base portions of the CZs and all of the APZs fall over land that is largely agricultural with a few single-family homes dispersed throughout. The Salt Fork Arkansas River runs through the northern CZs and APZs.

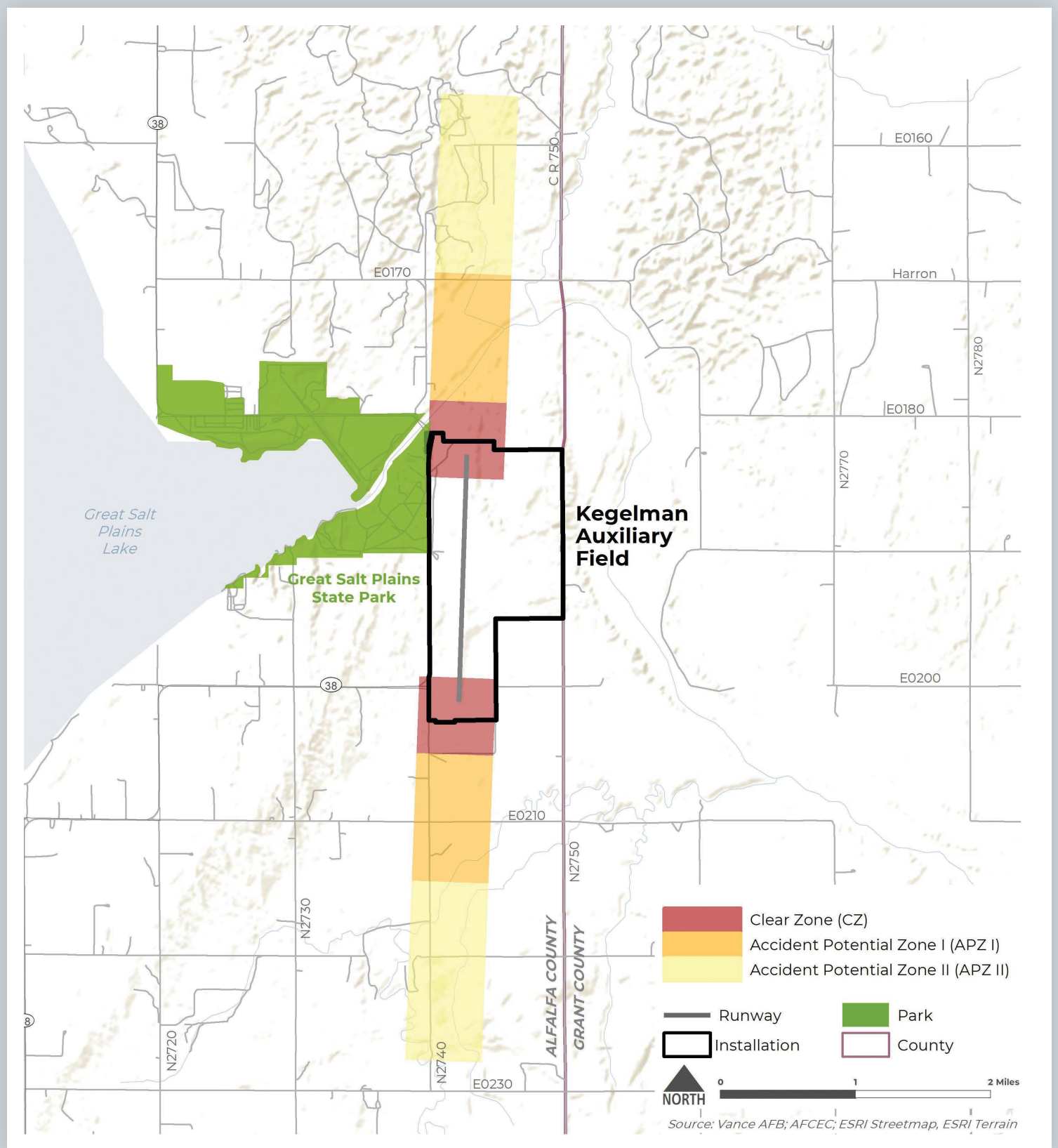
Table 5-2 presents the off-installation land acreage and estimated population within the CZs and APZs. There is no population residing in APZ II, and only five residents within APZ I. There is no population present within the approximately 215 acres of CZs that extend outside the airfield boundary. Chapter 6 discusses land uses and compatibility issues in these areas in further detail.

Table 5-2 Off-Installation Land Area and Estimated Population within the Kegelman Auxiliary Field Clear Zones and Accident Potential Zones

Zone	Acres	Population
CZ	214.8	0
APZ I	688.3	5
APZ II	963.6	0
Total	**1,866.7**	**5**

Source: U.S. Census Bureau

Figure 5-3 2022 AICUZ Clear Zones and Accident Potential Zones for Kegelman Auxiliary Field

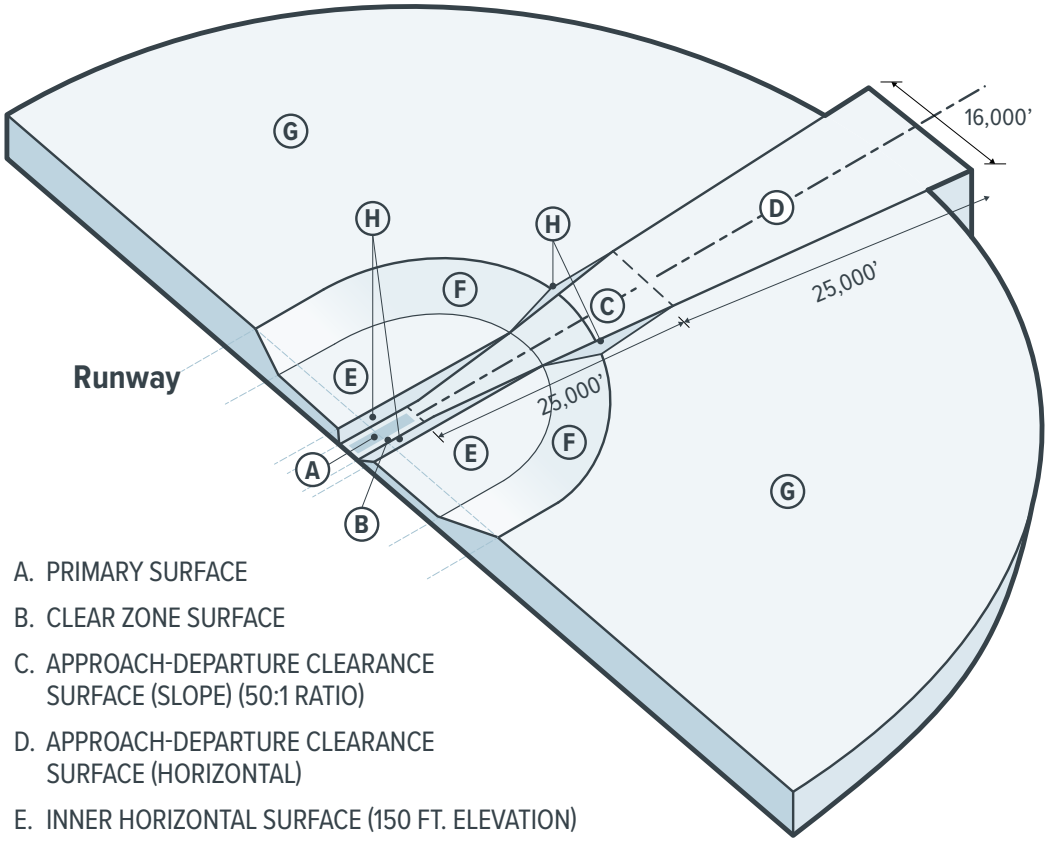


5.2 Imaginary Surfaces

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

There are different imaginary surfaces for fixed-wing runways (depending on type of aircraft supported by the runway) and rotary-wing runways/helipads. **Figure 5-4** depicts the imaginary surfaces for typical Class B fixed-wing runways like those at Vance AFB. **Table 5-3** provides brief descriptions for each of these surfaces. **Figures 5-5 and 5-6** depict the actual runway airspace imaginary surfaces specific to the Class B runways at Vance AFB and Kegelman Auxiliary Field, respectively. In general, the Air Force does not permit aboveground structures on the primary surface (located on base), and height restrictions apply to transitional surfaces and approach and departure surfaces. Height restrictions are more stringent for areas closer to the runway and flight paths.

Figure 5-4 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 5-3 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 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.

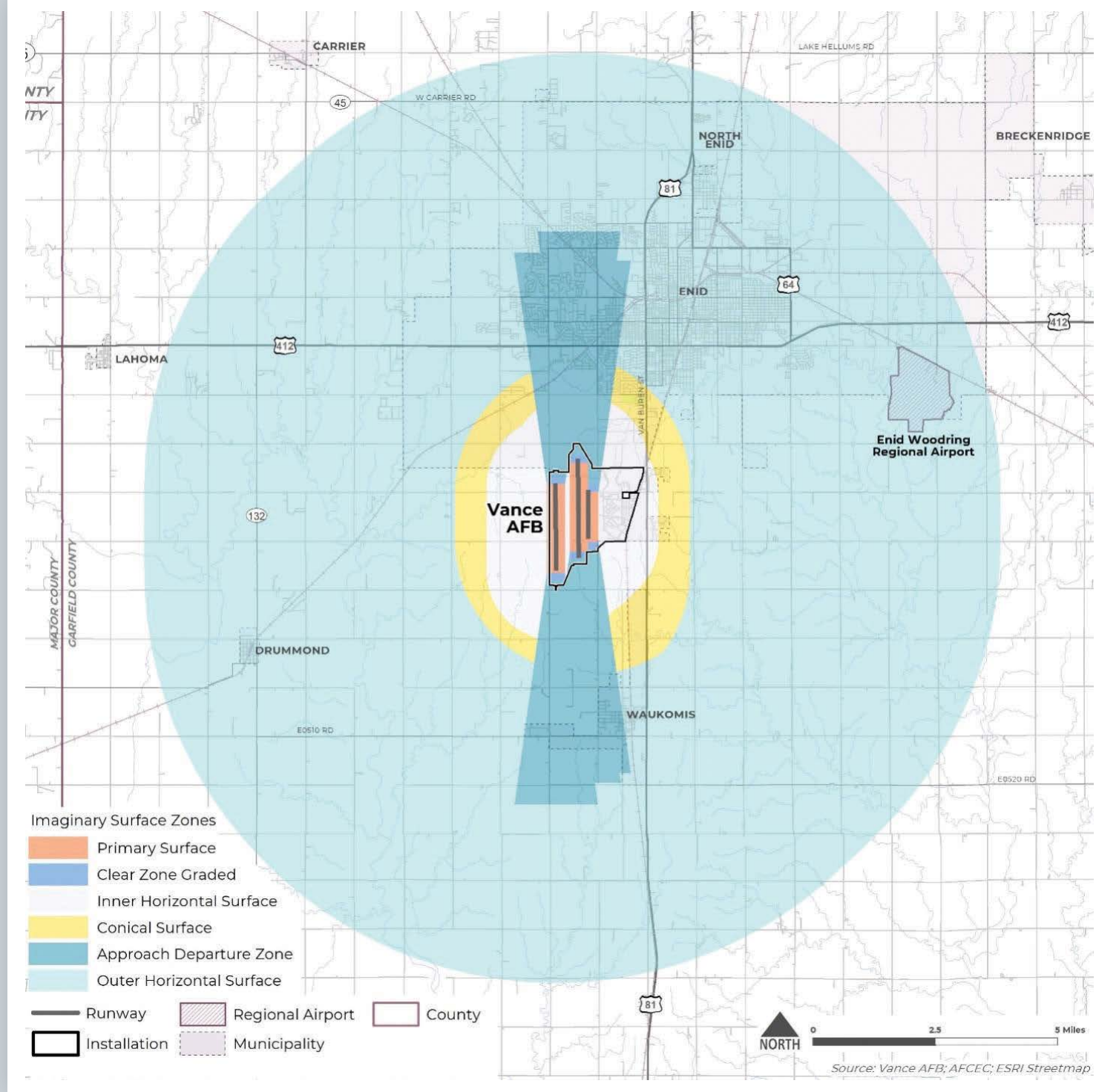
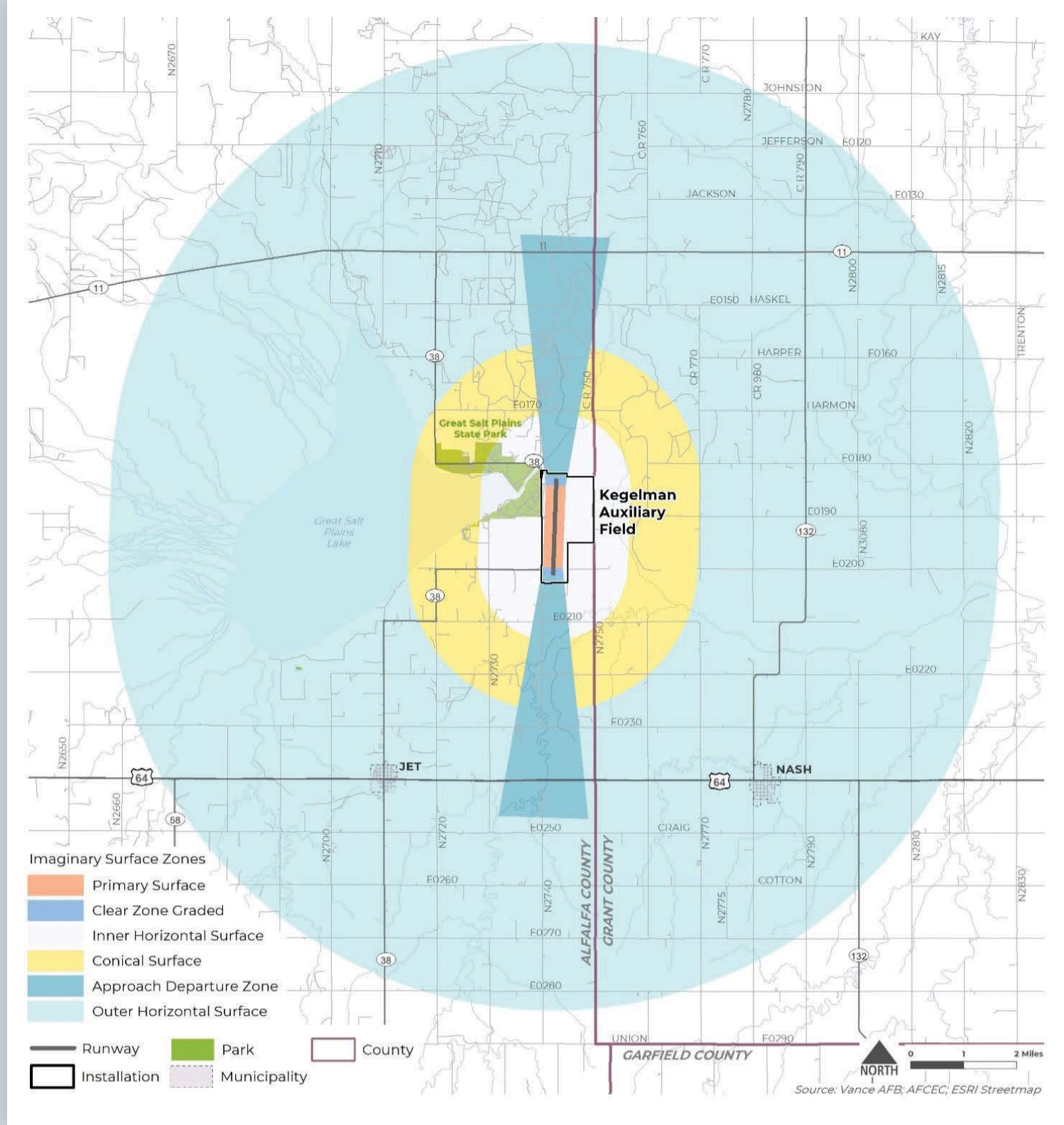

CARRIER
LAKE HELLUMS RD
W CARRIER RD
45
NORTH ENID
BRECKENRIDGE
81
ENID
64
412
LAHOMA
412
Enid Woodring Regional Airport
VAN BUREN ST
Vance AFB
132
MAJOR COUNTY
GARFIELD COUNTY
DRUMMOND
WAUKOMIS
E0510 RD
E0520 RD
81
Imaginary Surface Zones
Primary Surface
Clear Zone Graded
Inner Horizontal Surface
Conical Surface
Approach Departure Zone
Outer Horizontal Surface
Runway
Regional Airport
County
Installation
Municipality
NORTH
0
2.5
5 Miles
Source: Vance AFB; AFCEC; ESRI Streetmap

Figure 5-6 Imaginary Surfaces and Transition Planes for Kegelman Auxiliary Field



5.3 Hazards to Aircraft Flight Zone

Certain land uses and activities pose potential hazards to flight. To ensure land uses and activities are examined for compatibility, the Air Force has identified a hazards to aircraft flight zone (HAFZ). The HAFZ is the area within the imaginary surfaces that is shown in **Figures 5-5 and 5-6.** Please note that the area and shape of the HAFZ may change depending on the encroachment issue at hand; at a minimum, the HAFZ encompasses the imaginary surfaces. For instance, issues related to bird/wildlife aircraft strike hazards may follow natural boundaries, encompass local bodies of water, and extend along flight paths. 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 the following categories.

5.3.1 Height

Tall objects such as wind turbines, cell phone towers, and grain towers can pose significant hazards to flight operations or interfere with navigational equipment (including radar). City/county agencies involved with approvals of permits for construction should require developers to submit calculations showing 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.

5.3.2 Wind Turbines

Wind turbine encroachment on airspace is of specific concern to installation leadership as it relates to low-altitude training. Within the past decade, several wind farms built in the region have resulted in a loss of functionality for Vance AFB’s low-level training routes. Wind turbine-related impacts on radar signals and air traffic control operations can require additional filters on the radar so turbines do not appear as aircraft on the radar and thus endanger pilot safety.

- ✓ **Vance AFB desires involvement with the development process in the early stages** to ensure projects are not a detriment to the training environment. To support this, Oklahoma enacted legislation requiring wind energy companies to submit documentation to the Aeronautics Commission prior to the construction of wind turbines and other structures associated with wind energy facilities (Oklahoma Register, Volume 37, No. 24, Title 25, Chapter 40, Wind Energy Rules).
- ✓ **Local governments around Vance AFB and Kegelman Auxiliary Field are aware** that they should contact Vance AFB to notify the installation if a developer proposes a wind energy project within the region, and developers are increasingly aware that they need to contact Vance AFB prior to siting a project. State legislation passed in 2018 requires bases to be notified if a proposed wind energy project could affect their operations.
- ✓ **An encroachment management team at Vance AFB also tracks wind energy projects** and works with developers to prevent siting of projects within low-level flying routes. Early coordination is key for all parties to find a mutually agreeable solution.

5.3.3 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.

5.3.4 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, which can produce an unintended safety consequence** because red LED lights are not visible on most NVG models, rendering them invisible to NVG users in the area.

Clusters of lazings occur sporadically around the Vance AFB airfield, usually originating from the Enid area; these can be potentially harmful to a pilot's vision during both day and night and can cause permanent eye damage. Pointing a laser at any aircraft is a felony under a federal law enacted by Congress in 2012. The issue has been alleviated through the use of public outreach campaigns on social media and local television news stories.

5.3.5 Bird/Wildlife Aircraft Strike Hazard

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, 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 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 bird/wildlife aircraft strike hazard (BASH) incident, the Air Force recommends that land uses that attract birds not be located near installations with an active air operations mission. These land uses include:

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

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.

BASH issues are a continual challenge at Vance AFB and Kegelman Auxiliary Field. Of particular concern at Kegelman Auxiliary Field is the proximity of the Salt Plains National Wildlife Refuge (NWR), about 2 miles west. The Salt Plains NWR is critical habitat for several migratory bird species, including the endangered whooping crane. The Vance AFB BASH manager consults with the Salt Plains NWR manager throughout the year to coordinate BASH management activities. There is an opportunity to alter flight operations at Kegelman Auxiliary Field during key migration periods as well.

Areas of concern near Vance AFB include the Waukomis sewer lagoons, Meadowlake Park, Crosslin Park, Drummond Flats (a migratory bird sanctuary), and the City of Enid landfill. These uses include water ponding and food sources that attract birds. Agricultural uses in the region (e.g., wheat fields) can also attract birds.

Vance AFB has a BASH management plan and a BASH manager to help enforce the plan, which includes strategies for wildlife and habitat management. These strategies include removal of food or water sources, controlled burns, the use of loud noises or bright lights, and depredation, among others. Several levels of bird watch conditions have been established to help coordinate operations among ground agencies and aircrews in case bird or animal activity is observed. The installation also takes additional protective measures from October 1 to January 31 and April 15 to May 31 (BASH Phase II), when large numbers of migratory birds traverse the region.

5.3.6 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 as a result 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. Many of these sources are low-level emitters of EMI; however, when combined, they have an additive quality.

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.

5.3.7 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.

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 as a result 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 will be required to provide a nominal fee of $5 per application. This registration will be valid for a period not to exceed three years.

The FAA distinguishes between recreational UAS fliers 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 (above) to ensure they have the most up-to-date guidance on how to operate legally and safely.

In accordance with FAA guidelines, Vance AFB issued a Drone Operations Military Compatibility Area (MCA) applicable to drone-restricted airspace surrounding Vance AFB, Kegelman Auxiliary Field, and Enid Woodring Regional Airport. The intent of this MCA is to ensure local activities do not interfere with a safe operating environment for military pilots. Examples of Vance AFB's effort to mitigate drone concerns are stated below:

- ✓ **Vance AFB's drone policy prohibits all UAS flight operations,** including public, civil, and model aircraft over Vance AFB facilities from surface to 400 feet above the ground.
- ✓ **Any commercial operators desiring to fly in Vance AFB's Class D or E airspace** must request from the FAA a Certificate of Authorization (COA), which will then be evaluated by Vance AFB's Airspace Management office.
- ✓ **Drone usage in military training routes (MTRs) cannot exceed 400 feet** above the ground unless previously coordinated through the COA process.

There are occasional drone incursions throughout the year at the Vance AFB airfield. Concentrated public outreach and education campaigns conducted by the Vance AFB PA Office have effectively reduced the number of interferences within the past year.


USAF
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6.0 LAND USE COMPATIBILITY ANALYSIS

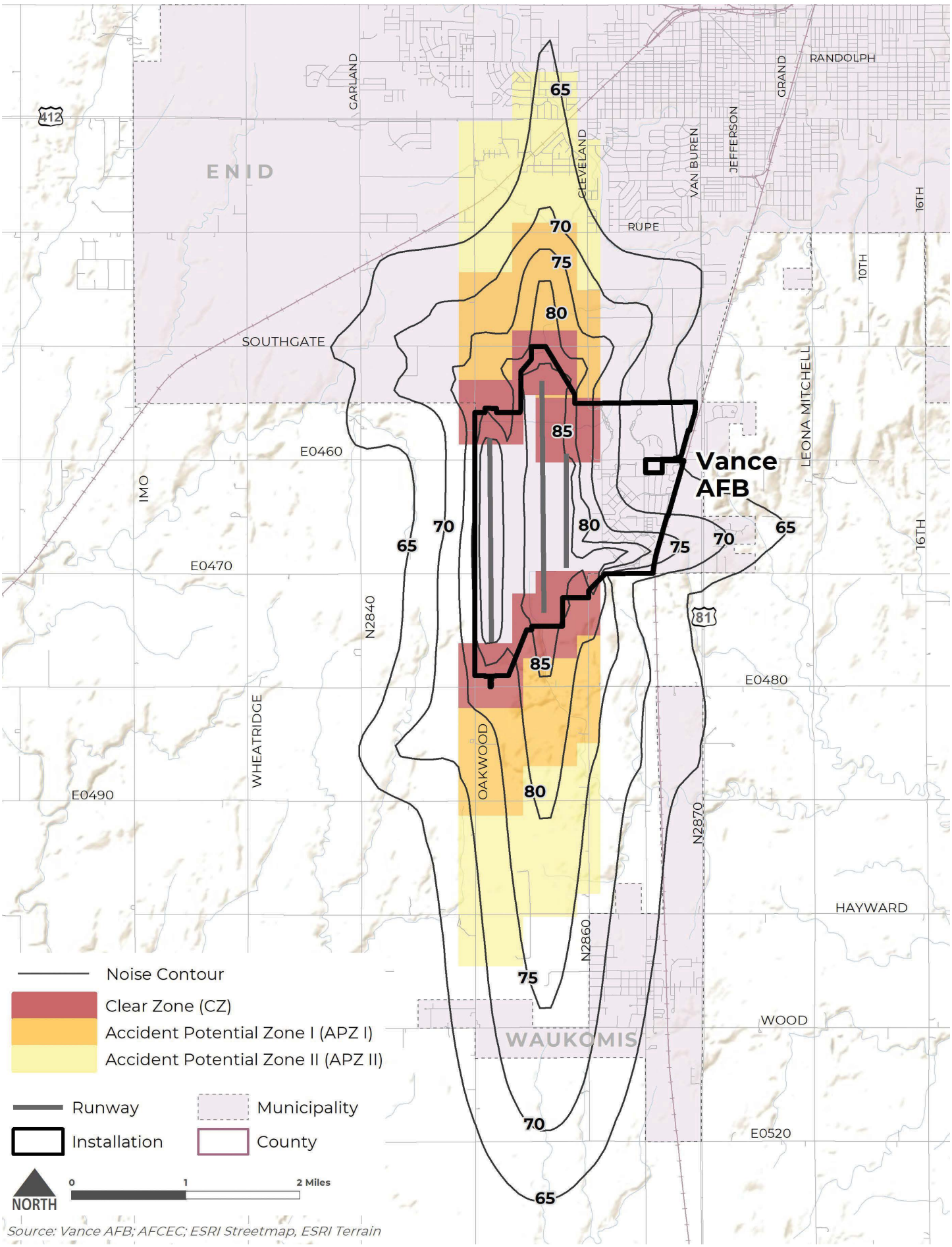
CZs, APZs, noise zones, and the HAFZ make up the AICUZ footprint for an installation and are the basis for the following land use compatibility analysis. The CZs, APZs, and noise zones for Vance AFB and Kegelman Auxiliary Field are shown in **Figures 6-1 and 6-2,** respectively. The AICUZ footprint defines 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

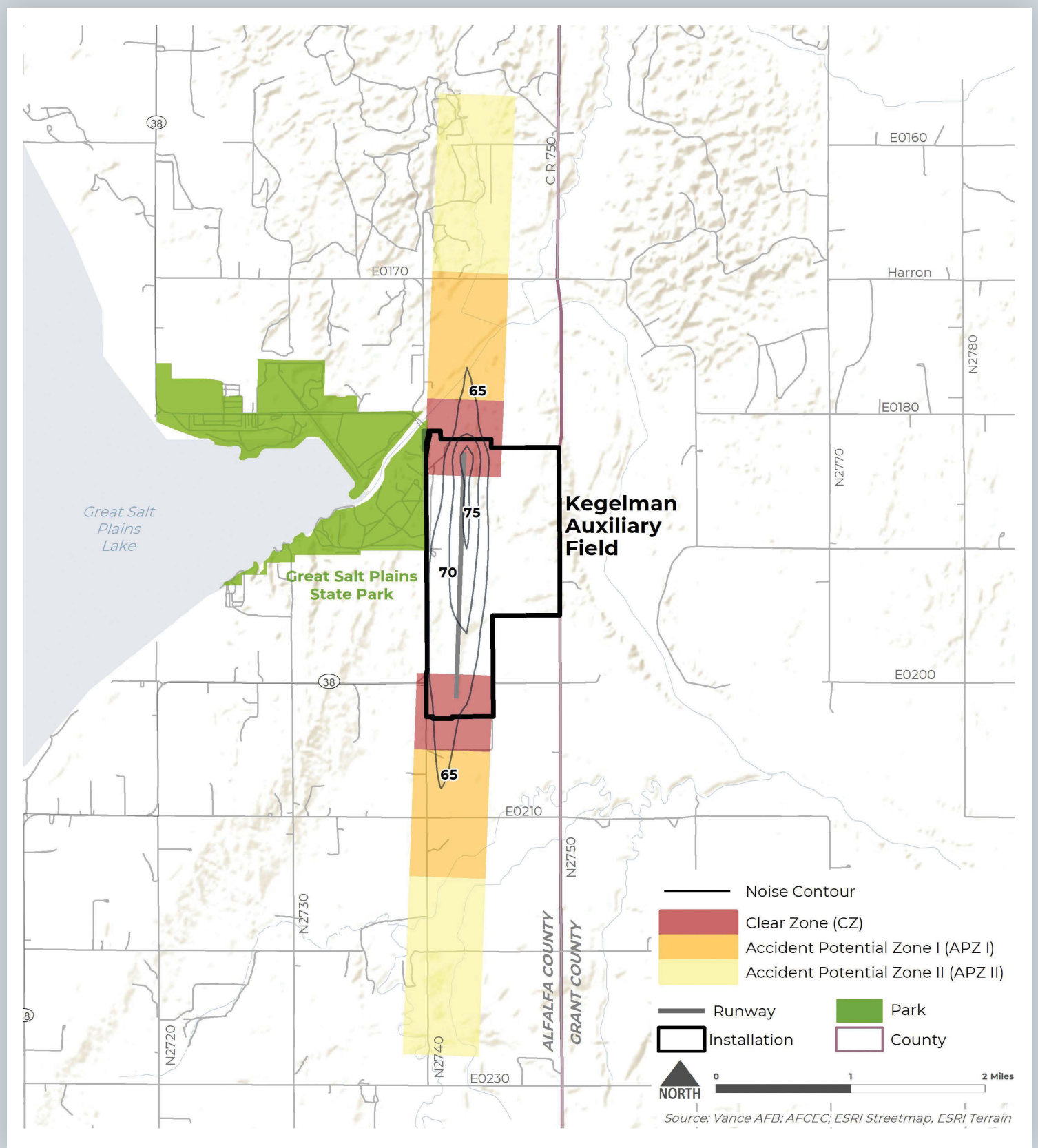
To establish long-term compatibility for lands within the vicinity of military air installations, the DoD has created land use compatibility recommendations based on the Federal Highway Administration's (FHWA) Standard Land Use Coding Manual (SLUCM). DoD personnel use these guidelines for on-installation 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 Vance AFB and Kegelman Auxiliary Field.

Figure 6-1 2022 Vance AFB Composite AICUZ Footprint



Source: Vance AFB; AFCEC; ESRI Streetmap, ESRI Terrain


38
E0160
C R 750
E0170
Harron
N2780
E0180
N2770
65
75
70
65
Kegelman
Auxiliary
Field
Great Salt
Plains
Lake
Great Salt Plains
State Park
38
E0200
E0210
N2750
N2730
ALFALFA COUNTY
GRANT COUNTY
N2720
N2740
E0230
Noise Contour
Clear Zone (CZ)
Accident Potential Zone I (APZ I)
Accident Potential Zone II (APZ II)
Runway
Installation
Park
County
NORTH
0
1
2 Miles
Source: Vance AFB; AFCEC; ESRI Streetmap, ESRI Terrain

6.2 Planning Authorities, Stakeholders, and Policies

This section describes each governing body that has land use jurisdictions near Vance AFB and Kegelman Auxiliary Field, including descriptions of existing and future land uses, relevant stakeholder groups, and existing compatible planning policies and regulations.

6.2.1 State of Oklahoma Land Use Planning and Zoning

In Oklahoma, land use planning and zoning is delegated to municipal and county governments, which are empowered to create comprehensive land use plans and may choose to join a joint planning commission to administer and coordinate local land use plans. The Aircraft Pilot and Passenger Protection Act, discussed in Section 7.2, is a state law intended to increase safety near airports, including military airports, in Oklahoma.

6.2.2 Northern Oklahoma Development Authority

Regional councils are voluntary associations of local governments formed under Oklahoma law. These associations deal with the problems and planning needs that cross the boundaries of individual local governments or that require regional attention. These councils coordinate planning and provide a regional approach to problem solving through cooperative action. Although known by several different names, including councils of governments, regional planning commissions, associations of governments and area councils, they are most commonly referred to as “regional councils” or “councils of governments.” No legal distinction exists among the different names.

In 1970, Oklahoma’s governor established 11 substate planning districts to coordinate regional approaches and solutions applicable at the local level. The Northern Oklahoma Development Authority (NODA) is a council of governments (COG) managed by the Enid Regional Development Alliance (ERDA). NODA serves localities in an eight-county region in north central Oklahoma – Alfalfa, Blaine, Garfield, Grant, Kay, Kingfisher, Major, and Noble. NODA also offers support to all public agencies having jurisdiction within those counties, including cities and towns, conservation districts, school districts, authorities, or political subdivisions.

NODA’s primary role is to provide planning, technical assistance, and direct services management. Assistance ranges from fire department needs, infrastructure improvements, capital improvement planning, and economic development strategies, to hazard mitigation planning and projects and regional transportation needs. NODA also provides support in the comprehensive planning process by creating and managing GIS data for localities.

With respect to Vance AFB operations, NODA is a helpful partner in ensuring compatible land uses at the regional scale.

6.2.3 Garfield County

Vance AFB and the city of Enid are located in Garfield County. Though Garfield County does not have a planning department, they have a county assessor who is responsible for tax-related information, and county commissioners, who are responsible for land use-related decision making.

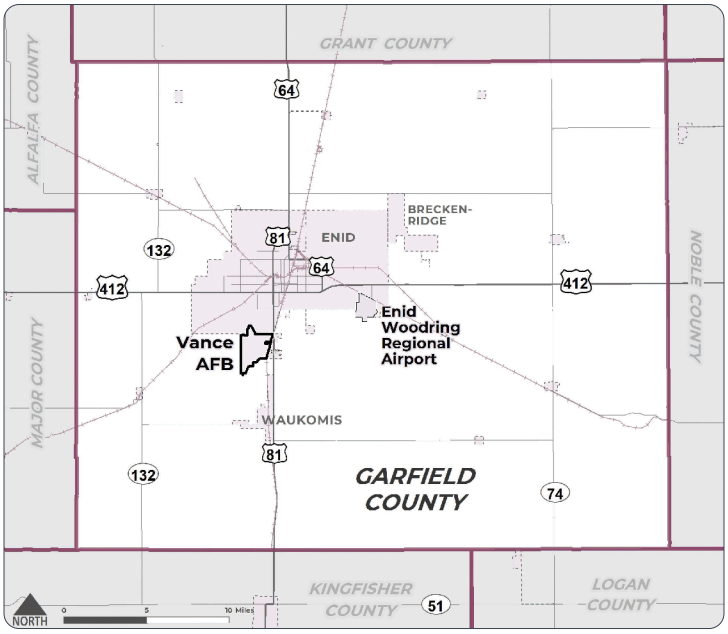
In 1963, Garfield County adopted zoning regulations that established 14 zoning classifications within unincorporated portions of Garfield County. Each zoning district specifies allowed and disallowed land uses; however, none specifically address compatibility with Vance AFB operations. The most recent major planning effort completed in Garfield County was a long-range transportation plan in September 2019.

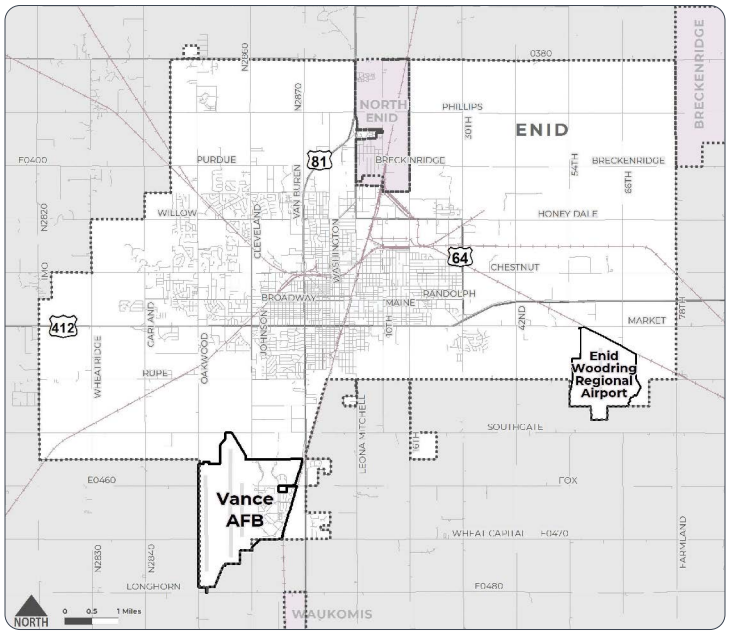
6.2.4 City of Enid

The City of Enid and Vance AFB have a strong working relationship as they partner to support each other in community development and mission sustainment initiatives. The City of Enid regularly notifies Vance AFB of any nearby planning projects that may affect the base, and the City has also adopted an Airfield Environs Overlay District that promotes compatible land uses within the Vance AFB APZs.

Planning, zoning, and development matters in Enid are addressed by the Community Development Department and the Metropolitan Area Planning Commission (MAPC). The Community Development Department reviews the growth, improvement, and sustainability of the community's infrastructure and makes recommendations to the MAPC for review and voting. The MAPC reviews proposed changes to the City of Enid's development codes and establishes long-range development policies for the city and the urbanized areas surrounding it.

The City of Enid and the MAPC have adopted several regulations and participated in planning initiatives that have strengthened land use compatibility within the AICUZ footprint, discussed below.





Airfield Environs Overlay District

The City of Enid's zoning ordinance, originally adopted in 1980, establishes 24 zoning districts. Within the zoning ordinance, there is a supplemental section that establishes the Airfield Environs Overlay District, which is intended to both support the mission of Vance AFB and protect the basic private property rights of surrounding landowners. Land use regulations in this district align with the recommendations of the SLUCM land use compatibility guidelines by delineating land use and density limitations within each type of safety zone as specified by the 2003 Vance AFB AICUZ Study. The overlay district also specifies noise attenuation construction standards for buildings located within greater than 65 dB DNL noise zones as specified by a noise study from a previously conducted AICUZ ("Guidelines for the Sound Insulation of Residences Exposed to Aircraft Operations," November 1989, Wyle Laboratories). Certain land uses are prohibited in the overlay district, including uses that cause steam, smoke, or dust, and uses that attract waterfowl or other birds. The Airfield Environs Overlay District supplements the regulations of underlying zoning districts and prevails if there is a conflict between the two.

"Envision Enid" Comprehensive Plan

The City's comprehensive plan 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 current comprehensive plan, entitled Envision Enid, was completed in September 2015. In this plan, Vance AFB was identified as a major economic engine for Enid. The plan addresses specific factors that will help aid Enid in its partnership with the Air Force and sustain civilian and military personnel and their families:

- ✓ Protection of the APZs
- ✓ Sustained, protected water source
- ✓ Housing
- ✓ Mechanic training
- ✓ Higher education

Envision Enid also addresses the City's current zoning ordinances and the importance of using zoning to protect Vance AFB from incompatible development, thus ensuring the city's growth does not negatively impact base missions.

Enid Area Housing Demand Study

A housing study conducted by ERDA in 2013 identified Vance AFB as the largest area employer and a key demand driver for home sales and rental housing. Conclusions of the study stated that while housing demand fluctuates, the current housing supply remains tight. The comprehensive plan suggests utilizing existing infrastructure to maximize density and mixed-use development rather than building new infrastructure and supporting urban sprawl.

Vance AFB Joint Land Use Study

As recommended by Envision Enid, the City led a Joint Land Use Study (JLUS) that brought together Vance AFB, the Town of Waukomis, the Town of North Enid, Garfield County, Alfalfa County, and the private sector to identify ways to protect the viability of current and future military mission and operations while concurrently guiding the surrounding community's growth, sustaining the environmental and economic health of the region, and protecting public health, safety, and welfare.

To achieve this purpose, three objectives were identified and accomplished through Public Engagement Plans:

1. **Understanding: Convene community and military representatives to identify, confirm, and understand the compatibility issues and concerns in an open forum, considering both the community and military perspectives and needs. This includes increasing public awareness, education, and opportunities for input through a cohesive outreach program.**

2. **Collaboration: Encourage cooperative land use and resource planning among Vance AFB and surrounding communities so that community growth and development are compatible with the military missions and operations, while seeking ways to reduce operational impacts on land within the study area.**

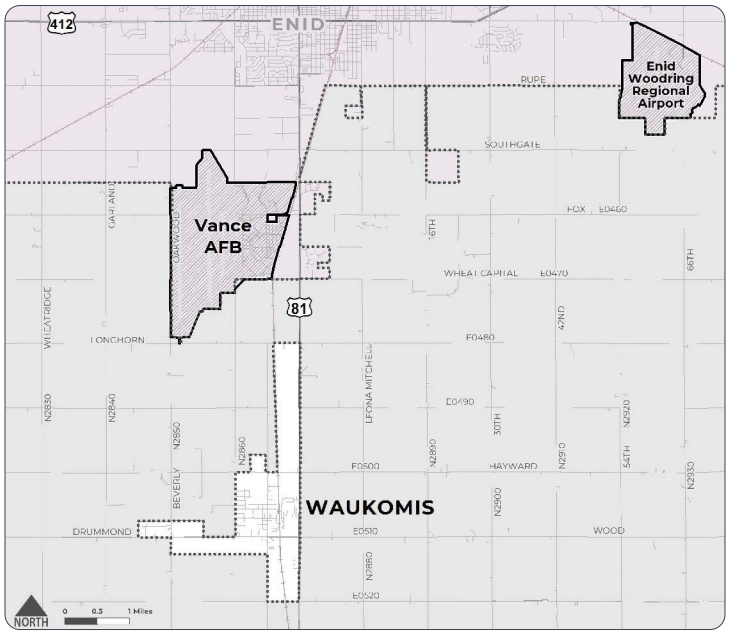
3. **Actions: Provide a set of mutually supported tools, activities, and procedures from which local jurisdictions, agencies, and Vance AFB can select, prepare, and approve/adopt to implement recommendations developed during the JLUS process. The actions include both operational measures to mitigate installation impacts on surrounding communities and local governments, as well as agency approaches to reduce community impacts on military operations. These tools help decision makers resolve compatibility issues and prioritize projects within their budget cycles.**

Through these objectives, 15 compatibility issues were identified: Antiterrorism/Force Protection, Communication/Coordination, Dust/Smoke/Steam, Energy Development, Frequency Spectrum Capacity, Housing Availability, Competition for Land/Air/Sea Spaces, Land Use, Noise, Public Services, Roadway Capacity, Safety Zones, Scarce Natural Resources, Vertical Obstructions, and Water Quality and Quantity.

As of the publication of this study, Enid has been actively working to implement various JLUS recommendations. Thus far, the city has successfully adopted ordinances related to development of telecommunications towers and has drafted ordinances that restrict renewable energy development and tall structures within the Vance AFB AICUZ footprint.

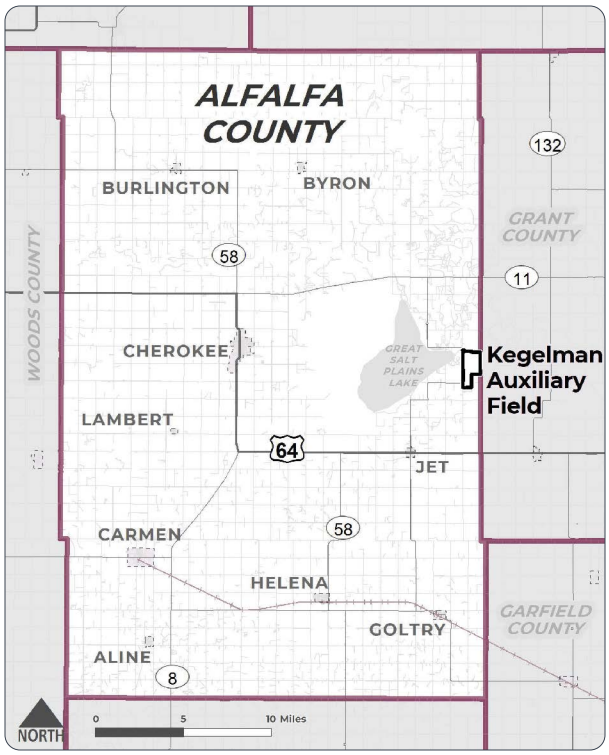
6.2.5 Town of Waukomis

The Town of Waukomis is an incorporated, rural town in Garfield County 2.5 miles south of Vance AFB. The Town's zoning codes were last updated in 2015, and the Town has a planning commission that provides regulatory oversight to zoning and land use matters in the town. While Waukomis does not have AICUZ-related overlays in its zoning code, town leadership indicated that they would be interested in implementing regulations that support compatible land use, specifically real estate notifications for homes within noise zones. There are no plans for development of tall structures such as cell towers, wind turbines, or residential development. The most notable known future development in the town is a potential commercial development initiative off of U.S. Route 81 on a parcel currently zoned for agricultural use. The Town of Waukomis Planning Commission has contact information for the Vance AFB PA Office and is willing to notify the base if a proposed development project might interfere with operations at the airfield.



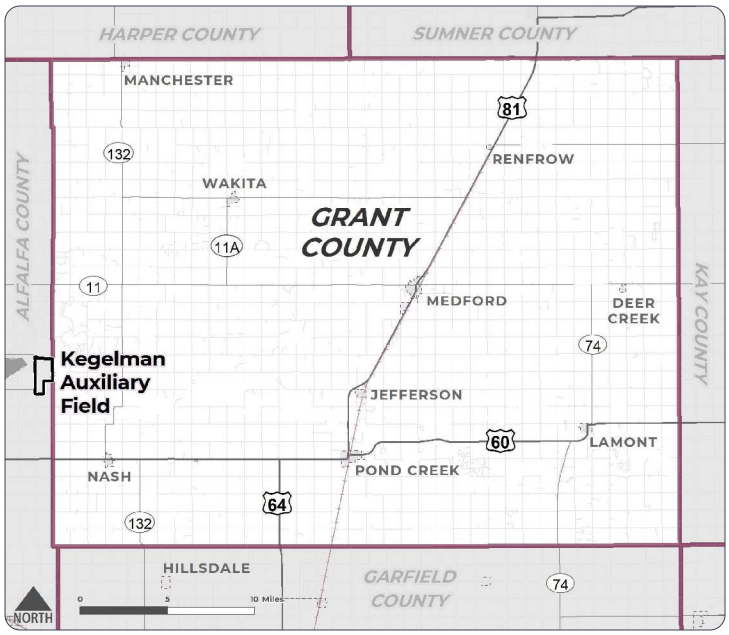
6.2.6 Alfalfa County

Alfalfa County is a rural county in northwest Oklahoma that does not have zoning or other land use regulations. According to the Alfalfa County Commissioners, there is a lack of development pressure on the eastern side of the county in the area around Kegelman Auxiliary Field. Alfalfa County commissioners have contact information for the Vance AFB PA Office and are willing to notify the base if a large development project is proposed that might interfere with operations at the airfield.



6.2.7 Grant County

Grant County is a rural county in northwest Oklahoma that does not have zoning or other land use regulations. Similar to Alfalfa County, Grant County officials stated that there is a lack of development pressure on the western side of the county proximate to Kegelman Auxiliary Field. Grant County commissioners have contact information for the Vance AFB PA Office and are willing to notify the base if a large development project is proposed that might interfere with operations at the airfield.



6.3 Land Use and Proposed Development

The land use compatibility analysis evaluates existing and future land uses and zoning near Vance AFB to determine compatibility conditions. Some municipalities have future land use maps in their respective comprehensive plans, which is a predictor of where they see development in the long term, but GIS data associated with these future land use maps were not available. Land use and zoning GIS data were obtained from the City of Enid, NODA, and a national land use dataset (land use data was not available for Grant County).

To analyze the compatibility of nearby land uses surrounding Vance AFB, the use of each parcel of land is characterized into use categories. Shown below are broad use categories as defined by the FHWA SLUCM tables. While the specific categories used by each local government may vary, these generalized categories provide a starting point for each analysis. Appendix A, Land Use Compatibility Tables, provides further description of the SLUCM land use categories along with notes on general allowable uses for jurisdictions surrounding Vance AFB and Kegelman Auxiliary Field. Appendix C provides a table illustrating how the local land use designations for these jurisdictions were consolidated into the following categories:

- **Residential:** Designations and zoning for family and personal living including rural/low-density development, medium-density, and high-density towers. Types of units include but are not limited to single-family detached dwellings' duplex, triplex and quadplexes; mobile homes or manufactured housing; and apartment buildings and condominiums.
- **Manufacturing:** Including food, textile and apparel manufacturing, household goods and trades manufacturing (metals, stones, clays, glass, plastic, and rubber, etc.).
- **Transportation, Communication, and Utilities:** Including public and private transportation uses (road, rail, air, marine), parking infrastructure, communication uses (cell towers, relay towers, etc.), public, semi-public, and private utilities (power stations, power transmission lines, substations, wastewater treatment plants, solid waste disposal facilities, etc.).
- **Trade:** Including wholesale trade, retail trade (neighborhood, community, regional and super-regional; food, transportation, home furnishings, etc.).
- **Services:** Including personal and professional services (financial, real estate, etc.), religious activities, cemeteries, warehousing/storage and repair services, medical facilities (hospitals, clinics, dentist offices, nursing homes, etc.), and governmental services.
- **Cultural, Entertainment, and Recreational:** Including cultural activity uses, nature exhibits, public assembly, indoor auditoriums and outdoor amphitheaters, outdoor sports, amusements and recreational activities, parks, etc.
- **Resource Production and Extraction:** Including farm and livestock agriculture, forestry and fishing activities, resource mining, etc.

The land use compatibility analysis performed as part of this AICUZ Study identifies existing land uses near Vance AFB and Kegelman Auxiliary Field to determine compatibility conditions. Existing land use is assessed to determine current land use activity, while zoning is used to project potential development and growth areas. Existing land use and parcel data provided by local communities were evaluated to ensure an actual account of land use activity regardless of conformity to zoning classification or designated planning or permitted use. In addition, local management plans, policies, ordinances, and zoning regulations were evaluated to determine the type and extent of land use allowed in specific areas.

6.3.1 Existing Land Uses

Existing Land Uses in the Vicinity of Vance AFB

Vance AFB is located in Garfield County, in the southernmost portion of the city of Enid. Consequently, the airfield's associated noise zones, CZs, and APZs span across developed areas of Enid and into rural areas of Garfield County.

Immediately to the north, south, and west of the Vance AFB runways are large parcels that are primarily open, agriculture, or vacant/undeveloped land uses, with some interspersed residential development.

Farther north, within and around the greater than 65 dB DNL noise zone and the APZ IIs that extend north off of runways 17L/C/R, there are additional residential dwellings, as well as trade, services, and cultural, entertainment, and recreation uses that stretch along U.S. Highway 412 (West Owen K. Garriott Road). U.S. Highway 412 contains a large portion of the city's commercial uses and is targeted for future infill development as a commercial corridor.

To the northeast of the Vance AFB runways, east of South Cleveland Street, there are single-family residential neighborhoods of varying densities that were developed before the establishment of the Airfield Environs Overlay District. The Meadowlake Golf Course constitutes the large recreational parcel nestled between these residential areas. Professional service and commercial uses are clustered along U.S. Route 81.

The land uses south of Vance AFB are predominantly agricultural, with a few residential and services uses. The Town of Waukomis contains a greater concentration of single-family residential development in this area in addition to service and trade land uses clustered around Main Street and Wood Road. Waukomis falls within the greater than 65 and 70 dB DNL noise zones.

Existing land uses within the 2022 AICUZ CZs, APZs, and noise contours for Vance AFB are illustrated in **Figure 6-3.** Several transportation corridors surround Vance AFB, including railroads, U.S. Route 81, U.S. Highway 412, and smaller U.S. and state highways. Areas of specific land use compatibility concerns within the Vance AFB noise contours, CZs, and APZs are further evaluated in Section 6.4, Compatibility Concerns.

Existing Land Uses in the Vicinity of Kegelman Auxiliary Field

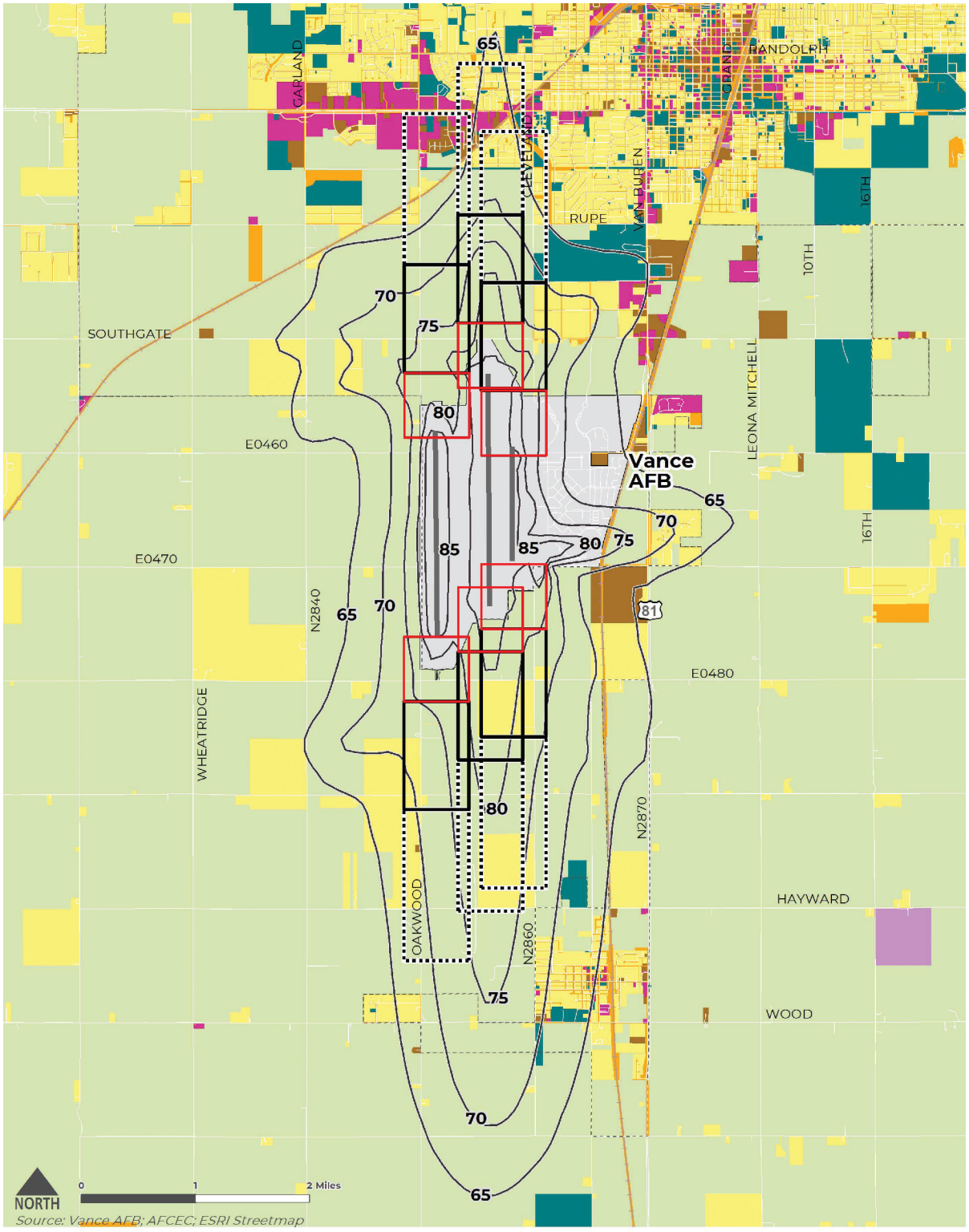
Kegelman Auxiliary Field is located in Alfalfa County near the border of Grant County. Parcels around Kegelman Auxiliary Field are overwhelmingly agricultural in use, few of which contain personal residences. The Great Salt Plains State Park is directly west of Kegelman Auxiliary Field. Several parcels classified as transportation, communication, and utility uses are interspersed in the area as well.

Existing land use data was not available for Grant County, but a Grant County commissioner confirmed that the region of Grant County closest to Kegelman Auxiliary Field mostly consists of agricultural land and scattered single-family residences. Existing land use within the 2022 AICUZ CZs, APZs, and noise contours for Vance AFB are illustrated on **Figure 6-4.**

6.3.2 Current Zoning

Zoning in the Vicinity of Vance AFB

Figure 6-5 overlays the 2022 Vance AFB AICUZ Study noise contours, CZs, and APZs with current generalized zoning in the vicinity of Vance AFB (for details on how the generalized zoning layer was created, see Appendix C). The majority of parcels surrounding the installation are either resource production and extraction (e.g., agricultural), or single-family residential, with smaller pockets of commercial, services, or recreational lands primarily located within residential areas or along transportation corridors.

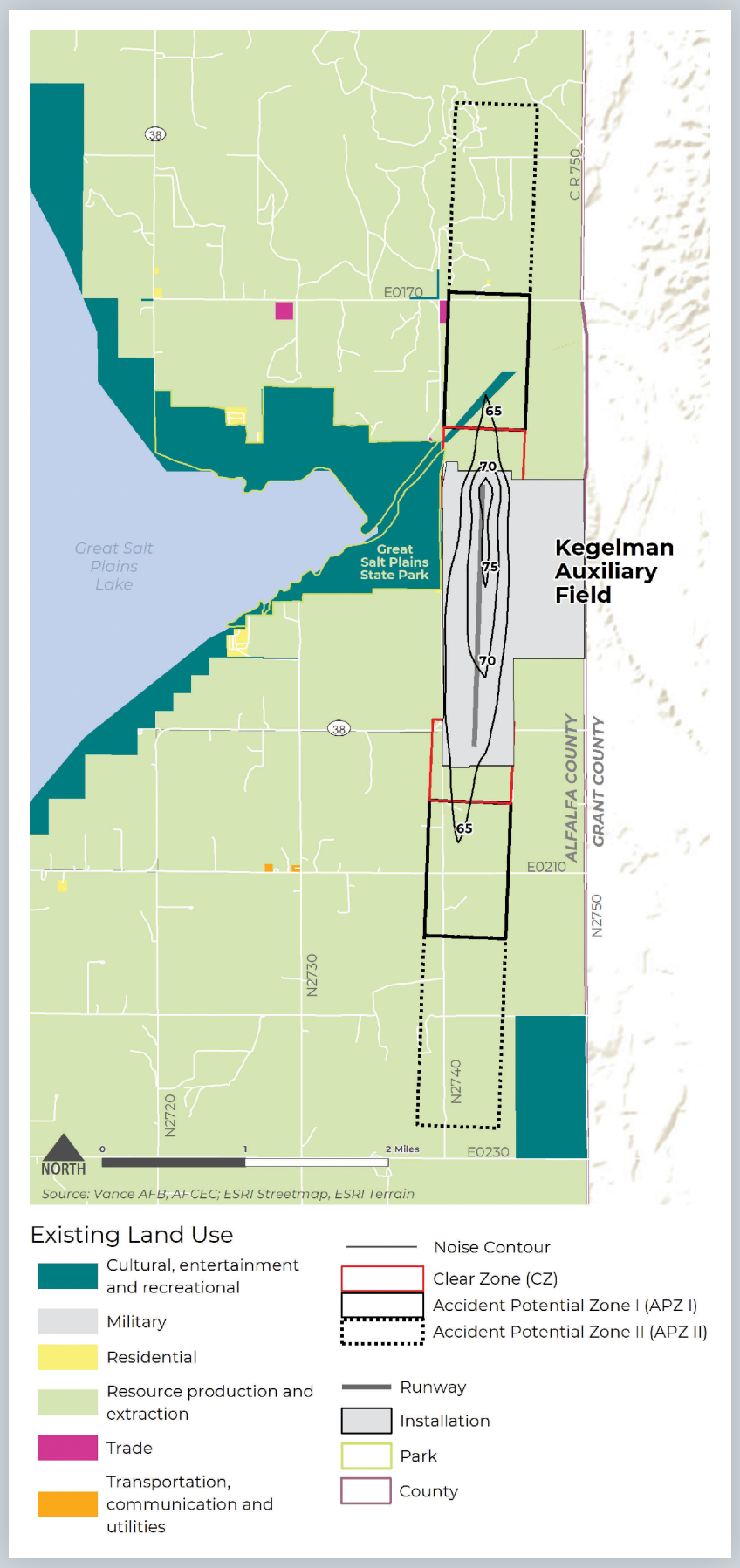


Noise Contour
Clear Zone (CZ)
Accident Potential Zone I (APZ I)
Accident Potential Zone II (APZ II)
Runway
Installation
Municipality

Existing Land Use

- Cultural, entertainment and recreational
- Manufacturing
- Military
- Residential
- Resource production and extraction
- Services
- Trade
- Transportation, communication and utilities

Figure 6-4 Existing Land Use and 2022 Kegelman Auxiliary Field AICUZ Study Noise Contours, CZs, and APZs



In Enid, to the northwest of Vance AFB, commercially zoned lands exist along the major corridor of U.S. Highway 412 and South Garland Road, including a portion of the Oakwood Mall. Because some of these commercial lands as shown in **Figure 6-3** allow residential uses (the more restrictive use from a safety standpoint), they are classified as residential in **Figure 6-5.** There are areas zoned single-family residential and agricultural to the north and northwest of the installation.

The area south of the installation is primarily zoned for agricultural-residential use apart from services and trade zoning districts in Waukomis. It should be noted that for the purpose of this analysis, these areas were classified as residential because residential buildings are an allowed use and would be affected more by air operations than agricultural uses.

The City of Enid's Airfield Environs Overlay District makes special recommendations for areas within the AICUZ safety zones. New residential development, along with retail and office uses, are prohibited within APZ I. In APZ II, single-family residential uses below two dwelling units per acre and most low-density retail and office uses are allowed. Because parcels within the CZs are most affected by airfield operations, their uses are limited to those listed in the underlying zoning districts, such as agriculture.

It is worth noting that of the 10,829.1 acres located within the AICUZ footprint, 9,071.3 acres are categorized as compatible uses. The 1,757.7 acres classified as incompatible consist of a mix of residential and commercial development that was present prior to the implementation of the Airfield Environs Overlay District.

Zoning in the Vicinity of Kegelman Auxiliary Field

Alfalfa and Grant Counties do not have zoning or other land use restrictions. The Salt Plains NWR is the only area in Alfalfa County where development is restricted. There are few circumstances where county commissioners have regulatory oversight over development projects.

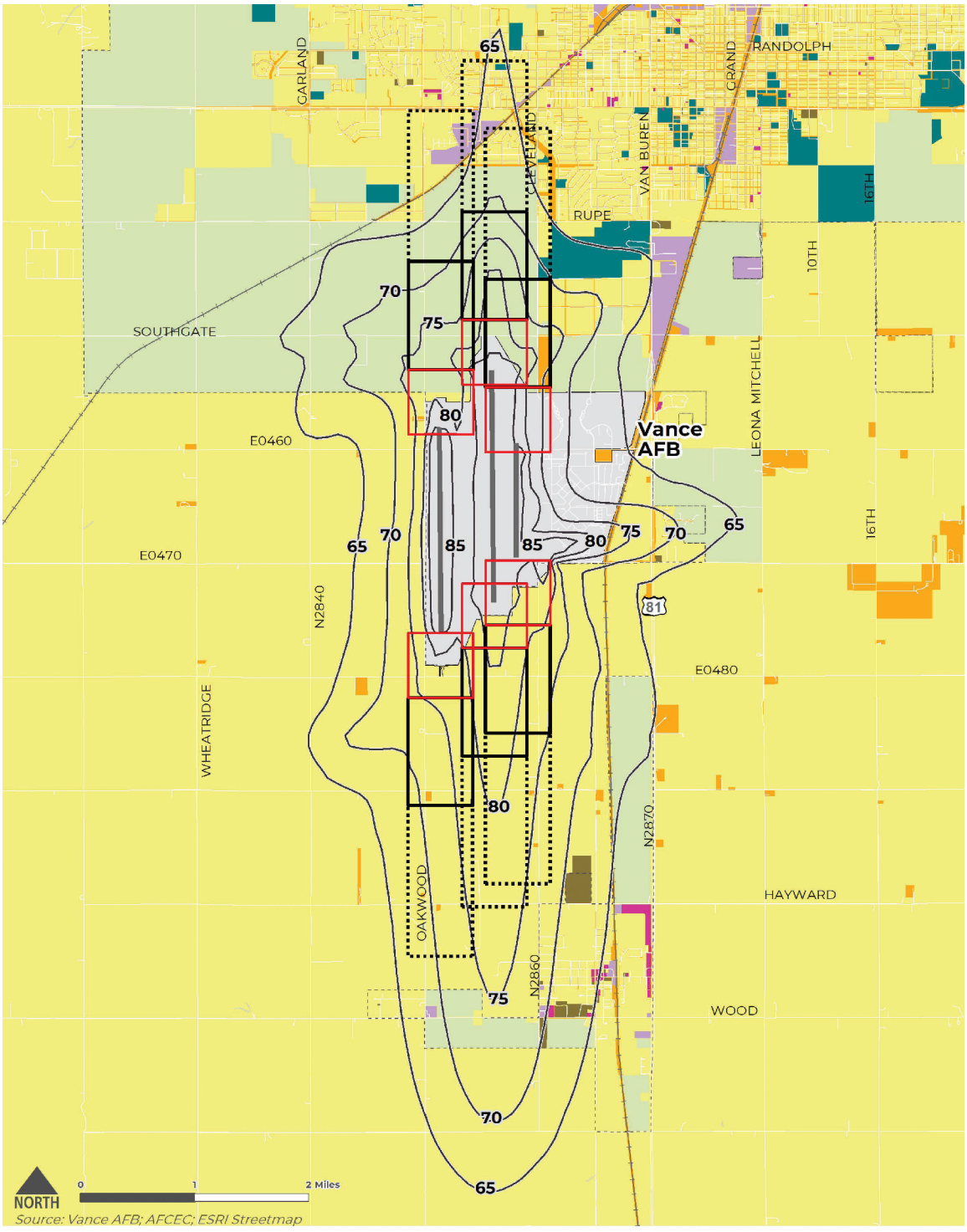
6.4 Compatibility Concerns

6.4.1 Land Use Analysis

Land use describes how land is developed, managed, and characterized by the dominant function occurring within an area. To compare land use consistently across jurisdictions, this analysis uses generalized land use classifications illustrating land use compatibility across common land use types. These generalized land use categories are not exact representations of the local community's land use designations, but combine similar land uses like those introduced in Section 6.3, Land Use and Proposed Development.

For the purpose of this analysis, the DoD AICUZ compatibility guidelines **(Tables A-1 and A-2 of Appendix A)** utilize the SLUCM standards to provide generalized land use classifications. **Table 6-1** provides generalized compatibility guidelines for the SLUCM categories. Land use compatibility falls into one of four categories: (1) Compatible; (2) Compatible with Restrictions; (3) Incompatible; and (4) Incompatible with Exceptions. The conditionally compatible land use (i.e., categories 2 and 4) may require incorporation of noise attenuation measures into the design and construction of structures and further evaluation to be considered "compatible," and may require density limitations for land in APZs, or other modifications in order to be deemed compatible.

Figure 6-5 Existing Zoning and 2022 Vance AFB AICUZ Study Noise Contours, CZs, and APZs



6.4.2 Existing Land Use Compatibility Concerns

Vance AFB Noise Zone Compatibility

As shown in **Table 6-2 and Figure 6-6,** a variety of land uses are located within the Vance AFB noise zones. There are a total of 1,757.7 acres of incompatible residential land use within the AICUZ noise contours (1,026.6 in the 65-69 dB DNL noise contour, 371.3 acres in the 70 to 74 dB DNL noise contour, 253.6 acres in the 75 to 79 dB DNL noise contour, and 106.2 acres in the 80+ dB DNL noise contour). Most of these residences existed prior to the first Vance AFB AICUZ. No additional residential development is expected to occur in the current noise zones within the City of Enid, and the Town of Waukomis only expects small-scale residential development outside of the greater than 65 dB DNL noise zone. No residential buildings are recommended within the greater than 80 dB DNL contours.

All other land uses are categorized as compatible or compatible with restrictions. Generally, agricultural land within noise zones is allowed as long as inhabitable buildings meet specified noise level reduction (NLR) standards.

Table 6-1 Generalized Land Use Categories and Noise/Safety Compatibility[1]

Generalized Land Use Category	Noise Zone (dB DNL)								
	<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]
Manufacturing	Yes	Yes	Yes[4]	Yes[4]	Yes[4]	No	No	Yes[4]	Yes[4]
Transportation/ Communication/Utilities	Yes	Yes	Yes[4]	Yes[4]	Yes[4]	No	No	No	Yes[4]
Trade	Yes	Yes	Yes[4]	Yes[4]	No	No	No	Yes[4]	Yes[4]
Services	Yes	Yes	Yes[4]	Yes[4]	Yes	Yes	No	Yes[4]	Yes[4]
Cultural/Entertainment/ Recreational	Yes	Yes[4]	Yes[4]	No	No	No	No	Yes[4]	Yes[4]
Resource Production and Extraction	Yes	Yes[4]	Yes[4]	Yes[4]	Yes[4]	Yes[4]	No	Yes[4]	Yes[4]

Source: Adapted from AFH 32-7084. **Key:** Compatible Incompatible Compatible with restrictions

Notes:

[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 density less than two dwellings per acre.

[4] Compatibility of these land uses requires certain restrictions that vary depending on the land use. Refer to Appendix A for more details.

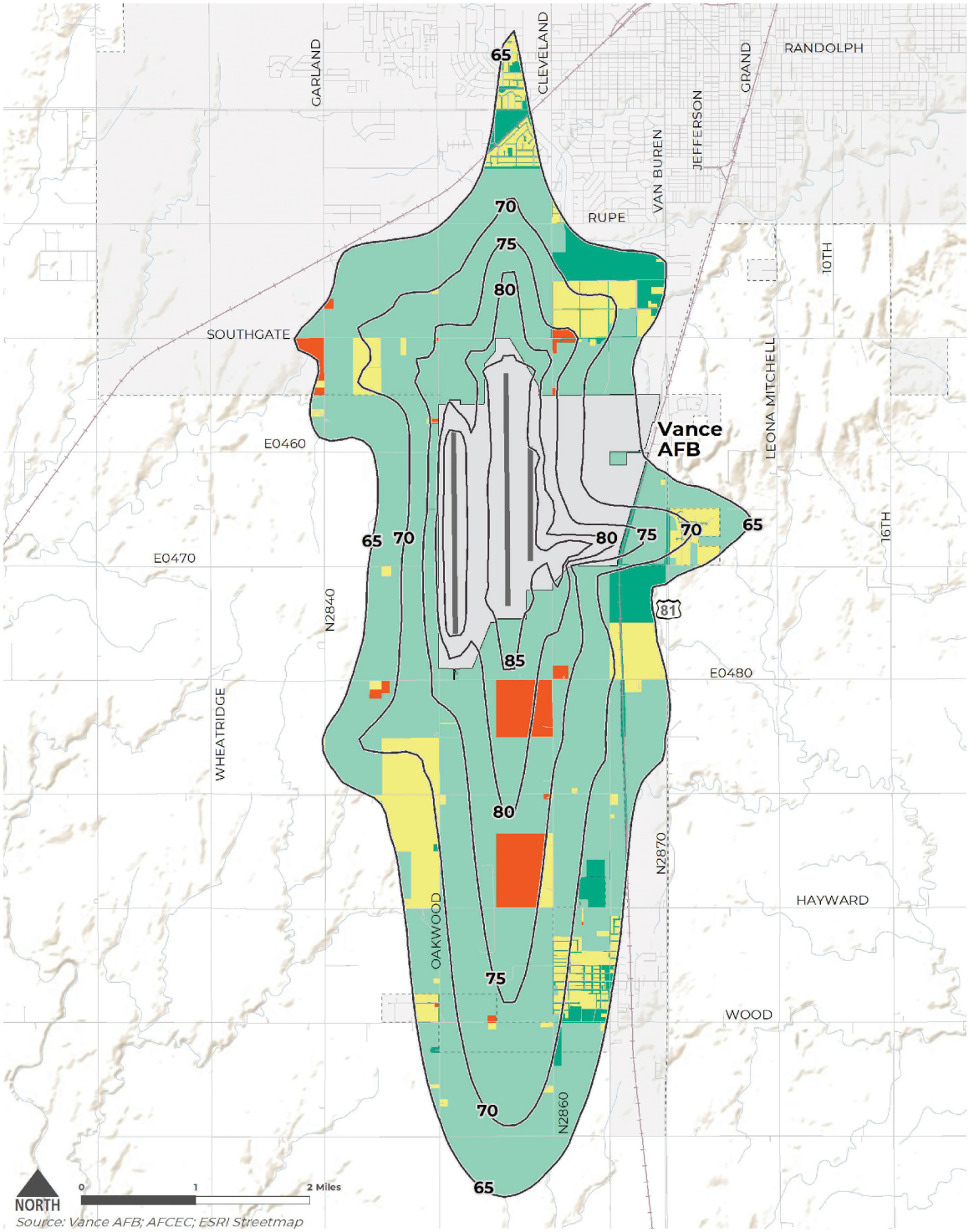
Table 6-2 Off-Installation Existing Land Use Acreage within AICUZ Noise Zones for Vance AFB

Designation	Generalized Land Use Category[1]	65-69	70-74	75-79	80+	Total
Incompatible or Incompatible with Exceptions	Residential	1,026.6	371.3	253.6	106.2	**1,757.7**
	Manufacturing	—	—	—	—	**—**
	Transportation/ Communication/Utilities	—	—	—	—	**—**
	Trade	—	—	—	—	**—**
	Services	—	—	—	—	**—**
	Cultural/Entertainment/ Recreational	—	—	—	—	**—**
	Resource Production and Extraction	—	—	—	—	**—**
Compatible or Compatible with Restrictions	Residential	—	—	—	—	**—**
	Manufacturing	—	—	—	—	**—**
	Transportation/ Communication/Utilities	164.1	47.2	10.4	—	**221.7**
	Trade	50.3	—	—	—	**50.3**
	Services	161.8	5.8	—	—	**167.6**
	Cultural/Entertainment/ Recreational	280.8	13.6	—	—	**294.4**
	Resource Production and Extraction	3,581.7	2,770.4	1,441.6	543.5	**8,337.2**
Incompatible		**1,026.6**	**371.3**	**253.6**	**106.2**	**1,757.7**
Compatible		**4,238.7**	**2,837.0**	**1,452.0**	**543.5**	**9,071.2**
TOTAL		**5,265.3**	**3,208.3**	**1,705.6**	**649.7**	**10,828.9**

Kegelman Auxiliary Field Noise Zone Compatibility

As depicted in **Table 6-3,** the only incompatible land use within the Kegelman Auxiliary Field noise zones is 1 acre of residential land. Figure 6-7 depicts this area as well as the areas that are considered compatible.

Beyond this, there is a mix of resource production and extraction (e.g., agricultural), recreational, and transportation/communication/utility uses totaling 192.7 acres that are considered compatible or conditionally compatible in the 65-69 dB DNL noise zone. There are 2 acres of resource production and extraction land use present in the 70-74 dB DNL that is also considered conditionally compatible. Agricultural land within the 65-74 dB DNL noise zone is allowed as long as inhabitable buildings meet specified NLR standards.



Existing Land Use Compatibility

Compatible
All land uses are compatible without restrictions.

Compatible with Restrictions
Certain non-residential land uses are considered compatible with restrictions, or conditionally compatible, within the APZs and would require density limitations for land in APZs in order to be deemed compatible.

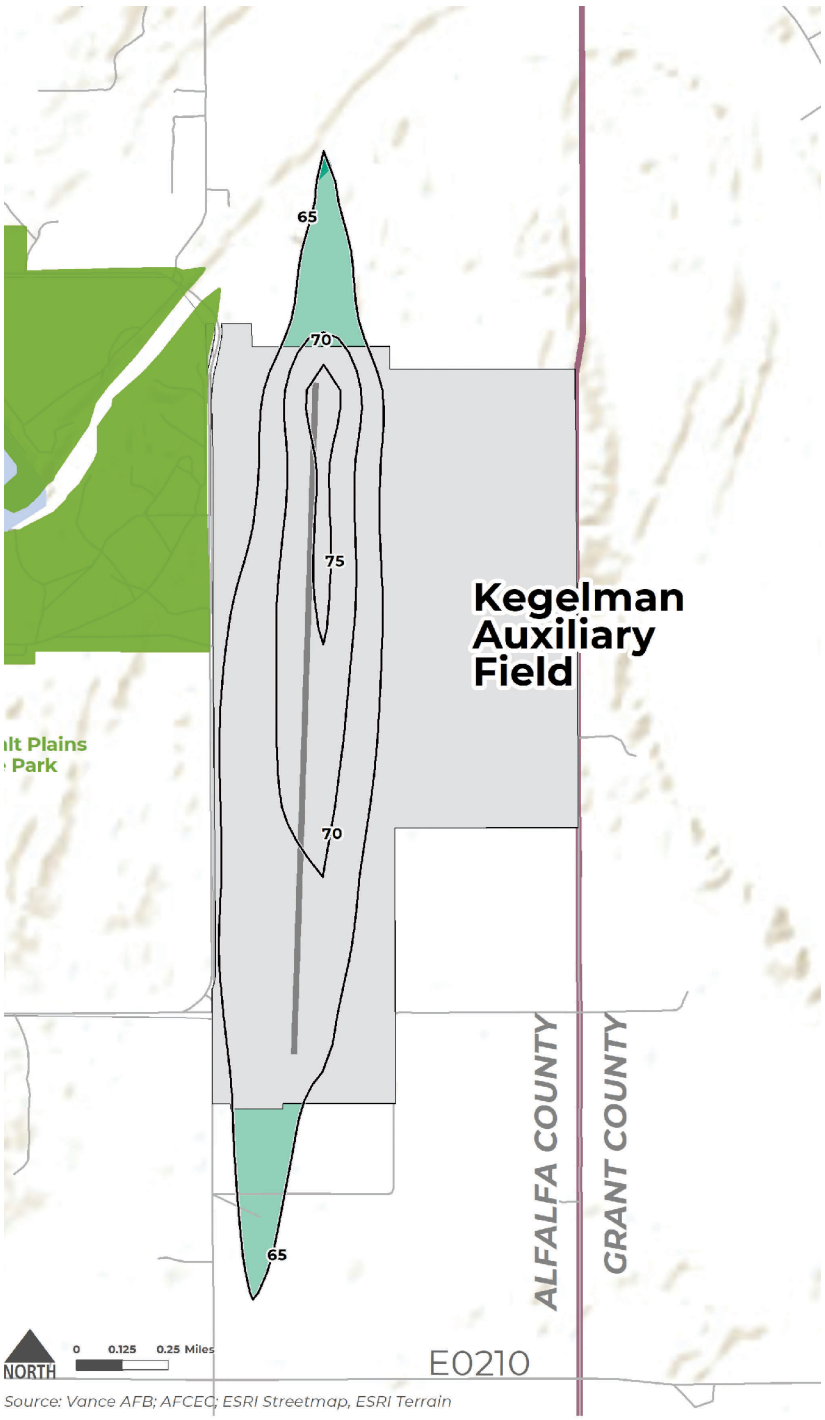
Incompatible with Exceptions
Certain land uses are conditionally incompatible and may require incorporation of noise-attenuation measures into the design and construction of structures and further evaluation to be considered compatible.

Incompatible
All land uses are incompatible without exceptions

Noise Contour
Runway
Installation
Municipality

Table 6-3 Kegelman Auxiliary Field Off-Installation Existing Land Use Acreage within Noise Zones

Designation	Generalized Land Use Category[1]	CZ	APZ I	APZ II	Total
Incompatible or Incompatible with Exceptions	Residential	1.0	—	—	**1.0**
	Manufacturing	—	—	—	**—**
	Transportation/Communication/Utilities	—	—	—	**—**
	Trade	—	—	—	**—**
	Services	—	—	—	**—**
	Cultural/Entertainment/Recreational	—	—	—	**—**
	Resource Production and Extraction	—	—	—	**—**
Compatible or Compatible with Restrictions	Residential	—	—	—	**—**
	Manufacturing	—	—	—	**—**
	Transportation/Communication/Utilities	6.7	—	—	**6.7**
	Trade	—	—	—	**—**
	Services	—	—	—	**—**
	Cultural/Entertainment/Recreational	10.6	—	—	**10.6**
	Resource Production and Extraction	175.4	2.0	—	**177.4**
Incompatible		**1.0**	**—**	**—**	**1.0**
Compatible		**192.7**	**2.0**	**—**	**194.7**
TOTAL		**2.0**	**—**	**—**	**195.7**


65
70
75
70
65
Kegelman Auxiliary Field
lt Plains
Park
ALFALFA COUNTY
GRANT COUNTY
E0210
NORTH
0 0.125 0.25 Miles
Source: Vance AFB; AFCEC; ESRI Streetmap, ESRI Terrain
Existing Land Use Compatibility
Compatible
All land uses are compatible without restrictions.
Compatible with Restrictions
Certain non-residential land uses are considered compatible with restrictions, or conditionally compatible, within the APZs and would require density limitations for land in APZs in order to be deemed compatible.
Noise Contour
Runway
Installation
Park
County

Vance AFB Accidental Potential Zone Compatibility

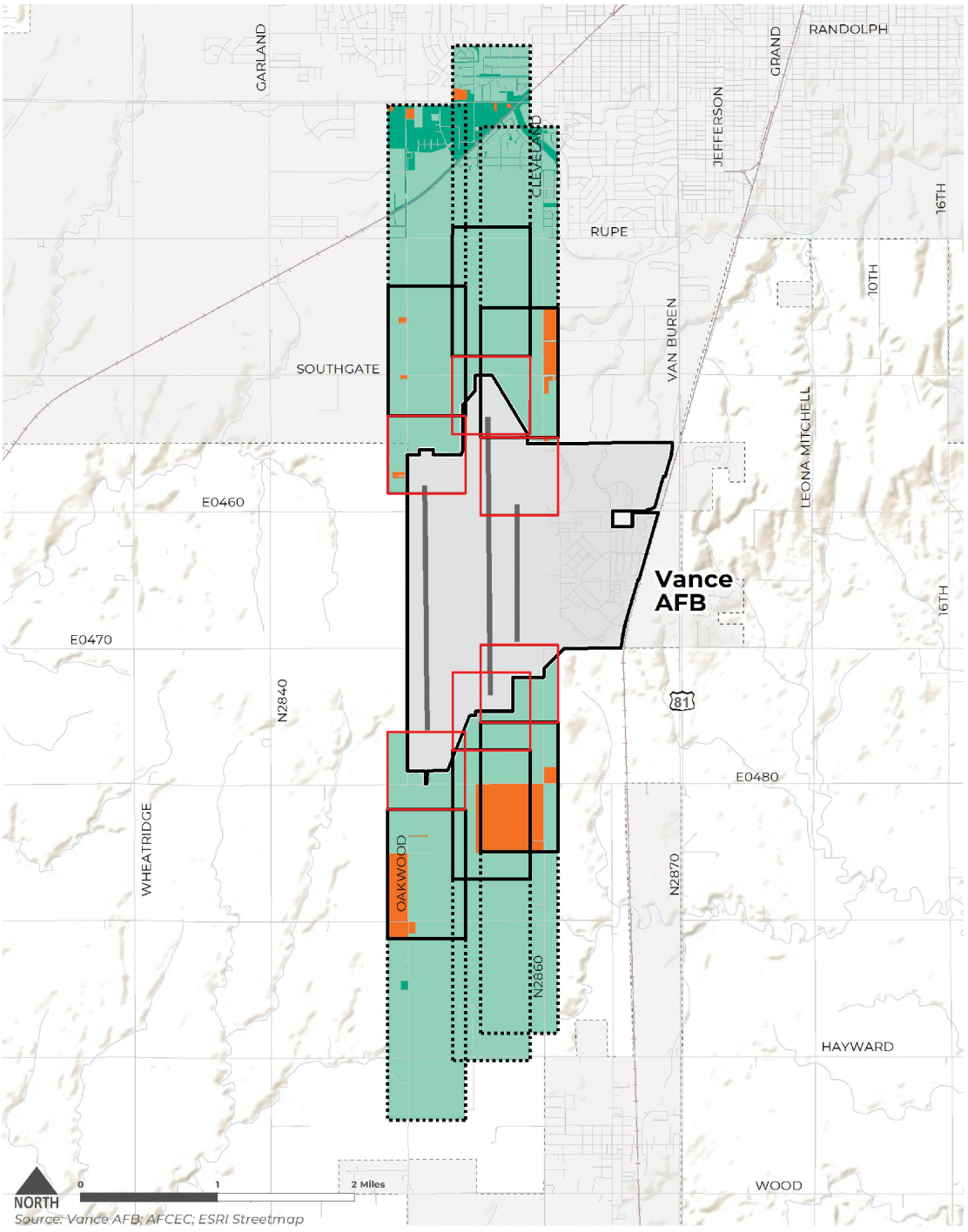
As shown in **Table 6-4,** there are 274.5 acres of residential land use that are considered incompatible within the Vance AFB CZs and APZs. In APZ II, there are 10.8 acres of trade land use that are considered incompatible. **Figure 6-8** depicts the incompatible areas as well as the areas that are considered compatible. Compatible land uses include services, trade, and transportation, communication, and utilities, which are present in APZs I and II.

The vast majority of conditionally compatible land in the CZs and APZs is classified as resource production and extraction. These areas should avoid activities that attract birds as they create a hazard to aircraft operations. The transportation, communication, and utility land use in APZ I is classified as compatible with restrictions. Above ground passenger terminals and above ground power transmission or distribution lines are not recommended for these areas, and high-voltage transmission lines and distribution lines are prohibited.

The cultural, entertainment, and recreational uses in APZ II are also classified as compatible with restrictions, indicating that facilities must be low intensity (i.e., no club houses or auditoriums), and that playgrounds are prohibited. Residential development in APZ II is recommended to maintain a density of two dwelling units per acre.

Table 6-4 Vance AFB Off-Installation Existing Land Use 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	4.0	270.5	—	**274.5**
	Manufacturing	—	—	—	**—**
	Transportation/Communication/Utilities	—	—	—	**—**
	Trade	—	—	10.8	**10.8**
	Services	—	—	—	**—**
	Cultural/Entertainment/Recreational	—	—	—	**—**
	Resource Production and Extraction	—	—	—	**—**
	Undeveloped	—	—	—	**—**
Compatible or Compatible with Restrictions	Residential	—	—	510.0	**510.0**
	Manufacturing	—	—	—	**—**
	Transportation/Communication/Utilities	—	5.3	122.3	**127.6**
	Trade	—	—	92.7	**92.7**
	Services	—	—	66.4	**66.4**
	Cultural/Entertainment/Recreational	—	—	66.7	**66.7**
	Resource Production and Extraction	537.8	1,233.6	1,244.5	**3,015.9**
Incompatible		**4.0**	**270.5**	**10.8**	**285.3**
Compatible		**537.8**	**1,238.9**	**2102.6**	**3,879.3**
TOTAL		**541.8**	**1,509.4**	**2,113.4**	**4,164.6**



Existing Land Use Compatibility

Compatible
All land uses are compatible without restrictions.

Compatible with Restrictions
Certain non-residential land uses are considered compatible with restrictions, or conditionally compatible, within the APZs and would require density limitations for land in APZs in order to be deemed compatible.

Incompatible
All land uses are incompatible without exceptions.

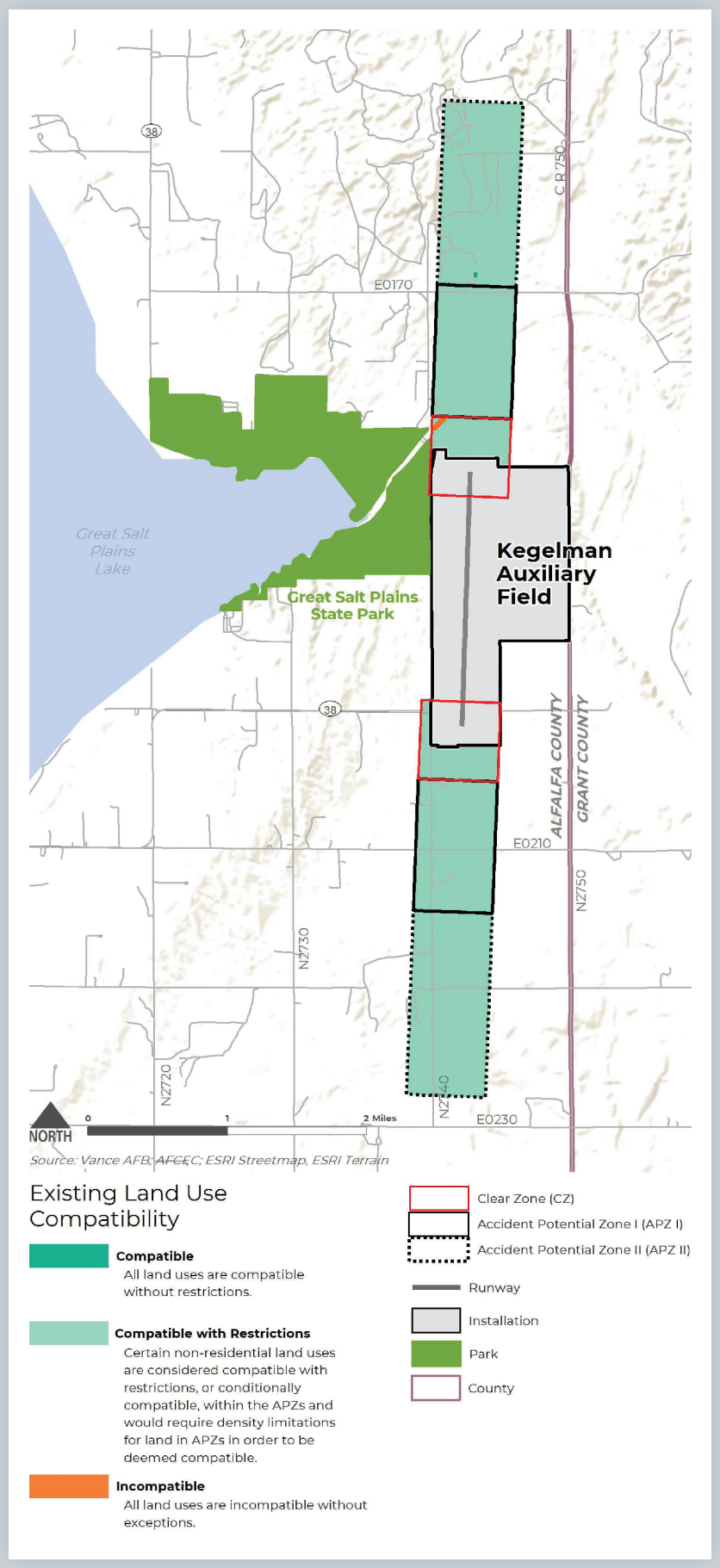
Clear Zone (CZ)
Accident Potential Zone I (APZ I)
Accident Potential Zone II (APZ II)
Runway
Installation
Municipality

Kegelman Auxiliary Field Accidental Potential Zone Compatibility

As shown in **Table 6-5,** the only incompatible land in the Kegelman Auxiliary Field CZs is 3.5 acres of recreational use. **Figure 6-9** depicts the incompatible areas as well as the areas that are considered compatible. Almost all (98.8 percent) of that land is classified as resource production and extraction. The remaining acreage consists of recreational, services, and transportation, communication, and utilities land uses dispersed between the CZ and APZ II.

Table 6-5 Kegelman Auxiliary Field Off-Installation Existing Land Use 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				-
	Manufacturing				-
	Transportation/Communication/Utilities				-
	Trade				-
	Services				-
	Cultural/Entertainment/Recreational	3.5			**3.5**
	Resource Production and Extraction				-
	Undeveloped				-
Compatible or Compatible with Restrictions	Residential				-
	Manufacturing				-
	Transportation/Communication/Utilities	1.2		0.6	**1.8**
	Trade				-
	Services		20.6		**20.6**
	Cultural/Entertainment/Recreational		20.6		**20.6**
	Resource Production and Extraction	210.2	667.6	963.0	**1,840.8**
Incompatible		**3.5**	-	-	**3.5**
Compatible		**211.4**	**708.8**	**963.6**	**1,883.8**
TOTAL		**214.9**	**708.8**	**963.6**	**1,887.3**

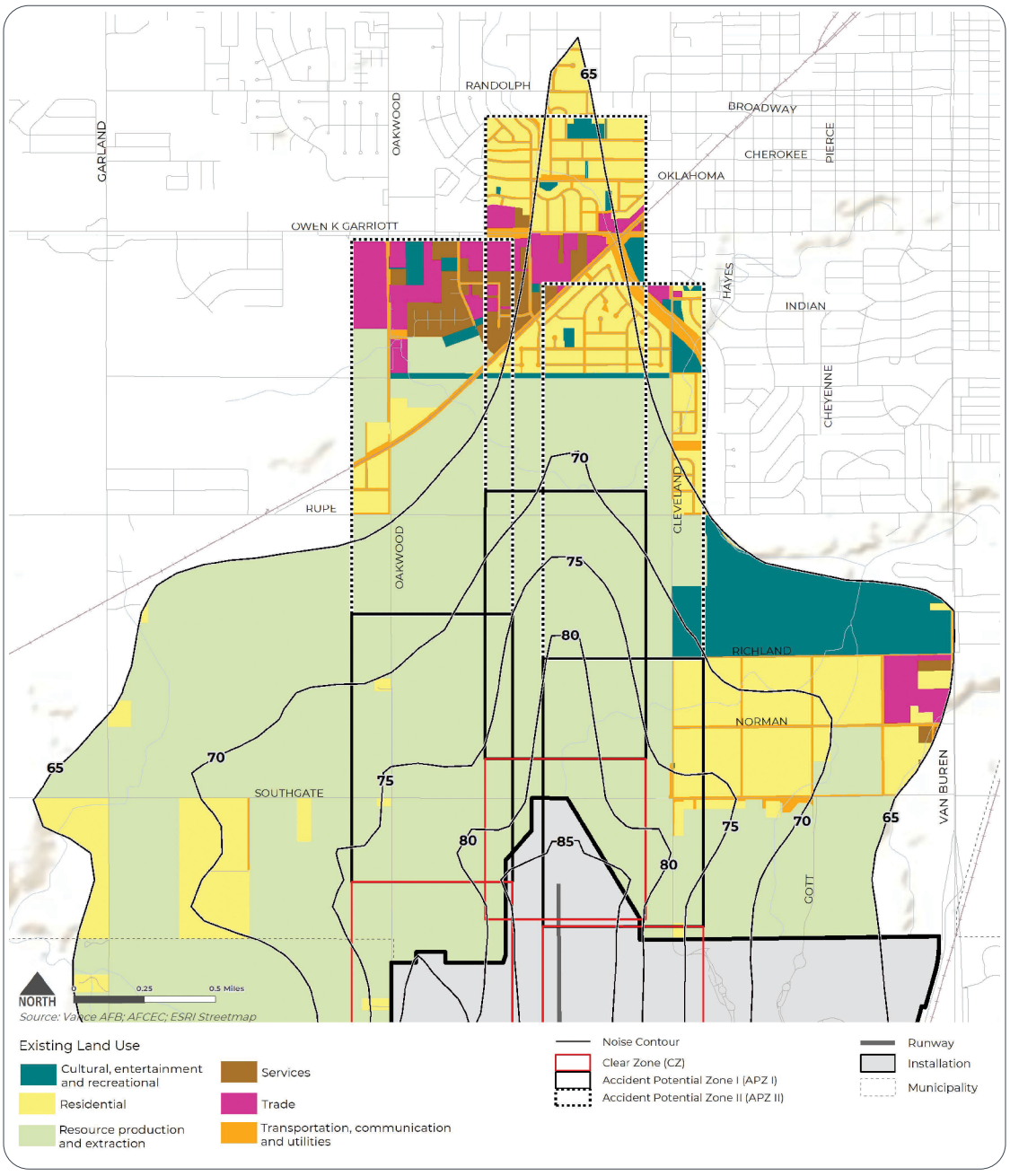

38
C R 750
E0170
Great Salt Plains Lake
Great Salt Plains State Park
Kegelman Auxiliary Field
38
ALFALFA COUNTY
GRANT COUNTY
E0210
N2750
N2730
N2720
N2740
E0230
NORTH
0
1
2 Miles
Source: Vance AFB; AFCEC; ESRI Streetmap, ESRI Terrain
Existing Land Use Compatibility
Compatible
All land uses are compatible without restrictions.
Compatible with Restrictions
Certain non-residential land uses are considered compatible with restrictions, or conditionally compatible, within the APZs and would require density limitations for land in APZs in order to be deemed compatible.
Incompatible
All land uses are incompatible without exceptions.
Clear Zone (CZ)
Accident Potential Zone I (APZ I)
Accident Potential Zone II (APZ II)
Runway
Installation
Park
County

6.4.3 Specific Compatibility Concerns within the AICUZ Footprint

Vance AFB Airfield, North

Residential Uses in CZs

A small portion of the greater than 80 dB DNL noise zone and CZ (106.2 and 4 acres, respectively) contains residential households that, prior to the 2013 AICUZ, did not fall within a CZ boundary. The 2013 AICUZ Study expanded the CZ boundaries, redefining the safety risks associated with these properties. Because the City's Airfield Environs Overlay District was modeled after the smaller CZ size, there are currently no land use regulations to govern land uses within the expanded areas of the new CZ boundaries, including these households. Residential uses are discouraged within CZs as these areas are at the highest risk of an aircraft safety incident.



Residential Uses in APZs I and II and Greater Than 65 dB DNL Noise Zone

There are a number of residential units in APZs I and II on the north side of Vance AFB, all of which existed prior to the establishment of the Airfield Environs Overlay District. Residential land use in this area is discouraged in APZ I but can be considered compatible if APZ II if density is kept to less than two units per acre. A portion of the 65 dB DNL noise contour extends over these areas as well, which encourages residential buildings to achieve a NLR of at least 25 dB.

Multi-Family Residential in APZ II

The existing land use data that was used in this analysis is not fully representative of some of the uses on the ground, resulting in some incompatible land uses not being appropriately categorized. For example, along South Oakwood Road, within APZ II, there is a mobile home park and apartments that are currently categorized as a services land use, as well as multi-family condominium units that are classified as a trade land use. Multi-family dwellings are discouraged in APZ II.

U.S. Highway 412 Commercial Corridor

U.S. Highway 412, which falls within the boundaries of the APZ IIs for Runways 17R and 17C, serves as a key commercial corridor for Enid. Commercial (trade) uses are considered compatible in APZ II, and the City is committed to doing infill development that is compatible with existing land use restrictions. However, there are a few higher population retail areas (e.g., shopping centers) that are considered incompatible.

Vance AFB Airfield, South

Residential Uses in APZs I and II

Residential land uses are not considered compatible within APZ I; however, some of the land currently classified as residential (notably the large square of residential land located within APZ I for Runway 35R) does not have appear to have any residential structures based on an aerial investigation.

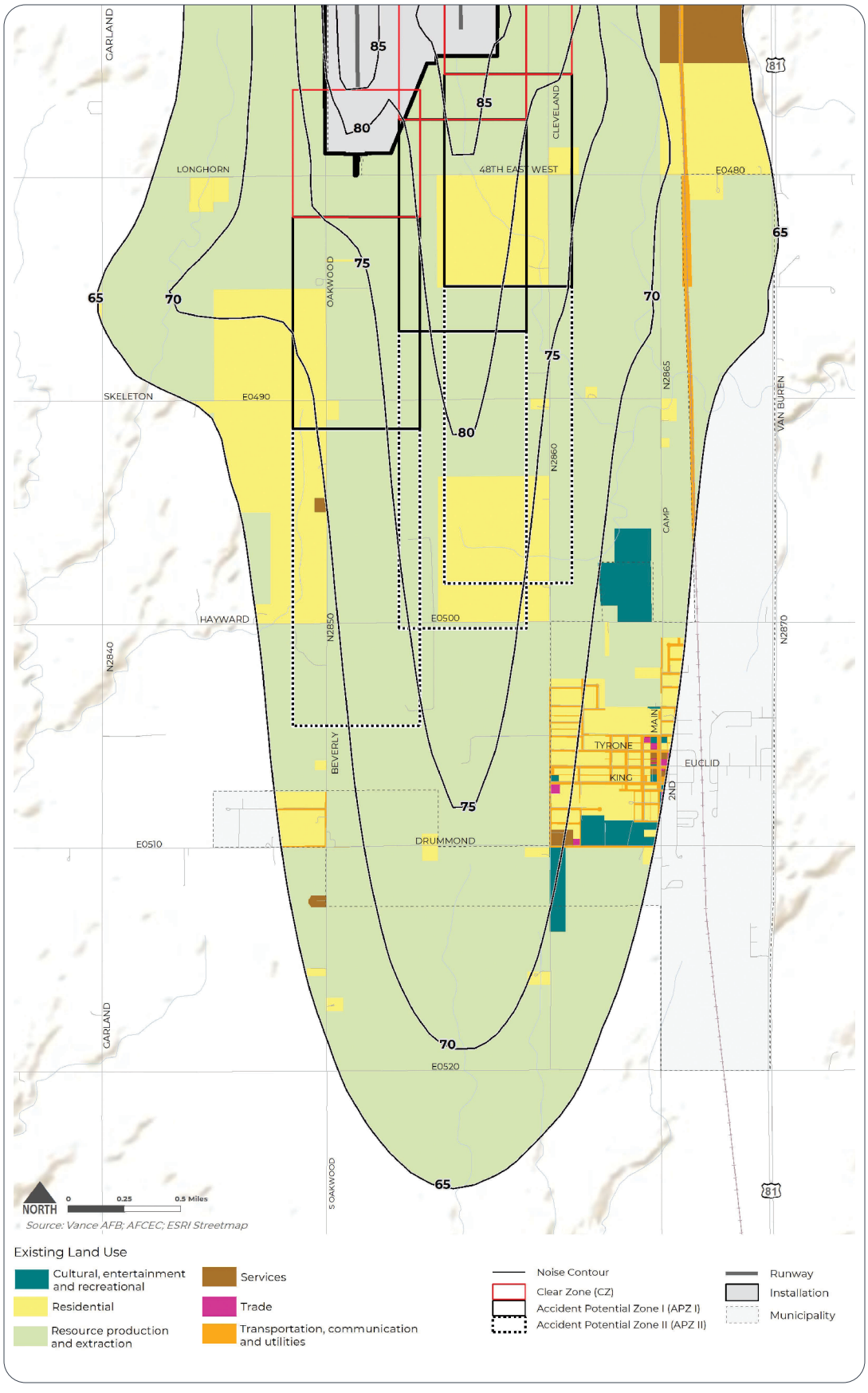
APZ II contains dispersed housing along the southwest and southeast side of the boundary, but there are no neighborhoods in these areas.

Residential Uses in the Greater than 65 dB DNL Noise Zone

A portion of the 65 and 70 dB DNL noise contours extend over the Town of Waukomis. Residential buildings in these noise zones should achieve a NLR of at least 25 dB and 30 dB for the 65 and 70 dB DNL noise contours, respectively.

Lack of Land Use Protections

The biggest concern about the land south of Vance AFB is that there are no land use regulations to discourage development in the CZs and APZs. Garfield County zoning allows for personal residences to be constructed on agricultural-zoned parcels as well as residential-zoned parcels, so this entire area is susceptible to additional growth unless protective measures are implemented.


GARLAND
LONGHORN
48TH EAST WEST
CLEVELAND
OAKWOOD
SKELETON
E0480
E0490
E0500
E0510
E0520
N2865
N2860
N2850
N2840
N2870
VAN BUREN
CAMP
HAYWARD
BEVERLY
MAIN
2ND
TYRONE
KING
EUCLID
DRUMMOND
85
80
75
70
65
81
NORTH
0
0.25
0.5 Miles
Source: Vance AFB; AFCEC; ESRI Streetmap
Existing Land Use
Cultural, entertainment and recreational
Residential
Resource production and extraction
Services
Trade
Transportation, communication and utilities
Noise Contour
Clear Zone (CZ)
Accident Potential Zone I (APZ I)
Accident Potential Zone II (APZ II)
Runway
Installation
Municipality

Kegelman Auxiliary Field

BASH Issues

The abundance of agricultural land in the region, and the nearby presence of the Salt Plains NWR, puts operations at Kegelman Auxiliary Field at a higher risk of bird and animal strikes. Habitat management strategies have helped to mitigate issues when they arise, but more intensive mitigation strategies may be needed (local government and citizen outreach campaigns, increased coordination with the NWR, etc.).

Lack of Land Use Protections

There are no local land use regulations to discourage development in the CZs and APZs. Because development pressure in this region is low, it is unlikely that additional population growth or additional development will happen quickly enough to have an impact on operations at the airfield. However, given the abundance of cell towers and wind energy projects that have been recently constructed in the region, there is cause for concern that Kegelman Auxiliary Field operations will continue to be susceptible unless protective measures are implemented.

6.4.4 Future Growth Areas and Recent and Proposed Development Projects around Vance AFB and Kegelman Auxiliary Field

Areas that are proximate to an air installation but fall outside the formally designated AICUZ and where AICUZ-focused land use planning recommendations and guidelines are not formally applied are sometimes referred to as “white spaces.” These large areas exist in all regions around bases where land development rules vary, regulatory authority is broad, and long-term development strategies do not necessarily consider AICUZ concepts, but their potential impact on mission is real.

Future projects – both in the white spaces and within the designated AICUZ – in the region of influence surrounding Vance AFB that are, or were at one time, planned and that warrant attention from a land use compatibility standpoint are discussed below (these projects are also shown on Figure 6-10).

There are no known proposed development projects around Kegelman Auxiliary Field. The land uses in this area are rural and the closest town of Jet, Oklahoma, does not expect to see significant growth in the near term.

City of Enid

Enid serves as regional commercial and residential center for northwest Oklahoma. Most residential growth in Enid is occurring in the northwest area of the city. Commercial growth is primarily occurring along Owen K. Garriott Road. The current comprehensive plan, Envision Enid, includes a goal to utilize existing infrastructure to maximize density and mixed uses rather than building new infrastructure and expanding out. While most of the expected growth within Enid will not affect Vance AFB, the developments described below merit consideration from a compatible use standpoint.

Stonebridge Village Apartment Complex. The Stonebridge Village Apartment Complex is located on 80 acres of land at the corner of West Chestnut Avenue and North Cleveland Street. The vision for this site is to create new growth opportunities for the community with a combination of commercial, single-family residential, and multi-family residential apartments. A 6-acre lake will be located at the center of the complex. Amenities surrounding the lake will include a walking trail that provides a park-like setting accessible to all areas of the village. The multi-family portion of the apartment complex will have one-, two-, and three-bedroom apartments, a swimming pool, club house, and covered parking.

This site will also include a 16-acre commercial site providing approximately 75,000 square feet for multi-use tenants, including the already developed 40,000-square foot Wal-Mart, a gas station, and

a drive-up pharmacy. Other planned tenants for this site include a medical facility, a strip mall with multiple specialty stores and office complex buildings, and a possible restaurant on the corner of Chestnut and Cleveland. The commercial site will include ample parking spaces as well.

Potential Oakwood Mall Redevelopment. The Oakwood Mall is located south of West Owen K. Garriott Road and west of South Garland Road. Envision Enid identifies this area as the ideal location for a regional retail center; however, currently, a portion of the Oakwood Mall site is within the Airfield Environs Overlay District. This limits the maximum density of retail use to 0.22-0.24 floor area ratio (FAR); however, the existing buildings have a FAR of 0.25.

The City of Enid has identified five development scenarios that fall within the guidelines of the overlay district and the risk tolerance accepted by the military, as stated below:

- **Development Scenario 1:** This development scenario involves keeping the mall intact while creating a framework to improve the mall over time through a mix of uses. It also focuses on creating a walkable, street-front retail environment.
- **Development Scenario 2:** This development scenario keeps the mall anchors while demolishing and redeveloping the rest of the development. This can occur as an initial step, or as a phase following Development Scenario 1. In the same manner as Development Scenario 1, this scenario would prioritize mixed-use and creating a walkable, street-front retail environment.
- **Development Scenario 3:** In this scenario the entire mall site will be redeveloped and will focus on quality of place and introducing mixed uses as much as Development Scenarios 1 and 2.
- **Development Scenario 4:** This scenario eliminates redevelopment of the mall and focuses on a big box store being repositioned to create a walkable and pedestrian-friendly environment.
- **Development Scenario 5:** This scenario shows how West Garriott street improvements can support the development of a regional retail destination.

As of the publishing of this study, the City of Enid and ERDA have not yet selected a development scenario for the site.

Garfield County

Most residential and commercial growth in Garfield County is within or proximate to the Enid metropolitan area. More remote areas are occasionally identified for small- and large-scale industrial projects.

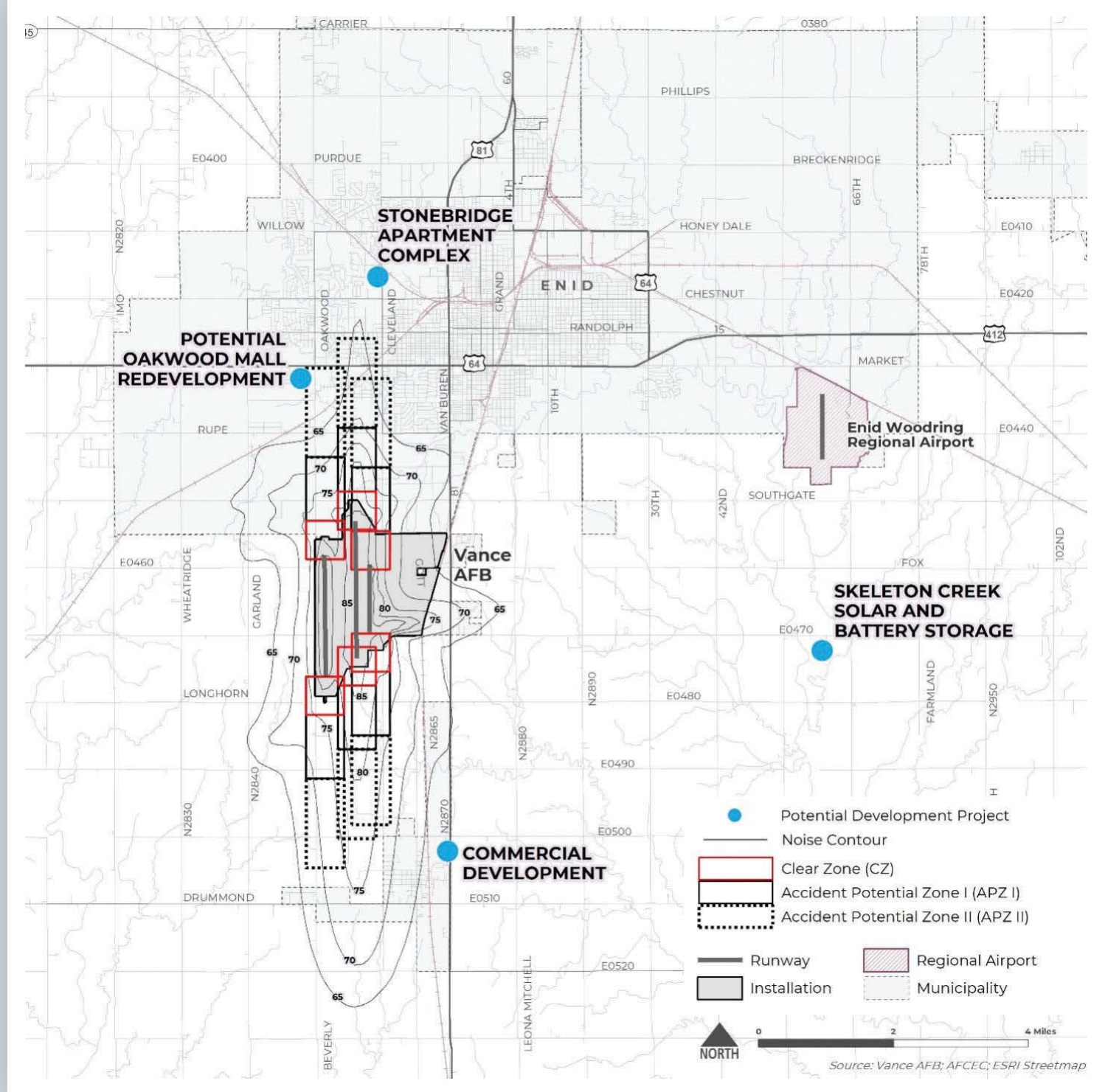
Proposed Skeleton Creek Solar and Battery Storage Project. The proposed location of the Skeleton Creek Solar and Battery Storage project is just south of E0470 Road and west of 66th Street. The site encompasses approximately 2,250 acres and is located approximately 7 miles south of Runway 17/35 at Enid Woodring Regional Airport. The location was chosen based on its proximity to its customer service area, existing points of interconnect, low load congestion, and high solar irradiance. With a 250 MW solar panel farm and a 200 MW battery facility, the proposed project is planned to provide customers safe, adequate, and reliable power at the lowest reasonable cost while complying with Oklahoma legislative declarations to facilitate the delivery of renewable energy.

The project is expected to be completed in 2023.

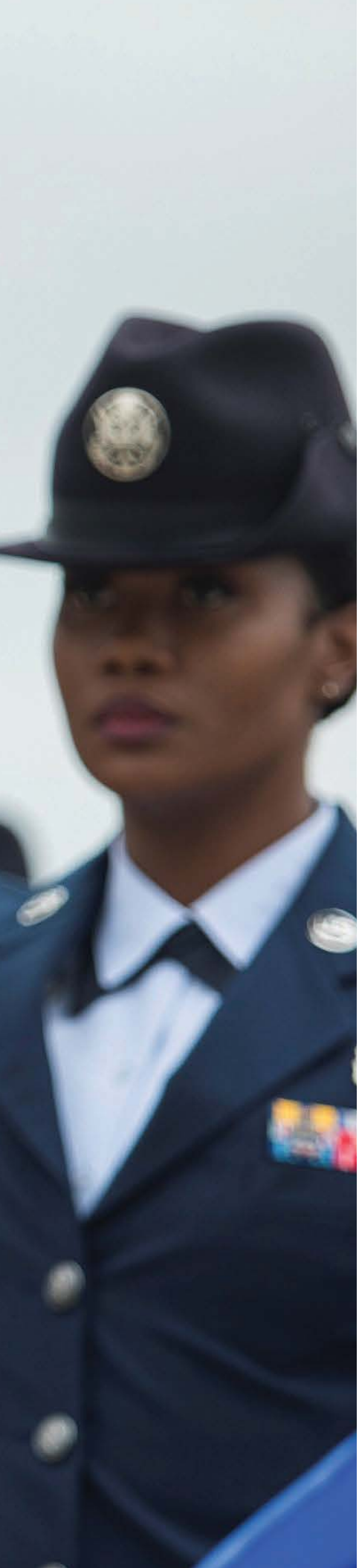
Town of Waukomis

Residential growth in Waukomis is mostly occurring south of the city as large lot single-family residences and is not expected to occur north or west of town. Future commercial growth is anticipated to be concentrated along U.S. Route 81.

Commercial Development. The Town is in the process of rezoning a parcel off U.S. Route 81 (between E0500 Road and Highland Drive) to commercial development.


STONEBRIDGE APARTMENT COMPLEX
POTENTIAL OAKWOOD MALL REDEVELOPMENT
Vance AFB
Enid Woodring Regional Airport
SKELETON CREEK SOLAR AND BATTERY STORAGE
COMMERCIAL DEVELOPMENT
ENID
CARRIER
PHILLIPS
PURDUE
BRECKENRIDGE
WILLOW
HONEY DALE
CHESTNUT
RANDOLPH
MARKET
RUPE
SOUTHGATE
FOX
LONGHORN
DRUMMOND
E0400
E0410
E0420
E0440
E0460
E0470
E0480
E0490
E0500
E0510
E0520
N2820
N2830
N2840
N2865
N2870
N2880
N2890
N2950
Potential Development Project
Noise Contour
Clear Zone (CZ)
Accident Potential Zone I (APZ I)
Accident Potential Zone II (APZ II)
Runway
Installation
Regional Airport
Municipality
NORTH
0
2
4 Miles
Source: Vance AFB; AFCEC; ESRI Streetmap


SKIBITSKY



7.0 IMPLEMENTATION

Implementation of the AICUZ Study must be a joint effort between Vance 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 the collaborative planning.

7.1 Military Role

The goal of the AICUZ Program is to assist local, regional, state, and federal officials with protecting the public health, safety, and welfare by promoting long-term land use compatible with military operations; and to protect 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.

Vance AFB is responsible for flight safety, noise abatement, and participation in existing local jurisdictional land use planning processes as part of its AICUZ Program responsibilities. 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.

Vance 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** and evaluate these factors in 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.
- ✓ **Consider the establishment of a community forum** between the installation and surrounding stakeholders to discuss land use and other issues of concern; the installation anticipates holding these meetings on an annual basis.
- ✓ **Schedule land use planning meetings** to provide a forum for agencies to meet and discuss future development and to address issues that may surface because of new proposals.

- ✓ Provide copies of the AICUZ Study to local, county, tribal, and regional planning departments and zoning administrators to aid in the planning process and provide copies of the AICUZ Study to appropriate state and federal agencies.

Preparation and presentation of this Vance 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, Vance 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 Oklahoma, land use planning and zoning are delegated to municipal and county governments, which 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.

7.2.1 Enid Regional Development Alliance

ERDA is a non-profit organization that promotes economic and community development in Enid and throughout northwest Oklahoma. ERDA is the overseeing organization for NODA and a mentor for northwest Oklahoma communities in pursuing economic initiatives.

ERDA has been a long-time supporter of Vance AFB and its missions. ERDA understands the importance of compatible land use planning and works closely with the City of Enid to direct landowners and developers to properties outside of noise and safety zones if the use could be in conflict with Vance AFB operations.

7.2.2 Northern Oklahoma Development Authority

As previously discussed in Section 6.2, NODA serves localities in an eight-county region in north central Oklahoma - Alfalfa, Blaine, Garfield, Grant, Kay, Kingfisher, Major, and Noble. In 2018, NODA was a participating organization in the Vance AFB JLUS. NODA also provides planning support for all public agencies having jurisdiction within those counties, including cities and towns, conservation districts, school districts, authorities, or political subdivisions.

7.2.3 State of Oklahoma

The Oklahoma legislature is very supportive of protecting Oklahoma's military installations and missions. The following two laws protect air missions at military installations by restricting the height of structures near military airfields and enabling municipalities near military airports to restrict land uses within AICUZ noise and safety zones.

Aircraft Pilot and Passenger Protection Act (APPPA)

The APPPA was passed into law by the state in 2010 to increase safety near airports—including military airports—in Oklahoma. The APPPA is administered by the Oklahoma Aeronautics Commission (discussed below) and regulates:

- ✓ The height of structures built or erected near public-use airports and military installations in Oklahoma
- ✓ Construction projects that may be deemed incompatible with normal airport operations due to safety concerns for individuals both in the air and on the ground

Building a structure for an incompatible use (i.e., homes, schools, childcare facilities, hospitals, nursing homes, churches, and other buildings or areas where people would gather) within 500 feet of an airport runway centerline or in the runway protection zone requires obtaining a permit from

the Oklahoma Aeronautics Commission. Structures in excess of 150 feet above an airport's elevation and within 3 miles of the airport also require a permit. The APPPA is credited with providing critical protection to the integrity and safety of military aircraft operations and airspace used by the military for training.

Oklahoma Statute §11-43-101.1. Restriction of use of or prohibition of future use of property within certain military installation areas.

Oklahoma State Statute §11-43-101.1 permits municipalities to restrict or prohibit future uses in areas affected by military training noise. The following is an excerpt from the statute:

"Any municipality in this state that is wholly or in part within an Air Installation Compatible Use Zone (AICUZ) study area, Joint Land Use Study (JLUS) area, Army Compatible Use Buffer (ACUB), or an Environmental Noise Management Plan (ENMP) of an active duty, National Guard or Reserve military installation may enact a city ordinance restricting or prohibiting future uses for that incorporated area which lies within the AICUZ, JLUS, ACUB, or ENMP area and which may expose residents to noise greater than sixty-five (65) Day-Night Noise Level (DNL) or accident potential that could affect the public health, safety, and welfare, or interfere with military operations, including aircraft operations."

This legislative authority empowers local municipalities to enact land use ordinances that promote compatible land uses within the AICUZ footprint.

7.2.4 Oklahoma Strategic Military Planning Commission

The Oklahoma Strategic Military Planning Commission includes seven members, five of whom represent the interests of the state's military installations (i.e., Altus AFB, Fort Sill, McAlester Army Ammunition Depot, Tinker AFB, and Vance AFB). The remaining two members are legislative appointees who serve as ex officio, non-voting members of the commission. Initially established as a coordination mechanism among Oklahoma's military installations in response to Base Realignment and Closure, the commission administers funds, appropriated by the Oklahoma legislature and governor, to local governments in communities near military installations. The grant program is intended to facilitate public projects that protect the interests of the community with respect to issues related to the realignment, expansion, reduction, or closure of a military installation. Several development projects at Enid Woodring Regional Airport have been supported by these grant funds, including a joint use hangar that Vance AFB uses to store aircraft overnight.

The commission is also engaged in legislation at the state level to protect Oklahoma's military installations and their operations from encroachment by wind energy projects. Per Oklahoma House Bill 3561, the commission is formally involved in the wind energy development approval process and is notified when an intent to build is submitted to the Oklahoma Corporation Commission, the state's public utilities commission. Upon notification, the commission notifies local base commanders and documents potential areas of impact in a letter to the Military Aviation and Installation Assurance Siting Clearinghouse. Oklahoma prohibits the construction or operation of a proposed wind energy facility that would have a significant adverse impact on the mission, training, or operations of any military installation, as determined by the Military Aviation and Installation Assurance Siting Clearinghouse and the FAA.

7.2.5 Readiness and Environmental Protection Integration

Vance AFB could continue to pursue funding sources through existing federal government programs, such as DoD's Readiness and Environmental Protection Integration (REPI) Program, for protection of mission-sensitive areas.

The REPI Program is a key tool used by DoD and its partners to protect the military's ability to train, test, and operate. DoD created the REPI Program in response to the development of lands 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, 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 both in the U.S. Congress and among groups representing state and local officials. Through FY 2020, DoD and its partners have spent over $16 million on REPI projects at three installations in the State of Oklahoma.

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 Vance 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:

- ✓ **Local government planners consider AICUZ policies and guidelines** when developing or revising city 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.
- ✓ **Ensure that new development applications** or properties that are applying for a change of use are submitted to Vance AFB to afford the opportunity to assess those applications for potential impacts on defense missions. The Vance AFB PA Office can provide a land use planning point of contact.
- ✓ **Adopt or modify zoning ordinances** to reflect the compatible land uses outlined in the AICUZ Study, including the creation of military airport overlay zones.
- ✓ **Local governments review their capital improvement plan, infrastructure investments, and development policies** to ensure they do not encourage incompatible land use patterns near Vance AFB, with particular emphasis on utility extension and transportation planning.
- ✓ **Local governments implement height and obstruction ordinances** that reflect current Air Force and 14 CFR 77 requirements, presented in this study as HAFZs.
- ✓ **Enact fair disclosure ordinances** to require disclosure to the public for those AICUZ items that directly relate to military operations at Vance AFB.
- ✓ **Where allowed, local governments require real estate disclosure** for individuals purchasing or leasing property within noise zones or CZs/APZs.
- ✓ **Enact or modify building/residential codes to ensure that any new construction near Vance AFB** has the recommended noise level reduction measures incorporated into the design and construction of structures.
- ✓ **Government planning bodies 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 Vance AFB. Where appropriate, coordinate with the FAA on the height of structures.
- ✓ **Local government land use plans and ordinances reflect AICUZ recommendations** for development in CZs/APZs and noise zones.
- ✓ **Local governments consult with Vance AFB on planning and zoning actions** that have the potential to affect installation operations.
- ✓ **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 Vance AFB representatives to discuss land use concerns and major development proposals that could affect military operations.

7.3.1 Vance AFB JLUS Recommendations

In addition, Appendix D highlights selected recommendations from the 2018 Vance AFB JLUS that are relevant to this AICUZ Study. These recommendations provide for additional actions by local governments to improve land use decisions that may affect the mission of Vance AFB. The recommended actions aim to improve the compatibility of land uses around Vance AFB and Kegelman Auxiliary Field with the base's mission now and in the future.

7.4 Community Role

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

7.4.1 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.

7.4.2 Developers

- ✓ **Know where the noise zones and CZs/APZs encumber land near the air installation.** Consult with Vance 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 through implementation of a zoning overlay district based on noise contours and CZs/APZs.

7.4.3 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.
- ✓ **Stay informed about Vance AFB's operations** by following the Vance AFB Facebook page.

While the installation and community are separated by a fence, it is recognized that Vance AFB activities and operations may affect the community. Likewise, community activities and development decisions can affect Vance 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 provide a foundation on which related communication can be based to 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 PA Office at 580-213-5250.


71st FLYING TRAINING WING

8.0 REFERENCES

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

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

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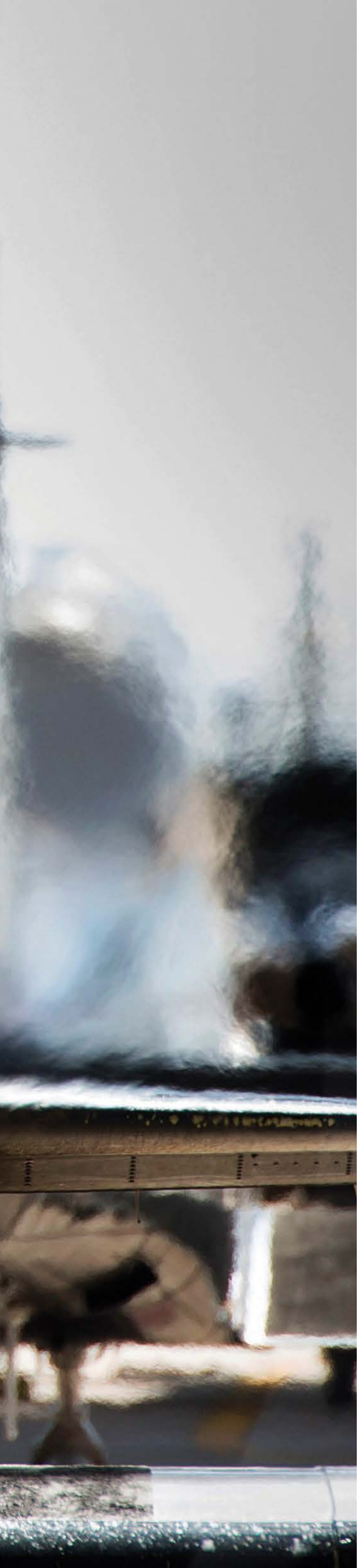

APPENDIX A

Land Use Compatibility Tables

Table A-1 provides compatibility recommendations based on historic aircraft mishap locations on or near air installations. The primary land use 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, it varies from SLUCM as the coding system does not differentiate based on population density. Some 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 Recommended Land Use Compatibility for Clear Zones and Accident Potential Zones

Land Use Name and SLUCM Category	Clear Zone	APZ-I	APZ-II	Maximum Density
RESIDENTIAL USE GROUP (SLUCM CATEGORY 10)				
Residential uses, inclusive of all residential units i.e., any type of single or multiple dwelling units.	N	N	Y[1,2]	Maximum density of 2 dwelling units per acre
Mobile home parks or courts	N	N	N	
Transient lodgings	N	N	N	
MANUFACTURING USE GROUP (SLUCM CATEGORIES 20 & 30)				
Food and kindred products; Textile mill products; manufacturing; Stone, clay, glass, primary metal and fabricated metal products; manufacturing	N	N	Y	Max FAR 0.56 in APZ II
Fabric products; leather and similar materials; chemicals and allied products; petroleum refining and related industries; Rubber and miscellaneous plastic products; manufacturing; Precision manufacturing	N	N	N	
Lumber and wood products; manufacturing furniture and fixtures; paper and allied products; printing, publishing, and allied industries Miscellaneous manufacturing	N	Y	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
TRANSPORTATION, COMMUNICATION AND UTILITIES USE GROUP (SLUCM CATEGORY 40)				
Rail, motor vehicle, aircraft, marine etc. transportation, Highway and street right-of-way, automobile parking, and utilities, Telephone, cellular and radio communication	N[3]	Y[4]	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
Solid waste disposal, (landfills, incinerators, etc.)	N	N	N	
TRADE (SLUCM CATEGORY 50)				
Wholesale trade	N	Y	Y	Maximum FAR of 0.28 in APZ I & .56 in APZ II
Retail trade—building materials	N	Y	Y	Maximum FAR of 0.20 in APZ-I and 0.40 in APZ-11;
Retail trade—hardware, paint, and farm equipment stores,	N	Y	Y	Maximum FAR of 0.12 in APZ I and 0.24 in APZ II
Retail trade—including neighborhood centric shops	N	N	Y	Maximum FAR of 0.16 in APZ II
Mass retailing, super stores, strip malls, shopping centers,[5] discount clubs, home improvement stores, etc.; Eating and drinking establishments	N	N	N	
Retail trade—food such as groceries, bakeries, confectionaries, meat markets, and fast food establishments	N	N	Y	Maximum FAR of 0.24 in APZ II

Table A-1 Recommended Land Use Compatibility for Clear Zones and Accident Potential Zones

Land Use Name and SLUCM Category	Clear Zone	APZ-I	APZ-II	Maximum Density
Retail trade—automotive, marine craft, aircraft, and accessories	N	Y	Y	Maximum FAR of 0.14 in APZ I & 0.28 in APZ II
Retail trade—apparel and accessories, furniture, home, furnishings and equipment	N	N	Y	Maximum FAR of 0.28 in APZ II
Other retail trade	N	N	Y	Maximum FAR of 0.16 in APZ II
SERVICES (SLUCM CATEGORY 60)				
Finance, insurance, real estate, personal, professional and miscellaneous services (office uses only) services	N	N	Y	Maximum FAR of 0.22 in APZ II
Cemeteries	N	Y[6]	Y[6]	
Warehousing and storage services	N	Y	Y	Maximum FAR of 1.0 in APZ I; 2.0 in APZ II
Repair Services and contract construction	N	Y	Y	Maximum FAR of 0.11 APZ I; 0.22 in APZ II
Hospitals, nursing homes, and other medical facilities; Educational services, Childcare services, child development centers, and nurseries	N	N	N	
Government Services	N	N	Y	Maximum FAR of 0.24 in APZ II
CULTURAL, ENTERTAINMENT AND RECREATIONAL USE GROUP (SLUCM CATEGORY 70)				
Nature exhibits	N	Y[7]	Y[7]	
Cultural activities, auditoriums, concert halls, places of worship; Outdoor music shells, museums, outdoor displays, amphitheaters, sports arenas, spectator sports, resorts and group camps, or other places of assembly	N	N	N	
Amusements—fairgrounds, miniature golf, driving ranges; amusement parks, etc.	N	N	Y11	
Recreational activities (including golf courses, riding stables, water recreation), parks	N	Y[7]	Y[7]	Maximum FAR of 0.11 in APZ I; 0.22 in APZ II
Other cultural, entertainment and recreation	N	Y[6]	Y[6]	

Table A-1 Recommended Land Use Compatibility for Clear Zones and Accident Potential Zones

Land Use Name and SLUCM Category	Clear Zone	APZ-I	APZ-II	Maximum Density
RESOURCE PRODUCTION AND EXTRACTION (SLUCM CATEGORY 80)				
Agriculture and Livestock farming, including grazing and feedlots	Y[8]	Y[8]	Y[8]	
Agriculture related activities	N	Y	Y	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II
Forestry activities9	N	Y	Y	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II
Fishing activities	N[10]	Y	Y	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II
Mining activities	N	Y	Y	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II
Other resource production or extraction	N	Y	Y	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II
OTHER (SLUCM CATEGORY 90)				
Undeveloped land	Y	Y	Y	
Water areas	N	N	N	

Key to Table A-1 Land Use Compatibility in APZs

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.

Notes to Table A-1 Land Use Compatibility in APZs

General Notes for All Uses:

a. The suggested maximum occupancy for commercial, service, or industrial buildings or structures in APZ I is 25 people per acre, and 50 people per acre in APZ II. 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.

b. Recommended FARs are calculated using standard parking generation rates for various land uses, vehicle occupancy rates, and desired density in APZ I/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)).

c. 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.

d. Safety of flight should be considered when evaluating development that includes explosive potential; generates smoke, steam, am or dust; and steam, creates electronic interference; lighting or glare; poor tall structures.

e. The suggested maximum occupancy for commercial, service, or industrial buildings or structures in APZ I is 25 people per acre, and 50 people per acre in APZ II. 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.

f. Recommended FARs are calculated using standard parking generation rates for various land uses, vehicle occupancy rates, and desired density in APZ I/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)).

g. 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.

h. Safety of flight should be considered when evaluating development that includes explosive potential; generates smoke, steam, am or dust; and steam, creates electronic interference; lighting or glare; poor tall structures.

i. 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 on a case-by-case basis that considers both the proposal and potentially affected mission.

j. Water features that may attract waterfowl and present bird/wildlife aircraft strike hazards (BASH), or activities that produce dust or light emissions that could affect pilot vision are generally not compatible and should be evaluated on a case-by-case basis.

k. Evaluation of potential land management actions occurring on public and private lands, such as prescribed burns, should identify the hazard (i.e., visual impairment) to aircraft flight safety and to de-conflict operations occurring at the base (i.e., scheduled exercises and training requirements).

l. This compatibility table identifies places of worship as a cultural gathering. However, religious institutions provide a wide variety of services and in these instances refer to the applicable category.

Footnotes specific to certain land uses:

1. The suggested maximum density for detached single-family housing is two dwelling units per acre to encourage retention of farming and open space.
2. Where a parcel is partially located in an APZ II, clustered development is encouraged on the portion outside the APZ while maximizing open space within the APZ.
3. 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.
4. Above ground passenger terminals and above ground power transmission or distribution lines are not recommended. Prohibited power lines include high-voltage transmission lines and distribution lines that provide power to cities, towns, or regional power for unincorporated areas.
5. A shopping center is an integrated group of commercial establishments that is a 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. The maximum recommended FAR should be applied to the gross leasable area of the shopping center.
6. Land uses in the APZs should be passive open space; ancillary places of public assembly are not recommended.
7. Low occupancy facilities are compatible with these uses; however, playgrounds and marinas are not recommended.
8. Activities that attract concentrations of birds creating a hazard to aircraft operations are not compatible.
9. 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.
10. Controlled hunting and fishing may occur for the purpose of wildlife management.
11. 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 run-ups. Measures that reduce noise at a site should be used wherever practical in preference to measures that only protect interior spaces.

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] 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

	A-Weighted DNL Levels					
LAND USE NAME & SLUCM Category	**<65 dB**	**65-70 dB**	**70-75 dB**	**75-80 dB**	**80-85 dB**	**85+ dB**
RESIDENTIAL USE GROUP (SLUCM CATEGORY 10)						
Residential uses, inclusive of all residential units - i.e., any type of single or multiple dwelling units.	Y	N[1]	N[1]	N	N	N
Mobile home parks or courts	Y	N	N	N	N	N
Transient lodgings	Y	N[1]	N1	N1	N	N
MANUFACTURING USE GROUP (SLUCM CATEGORIES 20 & 30)						
Manufacturing and industrial uses	Y	Y	Y[2]	Y[3]	Y[4]	N
Precision manufacturing	Y	Y	Y[2]	Y[3]	N	N
TRANSPORTATION, COMMUNICATION AND UTILITIES USE GROUP (SLUCM CATEGORY 40)						
Rail, motor vehicle, aircraft, marine and other transportation, and communication systems and utilities	Y	Y	Y[2]	Y [3]	Y[4]	N
Highway and street right-of-way, automobile parking	Y	Y	Y	Y	Y	N
Telephone, cellular and radio communication	Y	Y	Y[2]	Y[3]	N	N
TRADE (SLUCM CATEGORY 50)						
Wholesale trade	Y	Y	Y[2]	Y[3]	Y[4]	N
Building materials, hardware and farm equipment sales	Y	Y	Y[2]	Y[3]	Y[4]	N
Mass retailing, super stores, strip malls, shopping centers, discount clubs, home improvement stores, etc., eating and drinking establishments	Y	Y	Y[2]	Y[3]	N	N
SERVICES (SLUCM CATEGORY 60)						
Finance, insurance and real estate, personal, professional and miscellaneous services; religious activities	Y	Y	Y[2]	Y[3]	N	N
Cemeteries	Y	Y	Y[2]	Y[3]	Y[4]	Y[5]

Table A-2 Recommended Land Use Compatibility for Noise Zones

	A-Weighted DNL Levels					
LAND USE NAME & SLUCM Category	**<65 dB**	**65-70 dB**	**70-75 dB**	**75-80 dB**	**80-85 dB**	**85+ dB**
Warehousing/storage & repair services	Y	Y	Y[2]	Y[3]	Y[4]	N
Hospitals/medical, childcare & development services, educational facilities	Y	Y[2]	Y[3]	N	N	N
Nursing homes	Y	N[1]	N[1]	N	N	N
Governmental	Y	Y	Y[2]	Y[3]	N	N
CULTURAL, ENTERTAINMENT AND RECREATIONAL (SLUCM CATEGORY 70)						
Cultural activities, auditoriums & concert halls	Y	Y[2]	Y[3]	N	N	N
Nature exhibits	Y	Y	N	N	N	N
Public assembly	Y	Y	N	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Outdoor sports arenas, spectator sports	Y	Y[6]	Y[6]	N	N	N
Amusements	Y	Y	Y	N	N	N
Outdoor recreational activities	Y	Y	Y[2]	Y[3]	N	N
Resorts, camps, parks & other c/e/r activities	Y	Y	Y[2]	N	N	N
Resource Production and Extraction (SLUCM Category 80)						
Agriculture and forestry	Y	Y[7]	Y[8]	Y[9]	Y[9]	Y[9]
Livestock farming, animal breeding	Y	Y[7]	Y[8]	N	N	N
Fishing, mining and other resource production or extraction	Y	Y	Y	Y	Y	Y

Key to Table A-2 Land Use Compatibility in Aircraft Noise Zones

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.

Notes for Table A-2 Land Use Compatibility in Aircraft Noise Zone

General Notes for All Uses:

a. Compatibility designations in Table A-2 generally refer to the principal use of the site. If other uses with greater sensitivity to noise are proposed, a determination of compatibility should be based on that use which is most adversely affected by operational noise.

b. When appropriate, noise level reduction (NLR) may be necessary to achieve compatibility. NLR (outdoor to indoor) is achieved through the incorporation of sound attenuation into the design and construction of a structure. Measures to achieve an indoor noise reduction do not necessarily solve noise issues outside the structure and additional evaluation may be warranted. Building location, site planning, design, and use of berms and barriers can help mitigate outdoor noise exposure, particularly from aircraft ground maintenance run-ups. Measures that reduce noise at a site should be used wherever practical in preference to measures that only protect interior spaces.

c. Land uses below 65db DNL are generally compatible. However, localities, when evaluating the application of these guidelines, should consider possible annoyance tied to land uses that involve predominately outdoor activities, or where quiet is a basis for the use.

d. Land use that involves outdoor activities in areas above 80db DNL are not recommended, but if the community allows such activities, hearing protection devices should be worn when noise sources are present.

Footnotes to Table A-2 Land Use Compatibility in Aircraft Noise Zone

Footnotes Specific to Certain Land Uses:

1. Residential
   a. Although local conditions regarding the need for housing may require residential use in these zones, residential use is discouraged in DNL 65-70 and strongly discouraged in DNL 70-75. 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.
   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 65-70 and 30 dB in DNL 70-75 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 75-80.
   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.
2. Measures to achieve NLR of 25 dB 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 dB 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 dB 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. Buildings where public is received, are not recommended.
6. Land use is compatible provided special sound reinforcement systems are installed.
7. Where residences are permitted, measures to achieve outdoor to indoor NLR of at least 25dB should be incorporated into the design.
8. Where residences are permitted, measures to achieve outdoor to indoor NLR of at least 30dB should be incorporated into the design.
9. Residences are not compatible.


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EJECTION SEAT
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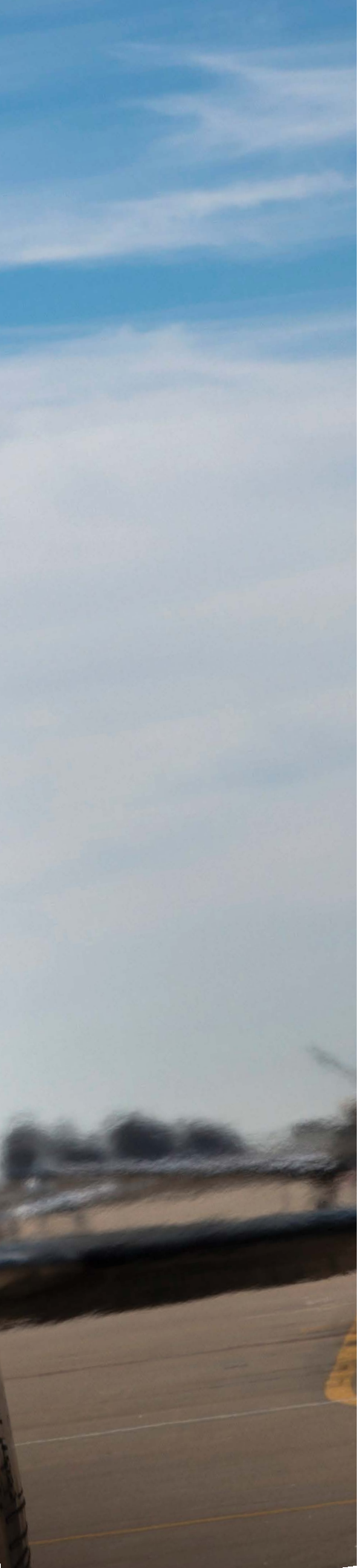

APPENDIX B

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 the on one side of the depicted track, while another pilot may fly slightly to the other side of the track).

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).


NO GUTS, NO GLORY.
--Boots Blesse
MICK HARRIS
JESSICA WALLANDER
USAF

APPENDIX C

Existing Land Use Comparison

Appendix C contains the existing land use categories for the local jurisdictions surrounding Vance AFB and Kegelman Auxiliary Field. These were the primary source of the land use compatibility analysis. In any cases where a city or town maintained its own land use data, those data were chosen over the county data.

Table C-1 Existing Land Use and AICUZ Land Use Category Assignments

Existing Land Use	AICUZ Land Use Category
Agricultural	Resource Production and Extraction
Apartment	Residential
Auto Repair	Trade
Auto Sales	Trade
Carwash - Service	Trade
Commercial	Trade
Commercial Building	Trade
Condominium	Residential
Convalescent Hospital	Trade
Fast Food Franchise	Trade
Financial Building	Trade
Food Stores	Trade
Gymnasium	Trade
Industrial Plant	Manufacturing
Medical Building	Trade
Mini Warehouse	Trade
Mobile Home	Residential
Motel	Residential
Multi-Family Dwelling	Residential
Office Building	Trade
Religious	Trade
Residential	Residential
Restaurant Building	Trade
Retail Trade	Trade
School	Trade
Single-Family Residence	Residential
Shopping Center	Trade
Storage	Trade
Store Building	Trade
Tavern	Trade
Tax Exempt	Trade
U.S. Postal Service	Trade
Warehouse	Trade


YOU ARE NO


S. INDEPENDENCE

APPENDIX D

JLUS Recommendations

This appendix highlights selected recommendations from the 2018 Vance AFB JLUS that are relevant to this study. These recommendations provide for additional actions by local governments to improve land use decisions that may affect the mission of Vance AFB. The recommended actions are aimed at improving the compatibility of land uses around Vance AFB and Kegelman Auxiliary Field with the base's mission now and in the future.

Table D-1 Selected JLUS Recommendations

Issue ID#	Recommendation	Responsible Party or Parties
DSS-1A	**Speed Limits** Limit speed (on Southgate Road) to help mitigate dust.	• City of Enid
DSS-2B	**Ensure Prescribed Burns Employ Best Management Practices** Consider adopting regulations requiring best management practices and enforcement mechanisms to control fugitive dust, smoke, and steam impacts to maintain the attainment status for regional air quality and to protect the environment.	• City of Enid • Town of North Enid • Town of Waukomis • Garfield County • Grant County • Alfalfa County • Vance AFB • Other Partner: U.S. Fish and Wildlife Service and the Bureau of Land Management
ED-1A	**Develop Alternative Energy Ordinance** Consider development of alternative energy development ordinances to coordinate siting within military influence areas and limit heights within restricted and special use airspace.	• Garfield County • Grant County • Alfalfa County
ED-1B	**Coordination with the National Oceanic and Atmospheric Administration** Coordinate the review of wind energy development projects within the recommended "No-Build Zone" and “Notification Zone” with the National Oceanic and Atmospheric Administration (NOAA). Incorporate NOAA's recommendations concerning wind turbine placement into local zoning regulations.	• City of Enid • Town of North Enid • Town of Waukomis • Garfield County • Grant County • Alfalfa County • Other Partner: National Oceanic and Atmospheric Administration
ED-2A	**Coordinate with DOD Siting Clearinghouse.** The DOD Siting Clearinghouse requirements and standards published in Title 32, Code of Federal Regulations, Part 211, advise and guide the process to facilitate the early submission of renewable energy project proposals to the Clearinghouse for military mission compatibility review. Amend applicable local planning documents (comprehensive plans, regional plans, and energy system ordinances) to incorporate procedures requiring coordination of alternative energy development applications with the DOD Siting Clearinghouse.	• City of Enid • Town of North Enid • Town of Waukomis • Garfield County • Grant County • Alfalfa County • Other Partners: DOD Siting Clearinghouse, Wind Energy Developers

Table D-1 Selected JLUS Recommendations

Issue ID#	Recommendation	Responsible Party or Parties
FSC-2A	**Identify and Map Locations Suitable for Wind Energy Development** Work with the Air Force to identify and publish locations for alternative energy development that are ideal for wind developers as well as compatibility with military operations. Develop a "Red, Yellow, Green" map that communicates and illustrates specific locations where structures that exceed a mutually agreed upon height should be prohibits to avoid incompatibility with military operations. Include discussion with the State of Oklahoma for pursuing additional mapping statewide to account for potential future changes in the mission.	• City of Enid • Town of North Enid • Town of Waukomis • Garfield County • Grant County • Alfalfa County • Metropolitan Area Planning Commission • Other partner: Wind Industry, FAA, State of Oklahoma
LU-2A	**Define and Establish Military Compatibility Areas** Create a Military Compatibility Area Overlay District (MCAOD) containing Military Compatibility Areas that reflect the types and intensity of compatible uses. The MCAOD is the collective geographic area of all of the MCAs combined. The MCAs established should be used by local jurisdictions to identify areas where specific compatibility issues are more likely to occur and address ways to avoid compatibility issues. **The MCAs should include:** • Safety MCA. Includes the land within the BASH Relevancy Area. The safety zone may need to be adjusted by the Air Force to include Clear Zone and Accident Potential Zones outside the installation dependent on future runway needs. • Noise MCA. Includes areas within the peak noise contours, as well as an additional half mile beyond the noise contour boundary. • Vertical Obstructions MCA. Includes the estimated Inner Horizontal Surfaces and Approach-Departure Clearance Surfaces for the runway at Vance AFB and Kegelman AAF. • Radar/Wind Energy MCA. Encompasses the areas within the radar viewshed. • Drone MCA. Includes the drone-restricted airspace surrounding Vance AFB, Kegelman AAF, and Woodring Regional Airport as indicated by FAA guidelines. • BASH MCA. Includes areas within a five-mile radius around the airfield with the highest concentrations of wildlife or wildlife-attractant uses.	• City of Enid • Town of North Enid • Town of Waukomis • Garfield County • Grant County • Alfalfa County
LU-7A	**Develop an Airport Overlay District** Develop an airport overlay district in the Enid Zoning Ordinance to guide development surrounding Woodring Regional Airport, similar to the existing Airfield Environs Overlay District.	• City of Enid
5A-2B	**Develop an Airport Master Plan** The City of Enid should consider creating an Airport Master Plan for Woodring Regional Airport and incorporate military aviation operations in the area and establish military compatibility policies.	• City of Enid

Table D-1 Selected JLUS Recommendations

Issue ID#	Recommendation	Responsible Party or Parties
5A-4B	**Update Plans and Amend Regulations with AICUZ Recommended Land Uses** Alfalfa County and Garfield County should review their zoning ordinance and amend as necessary to incorporate AICUZ recommended land use limitations and standards in the CZs.	• City of Enid • Garfield County • Alfalfa County • Other Partners: Vance AFB
SA-5A	**Land Use Controls in Safety Zones** The City of Enid should review current land use controls within Vance AFB safety zones and develop revisions to the land use regulations to address land use compatibility in the safety zones.	• City of Enid
VO-1A	**Amend Zoning Ordinance for Height Hazards** Garfield County should amend the zoning ordinance and the City of Enid should amend the Airfield Environs Overlay District in the Zoning Ordinance to specify the Imaginary Surfaces for the Vance AFB airfield.	• City of Enid • Garfield County
VO-1B	**Develop Telecommunications Ordinance** The City of Enid and Garfield County should develop a telecommunications ordinance to facilitate consistent, required coordination between multiple stakeholders. At a minimum, the ordinance should include: • Contact information for all local government and military officials including name, phone number, and email address, • Identification of suitable and non-suitable areas for telecommunications towers • Utilization of permit forms to aid in record keeping and formalization • Decommissioning procedures and contact information • Options or incentives for operators that collocate • Validation of proposed tower frequencies that might have changed since FAA review	• City of Enid • Garfield County
VO-2A	**Ensure FAA Part 77 compliance when permitting for Tall Structures** The City of Enid and developers should ensure compliance with the FAA's Part 77 for height limitations of structures within navigable airspace.	• City of Enid
VO-4A	**WECS Development Coordination** As part of the development permitting process for wind energy conversion systems (WEC), require developers of proposed tall structures (above 200 feet) to report to the FAA if structures are to be located within an MTR.	• City of Enid • Town of North Enid • Town of Waukomis • Garfield County • Grant County • Alfalfa County


U.S. AIR FORCE