

# Fort Campbell

## JOINT LAND USE STUDY



OCTOBER 2009 - FINAL REPORT

<b>ACKNOWLEDGEMENTS</b>	<b>VI</b>
<b>JLUS EXECUTIVE COMMITTEE</b>	<b>VII</b>
<b>JLUS TECHNICAL COORDINATING COMMITTEE</b>	<b>VII</b>
<b>EXECUTIVE SUMMARY</b>	<b>VIII</b>

## **1.0 Introduction /Study Purpose** **1-1**

---

<b>INTRODUCTION</b>	<b>1-3</b>
<b>STUDY PURPOSE</b>	<b>1-3</b>
<b>STAKEHOLDER AND PUBLIC PARTICIPATION EFFORTS</b>	<b>1-4</b>
Committees	1-4
Stakeholder Input	1-7
Public Meetings and Community Outreach	1-7
<b>OVERVIEW OF DOCUMENT</b>	<b>1-7</b>
Military Mission	1-7
Regional Demographics and Growth Trends	1-7
Operational Impacts and Hazards	1-7
Compatibility Analysis	1-8
Overview of Compatibility Efforts	1-8
Compatibility Tools	1-8
Implementation Plan	1-8
Technical Appendices	1-8

## **2.0 Military Mission** **2-1**

---

<b>DESCRIPTION OF INSTALLATION/GENERAL OVERVIEW</b>	<b>2-3</b>
<b>HISTORY</b>	<b>2-3</b>
<b>CURRENT MISSION</b>	<b>2-5</b>
<b>POST DEMOGRAPHICS</b>	<b>2-6</b>
<b>MAJOR TENANT UNITS</b>	<b>2-6</b>
<b>TRAINING RESOURCES</b>	<b>2-11</b>
Training Ranges	2-11
Air Capabilities	2-11
Airspace	2-12
Rail Capabilities	2-19
Line Haul Route Capabilities	2-19
Barge Route Capabilities	2-19

<b>MILITARY ECONOMIC IMPACT</b>	<b>2-20</b>
<b>FUTURE MISSION</b>	<b>2-21</b>
<b>3.0 Regional Demographics and Growth Trends</b>	<b>3-1</b>
<b>REGIONAL OVERVIEW</b>	<b>3-3</b>
<b>POPULATION GROWTH</b>	<b>3-3</b>
<b>COUNTY PROFILES</b>	<b>3-4</b>
Montgomery County, TN	3-4
Stewart County, TN	3-4
Christian County, KY	3-4
Trigg County, KY	3-9
<b>RECENT DEVELOPMENT ACTIVITY</b>	<b>3-9</b>
<b>REGIONAL INFRASTRUCTURE</b>	<b>3-10</b>
<b>4.0 Operational Impacts and Hazards</b>	<b>4-1</b>
<b>OVERVIEW</b>	<b>4-3</b>
<b>NOISE</b>	<b>4-4</b>
Aviation	4-8
Small and Large Arms	4-8
<b>AIR SAFETY</b>	<b>4-15</b>
<b>LIGHT INTRUSION</b>	<b>4-16</b>
<b>5.0 Compatibility Analysis</b>	<b>5-1</b>
<b>COMPATIBILITY GUIDELINES</b>	<b>5-3</b>
Noise Guidance	5-3
Air Safety Guidance	5-4
Area of Concern	5-4
<b>ANALYSIS OF CURRENT LAND USE COMPATIBILITY</b>	<b>5-7</b>
<b>ANALYSIS OF FUTURE LAND USE COMPATIBILITY</b>	<b>5-7</b>
<b>LAND USE COMPATIBILITY ASSESSMENT</b>	<b>5-8</b>
<b>BUILD OUT ANALYSIS</b>	<b>5-14</b>
<b>NIGHT VISION TRAINING ENVIRONMENT</b>	<b>5-21</b>

**6.0 Overview of Compatibility Efforts 6-1**

**OVERVIEW 6-3**

**CURRENT ARMY COMPATIBILITY TOOLS 6-3**

- Installation Environmental Noise Management Plan 6-3
- Sustainability/Army Compatible Use Buffer Program 6-3
- Other Regional Partnering efforts 6-8

**1996 JLUS AND PROGRESS SURVEY 6-9**

- 1996 Joint Land Use Study 6-9
- JLUS Progress Survey 6-11

**CURRENT LOCAL GOVERNMENT COMPATIBILITY TOOLS 6-12**

- Stewart County 6-12
- Trigg County 6-12
- Oak Grove 6-13
- Hopkinsville 6-13
- Christian County 6-13
- Clarksville/Montgomery County 6-13

**FEDERAL AND STATE INITIATIVES 6-14**

- Readiness and Environmental Protection Initiative 6-15
- State Initiatives 6-15

**7.0 Compatibility Tools 7-1**

**OVERVIEW 7-3**

**AVAILABLE ENCROACHMENT REDUCTION STRATEGIES 7-3**

- Conservation 7-4
- Zoning 7-4
- Subdivision Regulations 7-7
- Noise Attenuation 7-7
- Real Estate Disclosure 7-8
- Avigation Easements 7-8
- Comprehensive Plans 7-8
- Infrastructure 7-9
- Communication 7-9
- Coordination 7-10
- Clustering 7-10
- Transfer of Development Rights 7-10
- Outdoor Lighting Standards 7-11

**PRIORITIZED LIST OF ENCROACHMENT REDUCTION MEASURES 7-11**

1. Adopt Outdoor Lighting Standards 7-12
2. Control Development Density in the Public Safety Buffer Area at CAAF 7-16
3. Control Development Density in the Rural Planning Area West of SAH 7-20

4.	Conduct Corridor Management Studies along Highway 41A and Highway 79	7-20
5.	Expand Coordination and Communication Policies	7-23
6.	Continue and Expand Regional Coordination	7-24
7.	Continue to Improve Overall Communication	7-24
8.	Strengthen and Expand Memoranda of Understanding	7-25
9.	Explore State Compatibility Measures	7-25
10.	Explore Use of State Conservation Programs	7-27
11.	Develop Regional Sustainability Partnerships	7-27

## 8.0 Implementation Plan 8-1

<b>ACTIONS STEPS BY PARTNER</b>	<b>8-3</b>
Christian County	8-3
City of Hopkinsville	8-4
City of Oak Grove	8-5
Trigg County	8-6
City of Clarksville	8-7
Montgomery County	8-8
Stewart County	8-9
Fort Campbell	8-10

## List of Tables

<b>TABLE 1: COMMITTEE MEETING DATES</b>	<b>1-7</b>
<b>TABLE 2: PHYSICAL CHARACTERISTICS OF FORT CAMPBELL</b>	<b>2-3</b>
<b>TABLE 3: POPULATION PROFILE AT FORT CAMPBELL</b>	<b>2-6</b>
<b>TABLE 4: MAJOR UNITS AT FORT CAMPBELL</b>	<b>2-6</b>
<b>TABLE 5: ANNUAL AVIATION OPERATIONS AT FORT CAMPBELL</b>	<b>2-11</b>
<b>TABLE 6: SUMMARY OF LAND USE AND TRAINING FACILITIES</b>	<b>2-19</b>
<b>TABLE 7: TOTAL ECONOMIC IMPACTS IN THE REGION, FY 2008</b>	<b>2-20</b>
<b>TABLE 8: SIZE OF REGION AND STUDY AREA</b>	<b>3-3</b>
<b>TABLE 9: POPULATION TRENDS IN THE CLARKSVILLE MSA</b>	<b>3-3</b>
<b>TABLE 10: LAND IN NOISE &amp; AIR SAFETY AFFECTED AREAS</b>	<b>4-4</b>
<b>TABLE 11: COMPARABLE NOISE LEVELS</b>	<b>4-7</b>
<b>TABLE 12: LAND USE COMPATIBILITY GUIDELINES, A-WEIGHTED CONTOURS</b>	<b>5-3</b>
<b>TABLE 13: LAND USE COMPATIBILITY GUIDELINES, AIR SAFETY ZONES</b>	<b>5-4</b>
<b>TABLE 14: LAND USE ACREAGE SUMMARY, EXISTING &amp; FUTURE LAND USE</b>	<b>5-8</b>
<b>TABLE 15: COMPATIBILITY ACREAGE SUMMARY, EXISTING AND FUTURE USE</b>	<b>5-13</b>
<b>TABLE 16: ACREAGE &amp; SQUARE FOOTAGE SUMMARY, BUILD-OUT SCENARIO</b>	<b>5-14</b>
<b>TABLE 17: 1996 JLUS RECOMMENDATIONS BY COMMUNITY PARTNER</b>	<b>6-10</b>
<b>TABLE 18: PROGRESS SURVEY RESULTS, QUESTION RESPONSES</b>	<b>6-12</b>
<b>TABLE 19: PROGRESS SURVEY RESULTS, QUESTION RESPONSES RANKING</b>	<b>6-13</b>

## List of Figures

FIGURE 1: REGIONAL CONTEXT	1-5
FIGURE 2: FORT CAMPBELL TRAINING AREAS	2-9
FIGURE 3: MILITARY OPERATING AREAS (MOAS)	2-13
FIGURE 4: PROTECTED AIRSPACE SURFACES FOR CAAF AND SAH	2-17
FIGURE 5: POPULATION DENSITY – 2005	3-5
FIGURE 6: RECENT DEVELOPMENT ACTIVITY, SABRE HELIPORT SUB-AREA	3-7
FIGURE 7: RECENT DEVELOPMENT ACTIVITY, CAAF SUB-AREA	3-11
FIGURE 8: REGIONAL INFRASTRUCTURE PROJECTS	3-15
FIGURE 9: NOISE CONTOURS FOR CAAF AND SABRE ARMY HELIPORT	4-5
FIGURE 10: FORT CAMPBELL AIR ROUTES	4-9
FIGURE 11: LARGE CALIBER WEAPONS & HELICOPTER NOISE CONTOURS	4-11
FIGURE 12: ACCIDENT POTENTIAL ZONES FOR CAAF AND SABRE HELIPORT	4-13
FIGURE 13: JLUS AREA OF CONCERN	5-5
FIGURE 14: REGIONAL EXISTING LAND USE	5-9
FIGURE 15: JLUS AREA OF CONCERN -EXISTING LAND USE COMPATIBILITY	5-11
FIGURE 16: JLUS AREA OF CONCERN -FUTURE LAND USE COMPATIBILITY	5-15
FIGURE 17: CAMPBELL ARMY AIRFIELD BUILD-OUT POTENTIAL	5-17
FIGURE 18: SABRE ARMY HELIPORT BUILD-OUT POTENTIAL	5-19
FIGURE 19: 1993 LIGHTING CONCERNS AND PROTECTED AIRSPACE	5-23
FIGURE 20: 2003 LIGHTING CONCERNS AND PROTECTED AIRSPACE	5-25
FIGURE 21: ARMY COMPATIBLE USE BUFFER AND NOISE CONTOURS	6-5
FIGURE 22: FORT CAMPBELL ACTIVITY ZONES	7-5
FIGURE 23: NIGHT VISION DEVICE LIGHTING ZONE	7-13
FIGURE 24: CAAF SUB-AREA FUTURE COMPATIBILITY SCENARIO	7-17
FIGURE 25: SABRE SUB-AREA FUTURE COMPATIBILITY SCENARIO	7-21

## Acknowledgements

This study was prepared under contract with The Greater Nashville Regional Council, with financial support from the Office of Economic Adjustment, Department of Defense. The content reflects the views of the participating entities and does not necessarily reflect the views of the Office of Economic Adjustment.

The Fort Campbell Joint Land Use Study (JLUS) is a cooperative land use planning initiative between the U.S. Army and surrounding cities and counties of the region.

Partners in the JLUS study include: Montgomery County, Tennessee; Christian County, Kentucky; Trigg County, Kentucky; Stewart County, Tennessee; Clarksville, Tennessee; Hopkinsville, Kentucky; Oak Grove, Kentucky; Cadiz, Kentucky; Dover, Tennessee; Cumberland City, Tennessee; Pembroke, Kentucky; Lafayette, Kentucky and Fort Campbell.

This document serves as an ongoing guide to local government and Army actions to enhance compatibility around Fort Campbell and strengthen the civilian-military relationship.

### PREPARED BY:

EDAW/AECOM

MONRAD ENGINEERING

## JLUS Executive Committee

Steve Tribble, Christian County Judge-Executive  
 Stan Humphries, Trigg County Judge-Executive  
 Rick Joiner, Stewart County Mayor  
 Carolyn Bowers, Montgomery County Mayor  
 Dan Kemp, Mayor, City of Hopkinsville, KY  
 Dan Potter, Mayor, City of Oak Grove, KY  
 John Piper, Mayor, City of Clarksville, TN  
 Perry C. Clark, Garrison Commander, Fort Campbell  
 Lyn Bailey, Mayor, City of Cadiz, KY  
 Fred Shelton, Mayor, Town of Pembroke, KY  
 Gary Vaughn, Mayor, Town of Cumberland City, TN  
 Lesa Fitzhugh, Mayor, Town of Dover, TN

## JLUS Technical Coordinating Committee

Phil Armor, Greater Nashville Regional Council  
 Steve Bourne, Hopkinsville-Christian County Planning Commission  
 Chris Brown, Community Planner, Fort Campbell  
 Wally Crow, Fort Campbell Directorate of Public Works  
 Jon Hallock, Chief, Air Traffic Control  
 John Mahre, Christian County  
 Craig Morris, Pennyryle Area Development District  
 David Riggins, Clarksville-Montgomery County Regional Planning Commission  
 William J. (Bill) Chaudoin, Jr., City of Oak Grove

The Partnership would also like to acknowledge the following individuals for their previous participation in the JLUS update process: Doug Weiland, Rich Liebe, Berlin Moore, Colonel Frederick Swope, Colleen Ochs, Colonel (R) Larry Ruggley, David Wallace, Don Trotter, Keith Lampkin, Bill Bartlett, Angela Fernandez, Josh Sommer, Robert Ott and Richard Huser

## Executive Summary

Fort Campbell straddles the state line in north-middle Tennessee and southwestern Kentucky. Four counties surround the 105,000-acre installation: Montgomery County to the southeast; Christian County to the northeast; Trigg County on the northwest; and Stewart County on the southwest. Over the years, the cities and counties around Fort Campbell have grown along with the military, reinforcing a close economic and social relationship. This interdependence raises the central challenge of the Joint Land Use Study (JLUS).

In 1985, the Department of Defense's Office of Economic Adjustment (OEA) initiated the Joint Land Use Study (JLUS) program to create a participatory, community-based framework for addressing land use issues around military installations. The objectives of the JLUS are two-fold: to encourage cooperative land use planning between military installations and the surrounding communities; and to seek ways to reduce the operational impacts of military installations on adjacent land.

The Fort Campbell region was an early adopter of this coordinated approach to planning around military installations. In 1996, the Army and participating local governments completed a JLUS for the surrounding four-county area of Montgomery, Stewart, Christian and Trigg Counties.

Members of the Fort Campbell JLUS Partnership joined in initiating this effort to build on the 1996 study by revisiting current development issues, growth trends, and evolving mission needs and strengthening planning practices at the military/civilian interface.

While encroachment (incompatible land use) is currently not severe around Fort Campbell, changing market conditions, population growth, and increasing commercial activity are quickly reshaping development patterns near critical training operations. The JLUS is at its most effective as a proactive process for identifying and minimizing these foreseeable threats to military readiness, public safety, and regional quality of life.

Fort Campbell serves as a Power Projection Platform (PPP) and a major maneuver installation for the Army/Department of Defense. The post supports the training and deployment of over 30,000 assigned Soldiers and is one of the largest installations in the Army.

Fort Campbell occupies approximately 105,347 acres of land and is home to three of the U.S. Army's premier combat units (the 101st Airborne Division, the 160th Special Operations Regiment, and the 5th Special Forces Group), which includes a substantial portion of the Army's aviation assets. The post's tenant units operate at one of the highest tempos in the Army, and are among the first units deployed to theaters throughout the world. To maintain unit combat readiness, the installation must accommodate realistic and intense training exercises. Fort Campbell is also a significant economic engine for the region and the largest single (mobile) employer in Kentucky and Tennessee. According to statistics for Fiscal Year 2008, the installation circulated more than \$3.5 billion throughout the area.

The community of Clarksville, Tennessee to the east of the post is the fastest growing of the region's population centers. The communities north of the post, Hopkinsville and Oak Grove, Kentucky, are also expanding. The most significant trend shaping compatibility issues near the installation

is the demand for residential housing that is increasing pressure to develop the remaining farms and wooded areas on the urban edge. U.S. Highway 41A and the recently expanded U.S. Highway 79 are also emerging as commercial corridors that could facilitate more intense development and produce light intrusion impacts affecting aviation operations at Fort Campbell, particularly around Campbell Army Airfield and Sabre Army Heliport.

As with all active military installations, routine training and readiness activities at Fort Campbell produce various impacts that can affect the quality of life in surrounding communities. Based upon stakeholder feedback and a review of existing conditions and key documents, the planning team identified the following issues as the primary threats to mission viability and regional quality of life:

- exposure of residents to noise associated with aviation operations
- exposure of residents and businesses to the risk of an aircraft accident
- visual interference with the night vision training environment associated with exterior lighting

Partner entities, including Fort Campbell and local jurisdictions, have taken a variety of steps to mitigate the operational impacts of training activity on the post. The purpose of this JLUS effort is to build on previous measures and to develop additional strategies to promote land use compatibility around the installation. A particular emphasis of this document is on sustainability, which seeks to meet current and future mission requirements, while safeguarding human health, improving quality of life, and enhancing the natural environment.

The resulting document is a series of tools that the Army and the local governments can choose to adopt during the implementation phase of the JLUS process. The JLUS emphasizes a prioritized list of land use compatibility strategies for local jurisdictions and Fort Campbell including:

- Adopting outdoor lighting standards to protect the Fort Campbell night vision device environment from light intrusion
- Controlling Development Density in the public safety buffer area at Campbell Army Airfield
- Controlling Development Density in the Rural Planning Area west of Sabre Army Heliport
- Conducting corridor management studies along U.S. Highway 41A and U.S. Highway 79
- Expand coordination and communication policies for development within the JLUS Area of Concern
- Continuing and expanding regional coordination
- Continuing to improve overall communication
- Strengthen and expand Memoranda of Understanding with regional stakeholders
- Exploring state compatibility measures
- Exploring use of state conservation programs
- Develop regional sustainability partnerships



# 1.0 Introduction / Study Purpose



**FORT CAMPBELL**

Joint Land Use Study Update



## INTRODUCTION

Fort Campbell straddles the state line in north-middle Tennessee and southwestern Kentucky. Four counties surround the 105,000-acre installation: Montgomery County to the southeast; Christian County to the northeast; Trigg County on the northwest; and Stewart County on the southwest (See **Figure 1**). The communities of this region form the rapidly growing Clarksville, TN-KY Metropolitan Statistical Area.

The Army first activated Camp Campbell during World War II to train and mobilize armored divisions. Designated as a permanent installation in 1950, Fort Campbell's mission has continued to evolve in response to America's changing defense needs. Today the installation is home to three of the U.S. Army's premier combat units (the 101st Airborne Division, the 160th Special Operations Regiment, and the 5th Special Forces Group), as well as a substantial portion of the Army's aviation assets. The post's tenant units operate at one of the highest tempos in the Army, and are among the first units deployed to theaters throughout the world.

Over the years, the cities and counties around Fort Campbell have grown along with the military, reinforcing a close economic and social relationship. This interdependence raises the central challenge of the Joint Land Use Study.

As military installations expand, they bring new people and economic activity to an area. Communities build houses, schools and infrastructure, and create new jobs to support soldiers, civilian workers, and their families. More people begin to live and work in proximity to the noise and safety risks generated by military training. The presence of these civilian uses can in turn place pressure on installations to modify their operations, possibly compromising mission viability. This land use conflict, referred to as encroachment, threatens the ability of the U.S. military to conduct the realistic training activities necessary for combat readiness. Conversely, military training impacts such as noise from aircraft or weapons firing can diminish quality of life for affected local residents.

## STUDY PURPOSE

In 1985, the Department of Defense's Office of Economic Adjustment (OEA) initiated the Joint Land Use Study (JLUS) program to create a participatory, community-based framework for addressing land use issues around military installations.

The objectives of the JLUS are two-fold:

1. to encourage cooperative land use planning between military installations and the surrounding communities; and
2. to seek ways to reduce the operational impacts of military installations on adjacent land.

The JLUS is as much about the process as it is the final document. It creates a public dialogue around the complex issues of land use, economic and population growth, infrastructure delivery, environmental sustainability, and mission change. The intent of the study is to highlight common interests—attractive development, healthier environments, more efficient infrastructure, economic prosperity, and better quality of life—and to protect the military mission, while sustaining local growth. The resulting report is not a binding document, but a dynamic blueprint of best practices and ideas to guide military and community policy actions in the years ahead.

The Fort Campbell region was an early adopter of this coordinated approach to planning around military installations. In 1996, the Army and participating local governments completed a JLUS for the surrounding four-county area of Montgomery, Stewart, Christian and Trigg Counties. The study articulated the following mission statement:

*Recognizing the vital role of Fort Campbell and related facilities for the Kentucky and Tennessee communities and recognizing the vital role of Kentucky and Tennessee communities on the region, it is important that a military and community partnership is developed, which encourages balanced growth and development.*

Members of the Fort Campbell JLUS Partnership joined in initiating this effort to build on the 1996 study by revisiting current development issues, growth trends, and evolving mission needs and strengthening planning practices at the military/civilian interface. The JLUS Partnership is an ongoing regionally-based organizational framework that consists of city and county officials and Fort Campbell Garrison leadership.

The primary objectives of the JLUS Partnership are to:

- Enhance existing cooperative land use and infrastructure planning between Fort Campbell and surrounding communities.
- Develop a comprehensive land use strategy to preserve installation training capabilities and ensure the long-term viability of Fort Campbell Military Installation
- Refine current strategies to anticipate and minimize military operational impacts on adjacent lands and surrounding communities.

While encroachment is currently not severe around Fort Campbell, changing market conditions, population growth, and increasing commercial activity are quickly reshaping development patterns near critical training operations. The JLUS is at its most effective as a proactive process for identifying and minimizing these foreseeable threats to military readiness, public safety, and regional quality of life.

## STAKEHOLDER AND PUBLIC PARTICIPATION EFFORTS

### COMMITTEES

A successful JLUS requires active and broad participation to ensure that strategies reflect the diversity of the region and to build support for ongoing implementation. The JLUS planning team led by the project contractor EDAW worked closely with two committees throughout the planning process. The Executive Committee, consisting of local officials and Fort Campbell Garrison leadership, oversaw study efforts and accepted the final recommendations identified in this document.

Members of the Technical Coordinating Committee (TCC) assisted in developing practical encroachment reduction tools and delivering study recommendations to the Executive Committee for their evaluation. The TCC members are also the key military and community professionals who will implement strategies as part of daily decision-making on the installation and in the community. The planning team conducted the following committee meetings as shown in **Table 1**.



## STAKEHOLDER INPUT

The planning team also conducted a series of face-to-face interviews with members of the TCC to identify recent compatibility actions adopted by local communities, assess development trends, and establish priorities to guide policy development. The respondents also identified several existing challenges to implementing an effective land use compatibility plan around Fort Campbell, including the lack of planning capacity in local communities, rapid population growth and a lack of political support. Appendix I contains a summary of stakeholder feedback.

Committee Meeting Dates		
	Meeting	Date
TABLE 1	TCC Kick Off Meeting #1	March 6, 2007
	TCC Meeting #2	May 1, 2007
	Executive Committee #1	May 15, 2007
	TCC Meeting #3	June 21, 2007
	Public Meetings Round #1	July 16 through July 23, 2007
	Night Vision Device Workshop	August 22, 2007
	Executive Committee #2	September 5, 2007
	Public Meetings Round #2	October 4 through October 10, 2007
	TCC Meeting #4	December 11, 2007
	TCC Meeting #5	August 19, 2008
	Executive Committee #3	October 31, 2008
	Public Meetings Round #3	March and April 2009
	Public Review Period	May 2009
	TCC Meeting #6	June 12, 2009
	Executive Committee	September 21, 2009

## PUBLIC MEETINGS AND COMMUNITY OUTREACH

Active community involvement is a critical component of the JLUS. Public forums create a valuable opportunity to educate residents about training operations and the economic impact of the mission and to build trust between the military and community. Since study recommendations can affect nearby property owners, these sessions are also essential for conveying information about conservation or development options that maintain compatibility with adjacent training activities. The planning team hosted three rounds of public meetings in July and October of 2007 and March and April of 2009. The public forums consisted of a series of four evening sessions in Clarksville, Oak Grove or Hopkinsville, Dover and Cadiz. To continue engaging the public, the planning team has also produced a JLUS brochure that summarizes major study findings, recommendations, and maps.

## OVERVIEW OF DOCUMENT

The remainder of the document consists of the following sections:

### MILITARY MISSION

This section gives an overview of the installation's history, mission and economic impact.

### REGIONAL DEMOGRAPHICS AND GROWTH TRENDS

This section profiles the partner jurisdictions and summarizes growth trends and recent development activity around the installation.

### OPERATIONAL IMPACTS AND HAZARDS

This section identifies the impacts of the military mission on nearby civilian land and potential hazards to training activities caused by proximate off-post development.

### **COMPATIBILITY ANALYSIS**

This section defines land use compatibility and highlights current or foreseeable land use conflicts in the communities surrounding Fort Campbell based on zoning and land use plans. This section also assesses threats to the night vision training environment.

### **OVERVIEW OF COMPATIBILITY EFFORTS**

This section gives an overview of compatibility actions taken at the local, state, and federal levels of government. It also assesses the progress of partner governments in implementing the 1996 JLUS recommendations and explores the sustainable use of resources and protection of the environment.

### **COMPATIBILITY TOOLS**

This section identifies general strategies to promote land use compatibility around Fort Campbell and a set of prioritized key actions to reduce the risk of encroachment in the most vulnerable areas.

### **IMPLEMENTATION PLAN**

This section organizes recommended actions by partner.

### **TECHNICAL APPENDICES**

The appendices contain guidelines and a series of sample or model tools for promoting land use compatibility around the installation.

## 2.0 Military Mission



**FORT CAMPBELL**

Joint Land Use Study Update



## DESCRIPTION OF INSTALLATION/GENERAL OVERVIEW

Fort Campbell occupies approximately 105,000 acres of land. (See **Table 2** for a description of the physical features on post). Most of the post's major facilities cluster in a 15,000-acre area along the eastern boundary of the installation within the main cantonment area. The Army dedicates the remaining 90,000 acres of the post, including ranges, impact areas, and maneuver areas to training activities.

Fort Campbell serves as a premier Power Projection Platform (PPP) and major maneuver installation for the Army / Department of Defense. The post supports the training and rapid deployment of over 30,000 assigned soldiers and is one of the largest installations in the Army. Fort Campbell is the home of the only Air Assault Division in the world, the 101st Airborne Division (Air Assault). The installation is also the home of two prestigious Special Operations Command units, the 5th Special Forces Group (Airborne) and the 160th Special Operations Aviation Regiment (Airborne), and other important military units. The post's tenant units operate at a very high operational tempo and are among the most-deployed contingency forces in the Army.

To maintain unit combat readiness, the installation must accommodate realistic and intense training exercises. In addition to preparing its assigned tenant units, Fort Campbell provides training and mobilization support for numerous Army National Guard and Army Reserve units. Training facilities are also utilized by the other military services. Over 50,000 personnel train at the post each year.

**Physical Characteristics of Fort Campbell**

Physical Characteristics of Fort Campbell		
TABLE 2	Total size	105,000 acres
	Acreage in KY	37,000 acres
	Acreage in TN	68,000 acres
	Width	20.5 miles
	Length	11.7 miles

## HISTORY

Fort Campbell traces its roots to just before World War II. It is the only war-time camp that was planned and surveyed before Pearl Harbor. Following the Japanese attack in 1941, the U.S. Army Corps of Engineers acquired land between Hopkinsville, KY and Clarksville, TN and within a few months the War Department opened a war-time post called Camp Campbell. An initial cadre of one officer and 19 enlisted men arrived at Camp Campbell from Fort Knox in June of 1942.





During World War II, Camp Campbell was a major training and mobilization center for a new type of Army organization known as the armored division. Camp Campbell trained and deployed more than one-quarter of all soldiers who fought in the Army's armored divisions in World War II. The post also served as a prisoner-of-war camp for some 4,000 German soldiers. The vestiges of the fort's early history can be seen in a number of the 1940s era wooden facilities that are still in use today.

Camp Campbell remained operational after World War II and on April 14, 1950, the post became a permanent installation under the designation of Fort Campbell. During the 1950s, the installation grew and the Air Force relinquished control of Campbell Airfield to the U.S. Army. Construction of a control tower, crash fire station, Hangar 1, and two 25,000-square-foot barracks in 1959 elevated Campbell Army Airfield to the status of the U.S. Army's single largest airfield. The 11th Airborne Division was also assigned to Fort Campbell for several years (1949-1956) during this period.

The Cold War ushered in an era of change for the post. The Army fenced off 2,500 acres in the southeast corner of Fort Campbell for use as a top-secret nuclear weapons storage and modification facility. The military Armed Forces Special Weapons Project and the civilian Atomic Energy Commission jointly operated the facility named Clarksville Base. This facility was closed in the mid 1960s and the land was transferred to the Army.

In 1956, the 101st Airborne Division relocated to Fort Campbell from Fort Jackson in South Carolina. Nicknamed the "Screaming Eagles," the Division is well-known for leading the Allied assault prior to the D-Day invasion of Normandy.

During the absence of the 101st Airborne Division (Vietnam War) from 1967 to 1972, Fort Campbell became the home of the United States Army Training Center. More than 240,000 entry-level Soldiers received basic and advanced infantry training at Fort Campbell before receiving assignments around the world as individual replacements. Additionally, the 6th Infantry Division—a specially trained unit formed to provide assistance with civil disturbances—was also

activated and stationed at Fort Campbell during these years.

After the Vietnam War, the division switched its designation from “Airmobile” to “Air Assault.” This change reflected the changing mission of the division, from guerrilla war in Southeast Asia to high intensity combat on the battlefields of Europe, or elsewhere.

Throughout the 1970s and 1980s, Fort Campbell kept up with the demanding changes and support requirements of the air assault division, and in the process, became home to two other highly specialized and strategically deployable units: the 5th Special Forces Group (Airborne) and the 160th Special Operations Aviation Regiment (Airborne).

The installation experienced another spurt of construction in the 1980s, adding a total of 1,418,371 square feet of facilities, a 241-bed hospital, an aviation maintenance hanger at Sabre Heliport, and an AH-64 Apache flight simulator.

Fort Campbell proved throughout the 1990s to be an exceptional installation, capable of supporting the training, deployment and family needs of the finest and most elite contingency forces in the U.S. Army. In 1991, the 101st and other Fort Campbell units deployed in support of Operation Desert Shield/Desert Storm. In addition to major operations, Fort Campbell Soldiers also supported humanitarian relief efforts in Rwanda and Somalia, and supplied peacekeepers to Bosnia, Haiti and Kosovo in the decade that followed Operation Desert Storm.

The United States was again called to war after the Sept. 11, 2001 terrorist attacks on the World Trade Center and the Pentagon. Since that time, Fort Campbell units have been on multiple deployments to Afghanistan and Iraq in support of Operation Enduring Freedom and Operation Iraqi Freedom.

## CURRENT MISSION

The primary mission of Fort Campbell is to advance the combat readiness of the 101st Airborne Division (Air Assault) and the other non-divisional units posted at the installation through training, mobilization and deployment. The Commanding General of the 101st Airborne Division serves as the Installation Commander (and Senior Mission Commander) for the post.

Fort Campbell is a U.S. Army Installation Management Command (IMCOM) installation and its garrison staff supports the 101st Airborne Division and other assigned units. The garrison mission is to support expeditionary forces and power projection capabilities; to sustain, transform, and modernize the installation; to enhance well-being for the military community; to transform business processes to become effective, efficient, and equitable; and to develop and sustain an innovative, highly capable, mission focused workforce.



## POST DEMOGRAPHICS

Fort Campbell supports a total population of 180,786, including a military component of 30,000. **Table 3** shows the total population profile of the installation and includes active military, family members, civilian employees, contractors, reserve component and military retirees. The post accommodates more than 60,000 people each day.

Soldiers assigned to Fort Campbell, along with visiting Army units, U.S. Army Reserve, National Guard, U.S. Air Force and Marine units use the installation’s airfield facilities, training areas, and firing ranges 365 days a year. The installation serves as a Premier Power Projection Platform that can deploy combat equipped soldiers, tactical vehicles, weapons and ammunition, and logistical equipment by air, rail, water, or land. To fulfill this mission and to support current military operations in Afghanistan, Iraq and other locations, the post maintains a very high operational intensity.

Population Profile at Fort Campbell		
TABLE 3	Military	30,537
	Family Members	45,806
	Civilians	4,649
	Contract Employees	3,815
	Retirees & Family Members	95,521
	Reserve Component	755
	Total Supported	180,786

## MAJOR TENANT UNITS

Fort Campbell’s major units include the 101st Airborne Division (Air Assault), 160th Special Operations Aviation Regiment (Airborne), 5th Special Forces Group (Airborne), 86th Combat Support Hospital, 52nd Ordnance Group (EOD), U.S. Army Medical Activity Blanchfield Army Hospital, and the U.S. Army Garrison Fort Campbell (See **Table 4**).

Major Units at Fort Campbell		
TABLE 4	UNIT	SOLDIERS/EMPLOYEES
	101st Airborne Division (Air Assault)	20,539
	160th Special Operations Aviation Regiment (Airborne)	1,381
	5th Special Forces Group (Airborne)	2,191
	86th Combat Support Hospital	438
	52nd Ordnance Group (EOD)	202
	Blanchfield Army Hospital	1,189*
	U.S. Army Garrison Fort Campbell	7,030*
	* indicates totals that include military and civilian personnel	



### 101<sup>st</sup> Airborne Division (Air Assault)

*“The 101st Airborne Division is the world’s only Air Assault Division”*

The 101st Airborne Division is the largest operational unit stationed at Fort Campbell. Nicknamed the “Screaming Eagles,” the 101st is the Army’s only Air Assault Division. The unit is a joint air-ground division with an authorized strength of 20,539 soldiers. The division, which has been at Fort Campbell since 1956, is often one of the first units to deploy to theatre and its missions often combine ground and air operations over large areas of land.

In 2005, Army Transformation resulted in the addition of a fourth infantry brigade combat team (BCT) to the 101st. Unit training is focused around the combat readiness requirements of four brigade combat teams, two combat aviation brigades, and a Sustainment brigade. For this reason, sufficient training for the division must include the ability to use the entire installation and its facilities for ground and air exercises, as well as the ability to fly long distances outside of the installation.



## 160<sup>th</sup> Special Operations Aviation Regiment (Airborne)

*"Nightstalkers Never Quit"*

Since 1981, the mission of the 160th Special Operations Aviation Regiment (SOAR) at Fort Campbell has been to organize, equip, train, resource and employ Army special operations forces worldwide in support of contingency missions and warfighting. The unit has an authorized strength of 1,381 soldiers. The 160th SOAR is the Army's premier night fighting aviation force and the Army's only Special Operations Aviation force. Adequate training requires the unit to fly at low levels over long distances of minimally lit land using night vision goggles (NVG).



## 5th Special Forces Group (Airborne)

*"The 5th SFG(A) has been engaged in near continuous combat operations since 11 SEP 2001"*

The 5th Special Forces Group is an airborne-qualified unit and its mission is to conduct special operations (unconventional warfare, foreign internal defense, special reconnaissance, direct action, combating terrorism, counter-proliferation, and information operations) in support of the Commander, U.S. Central Command. The unit, which has been at the post since 1986, has an authorized strength of 2,191 airborne qualified soldiers. The addition of a fourth battalion has resulted in a recent increase in the strength of the 5th SFG.



## 86th Combat Support Hospital

*"Most Frequently Deployed Hospital in the U.S. Army"*

The mission of the 86th Combat Support Hospital is to deploy rapidly and establish Level III health service support to joint and/or coalition forces engaged in operations and to assume Medical Task Force command and control and conduct split based operations. The unit has an authorized strength of 438 soldiers.



## U.S. Army Medical Activity Blanchfield Hospital

Blanchfield Army Hospital is a 494,000 square foot, 66-bed facility that delivers soldier health services and operates two clinics, a Department of Social Work, and a Behavioral Health Support Center. Its mission is to ensure healthy soldiers, to deploy trained and ready medical forces, and to manage the health care of soldiers, families, and retirees. The hospital's 1,137 employees support a total population of 102,161.



## 52<sup>nd</sup> Ordnance Group

The 52nd Ordnance Group (Explosive Ordnance Disposal) is the command and control headquarters for all Army Explosive ordnance companies and battalions in the continental United States. The unit oversees three battalions that are highly trained to defuse weapons of mass destruction and improvised explosive devices such as roadside bombs. The 52nd is currently transitioning to Fort Campbell from Fort Gillem, Georgia. When this transition is complete, more than 300 EOD Soldiers will be stationed at Fort Campbell to support assigned brigade combat teams.



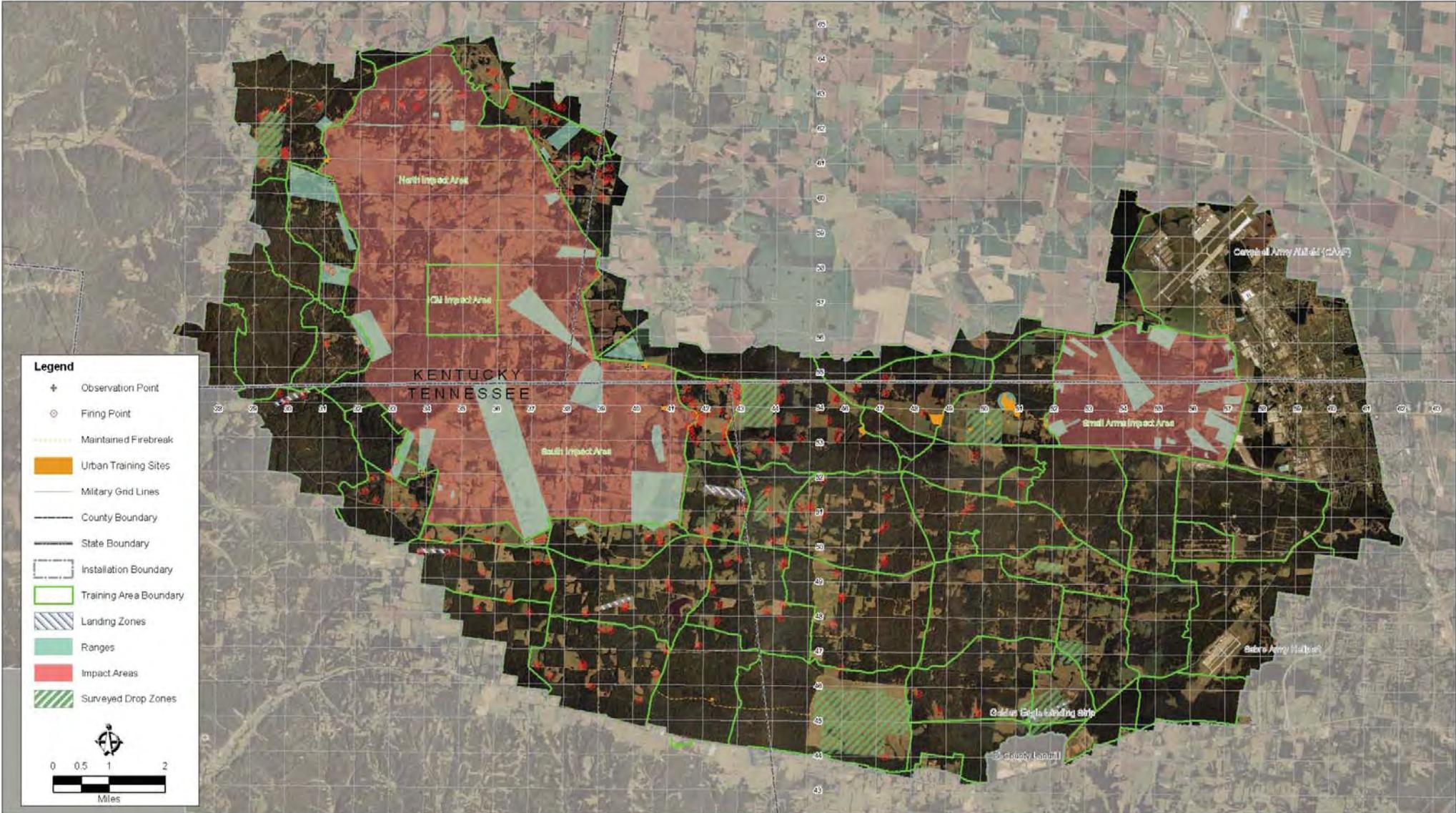
## US Army Garrison

The directorates, business centers and numerous agencies that make up the U.S. Army Garrison at Fort Campbell operate the installation on behalf of the Army Installation Management Command. Among the services that are provided by the garrison staff are housing, contracting and purchasing, information management, community activities, installation business, public works and public safety. The garrison and its supporting agencies comprise approximately 7,030 Soldiers, civilian employees and contractors.

Along with the major units, the post's other tenants include:

- Air Assault School
- AAFES
- American Red Cross
- Directorate of Contracting
- Defense Commissary Agency
- Document Automation & Production Services (DAPS)
- Defense Reutilization & Marketing Office
- U.S. Post Office
- Fort Campbell Schools
- NCO Academy
- Army Trial Defense Service
- Army Trial Judiciary, 2d Judiciary Circuit
- Army TMDE Support Center
- AFGE local 2022 Union
- 2-44 ADA Battalion
- 716th MP Battalion
- U.S. Army CID, 1000th MP Bn
- Co C, 1st Bn, 58th AVN Regiment
- 902d MI Group
- 31st MP Det CID (DSE)
- 621 Air Mobility Ops Grp
- A Co, 1-58th ATC
- OL-U, 621 AMOG (AMC)
- Special Operations Recruiting Team
- U.S. Air Force 19th ASOS
- U.S. Air Force Det 2, 10th Combat Weather Squadron
- Directorate of Health Services
- TN Valley Veterinary Command
- AMC Logistics Support Element
- 326th Engineer Battalion
- 1000th MP BN (CID)
- 18th Weather Squadron, Det. 4
- 1108th/1109th/1110th USAR Mobilization Support BNs

As with most Army installations, Fort Campbell functions as a self-sustaining community for its personnel and their families, offering on-post housing, a complete K-12 school system, health care facilities, child care facilities, personal services, recreation facilities, and a town center with numerous retail facilities.



**Figure 2**  
**Fort Campbell Training Areas**

## TRAINING RESOURCES

### TRAINING RANGES

The installation has two impact areas for live fire training that comprise a total of 26,627 acres of land (See **Figure 2**). Fort Campbell has a total of 53 training areas, 92 ranges and 130 artillery firing points, four sets of Brigade Qualification Training Ranges, a Special Forces Range Complex, fifteen urban combat training sites, and seven shoot-houses (see **Table 6**). Ranges accommodate training and qualification firing for individual and crew-served weapons systems, as well as anti-tank weapons, demolitions, helicopter gunnery, 25 mm gun and 120 mm tank gun firing. The installation also has approximately 340 pre-surveyed artillery and mortar firing points capable of supporting 105 mm through 155 mm howitzers and 60 mm through 120 mm mortars.

Aside from the ranges, Fort Campbell's other training facilities include five drop zones, seven observation points, four Military Operations in Urban Terrain facilities, and five landing zones. The installation also has a Multi-Purpose Range Complex (MPRC) and a special forces training complex. Since the mix of forest and open land at Fort Campbell creates favorable conditions for light infantry maneuvers, the Army designates approximately 64,000 acres outside of the impact areas as maneuver space.

### AIR CAPABILITIES

Fort Campbell contains facilities for both fixed-wing and rotary-wing aircraft. Campbell Army Airfield is one of the largest airfields in the U.S. Army, spanning 2,500 acres and capable of accommodating any aircraft in the Department of Defense (DoD) inventory. The airfield has two runways, an 11,800 foot primary strip and a 4,500 foot secondary strip, with a Maximum on Ground (MOG) capacity to accommodate 15 C-5 or 20 C-17 aircraft. CAAF operates as a full-service 24/7/365 DoD airfield capable of transporting soldiers and equipment directly to a theater of operation. It also serves as a HURRIVAC (Hurricane Evacuation) site for all military services during inclement weather.

Sabre Army Heliport is south of the installation's cantonment area and serves as the installation's primary airfield for Night Vision Device (NVD) training. The facility has a 4,450 foot runway used primarily for rotary wing aircraft; however, the strip can support C-17 cargo aircraft and other fixed-wing aircraft.

Annual Aviation Operations at Fort Campbell									
		2001	2002	2003*	2004*	2005*	2006*	2007	2008*
TABLE 5	HOP ARAC	83,785	89,600	68,731	92,383	109,833	123,183	119,303	100,907
	ASR/PAR	3,129	4,375	2,244	6,155	2,056	2,146	2,978	2,505
	HOP TWR	241,908	299,647	119,285	206,384	208,599	146,435	224,493	173,587
	EAGLE AIC	137,022	145,009	22,500	104,801	69,828	49,476	148,529	73,655
	EOD TWR	73,401	78,901	10,294	59,230	43,901	42,775	113,718	71,769
	TOTAL	539,245	617,532	223,054	468,953	434,217	364,015	609,021	422,423
Notes: HOP ARAC - Campbell Army Radar Approach Control HOP TWR - Campbell Control Tower EOD TWR - Sabre Tower ASR/PAR - Airport Surveillance Radar approach/Precision Approach Radar EAGLE AIC - Eagle Airspace Information Center * a large number of units were deployed during these years, resulting in the lower aircraft operations numbers									

In addition to CAAF and SAH, Fort Campbell provides 5 helipads throughout the cantonment area, as well as an unpaved forward landing strip (Golden Eagle) in the southeastern portion of the installation used for joint training operations.

Each of the tenant units at Fort Campbell follows established organizational Mission Essential Task Lists that support training operations. Training exercises to achieve each task include, among others, low level flight by aircraft on post at just above tree-top or ground level (also referred to as “nap of the earth” flight or “tactical terrain flight” training); parachute operations (including personnel and heavy payload drops); driving with night vision goggles (NVG) on roadways and across variable terrain; and clearing fields of fire (for defensive positions).

**Table 5** displays the number of aviation operations at Fort Campbell from the years 2001 to 2008. As reflected in these figures, military personnel at Fort Campbell conduct a significant number of aviation operations on lands surrounding the installation. After a period of decline in aviation activity due to unit deployments, operations increased to more than 600,000 in 2007 and totaled 422,000 in 2008, reflecting another cycle of deployments.

## AIRSPACE

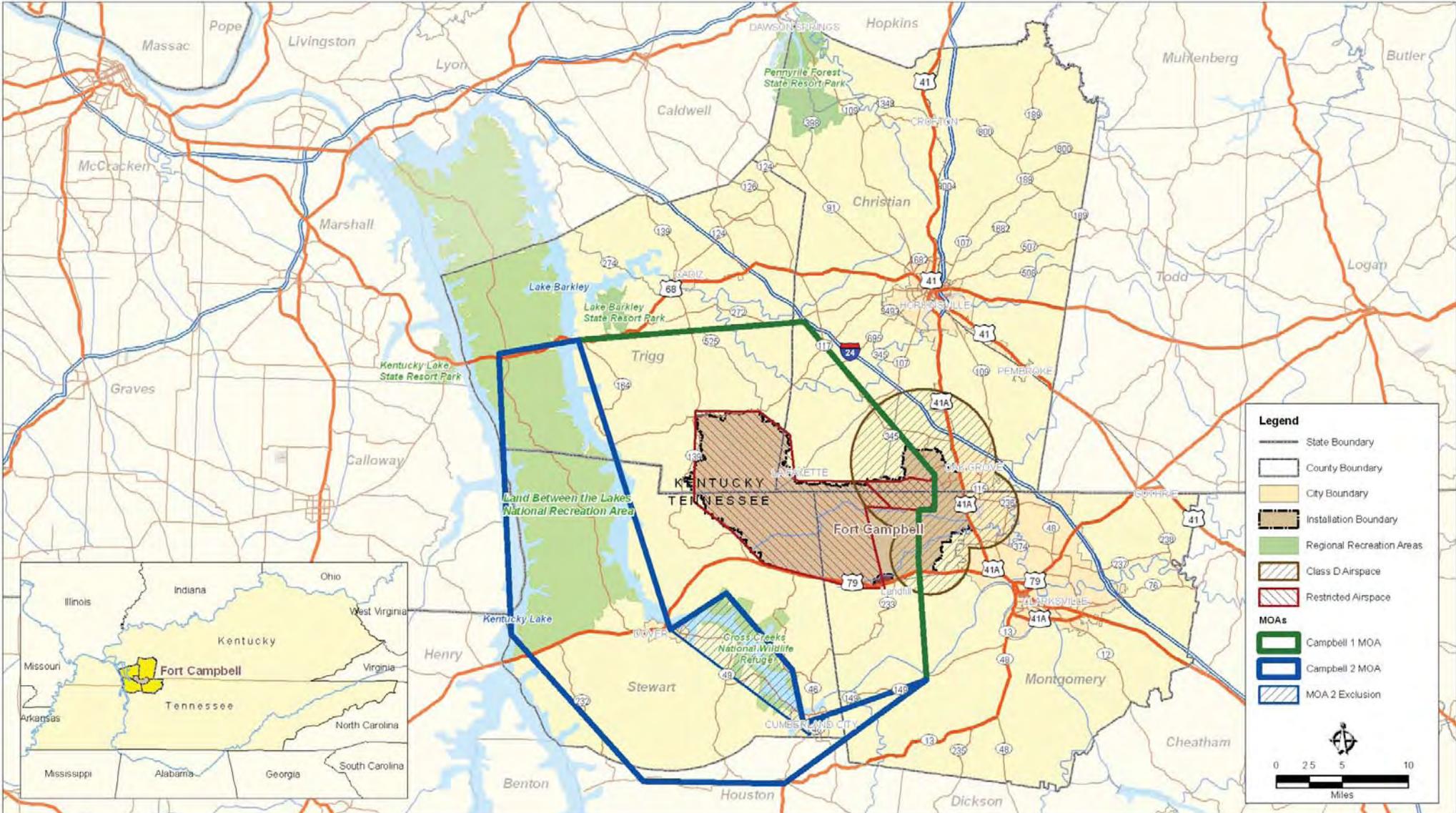
Protected airspace around Fort Campbell is essential to accommodate military testing and training. Airspace corridors away from the post are also critical to connect the installation to other military facilities and training or operations areas.

### Military Operations Area (MOAs)

An MOA is airspace that separates certain non-hazardous flight activities from Instrument Flight Rules (IFR) traffic and identifies Visual Flight Rules (VFR) traffic. Within these areas, the military conducts flight activities, such as acrobatic or abrupt flight maneuvers, intercepts, air combat maneuvering missions, aerial refueling and unmanned aerial vehicle flights. MOAs are three dimensional areas. In addition to mapped boundaries, MOAs have a defined floor (minimum altitude) and ceiling (maximum altitude). These altitudes can range from 500 feet above the surface to 17,999 feet above mean sea level (MSL). See **Figure 3**.

### Military Training Routes (MTRs)

MTRs are similar to complex systems of interrelated and interdependent highways in the sky that connect military installations, ranges and operation areas. DoD high performance aircraft use Visual Route (VR) and Instrument Route (IR) to conduct low-altitude navigation and tactical training at airspeeds in excess of 250 knots and at altitudes as low as just above surface level. VR and IR routes are low-level, high speed routes that enable the pilot to develop the skills necessary to avoid detection by enemy radar. DoD cargo aircraft use Slow Routes (SR) to conduct low navigation and tactical training at airspeeds less than 250 knots and at altitudes as low as just above surface area. Fort Campbell has five slow routes that start at various points within 250 miles of the installation and all five terminate within the boundaries of the post at select drop zones that are used for parachute drops, container drops or assault landings.



**FORT CAMPBELL**  
Joint Land Use Study Update

**Figure 3**  
**Military Operating Areas (MOAs)**

### Restricted Areas (RAs)

Restricted Areas (RAs) are a critical asset to the DoD because they allow for the use of weapons for training and testing purposes, such as ground weapons, mortar or artillery firing, aerial gunnery, live and inert practice bomb drops, guided missile testing and unmanned aerial vehicles or systems. RAs provide locations for training and testing to support the combat readiness of aviation and ground combat units, while separating these activities from the public and general aviation users. Fort Campbell's RAs start at the surface with a ceiling altitude of 27,000 feet. See **Figure 3**.

### Altitude Reservation (ALTRVs)

Altitude Reservation (ALTRVs) can be stationary or moving. A moving ALTRV will normally include the en route and arrival phase of flight up to and including the arrival holding pattern. A moving ALTRV can be assigned to an aircraft flight plan as a block of altitudes (i.e., 5,000 block 10,000 feet) and flow for several hundred miles across the country. A stationary ALTRV will normally define a fixed airspace area to be occupied, as well as the specific altitudes and time periods the area will be in use. Fort Campbell often uses stationary ALTRVs to support armed forces training involving multiple DoD departments.

### Controlled Firing Area (CFA)

Controlled firing areas contain civilian or military activities that can be hazardous to non-participants of the exercise or event. They differ from MOAs and RAs in that radar or a ground lookout observer indicates when an aircraft might be approaching the area, triggering a suspension of all activities. The Federal Aviation Administration does not chart CFAs since it does not require an aircraft not participating in the exercise or event to change its flight path. A CFA can be added to the airspace above an RA to fire weapons that exceed the maximum altitude of the RA on a random basis.

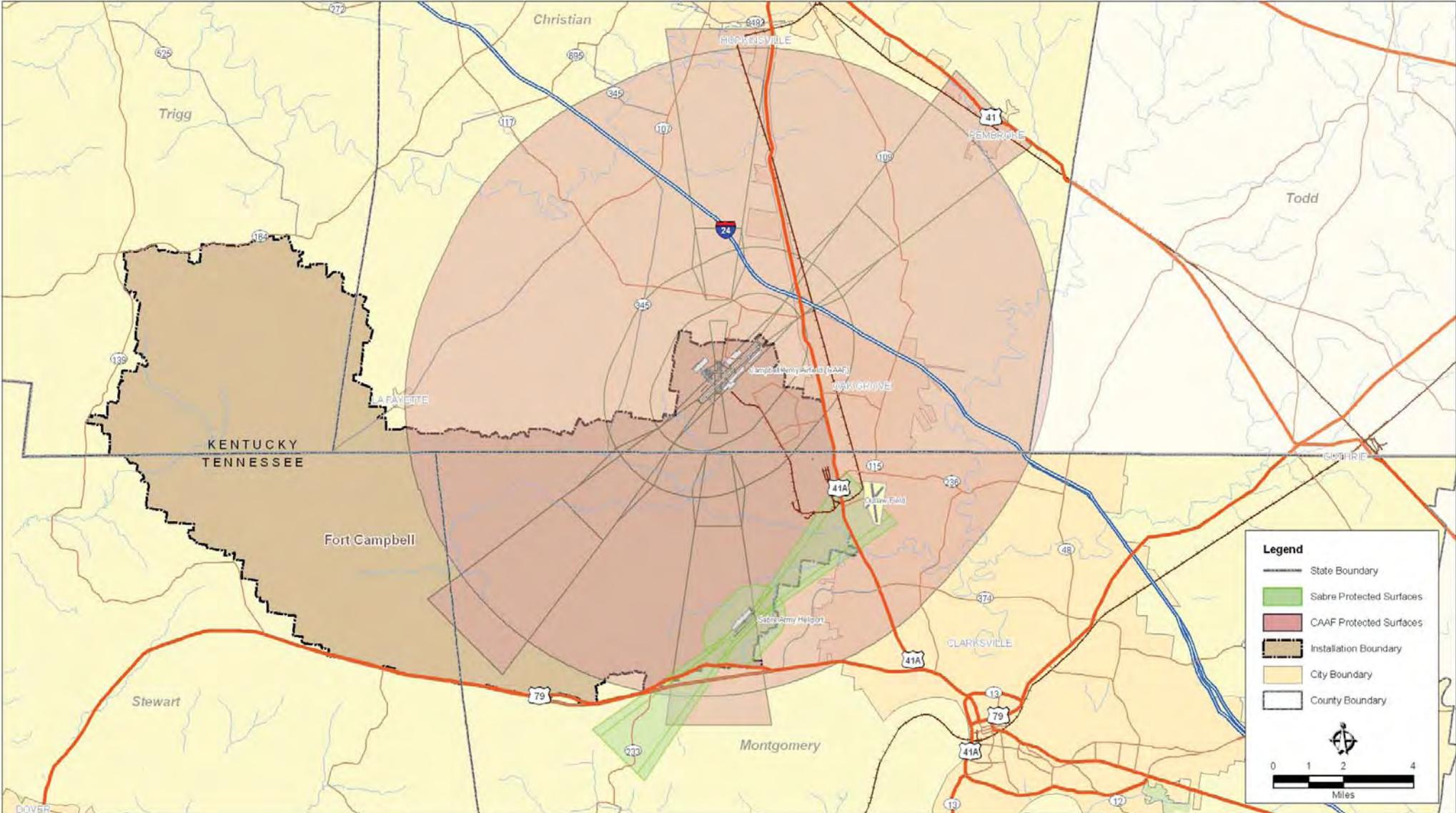
### Air Refuel Routes (ARs)

Air refuel routes permit aircraft to refuel while in flight. The capability to refuel while airborne enables aircraft with limited fuel ranges to fly long distances or long periods of time without landing for additional fuel. ARs can be established for fixed wing aircraft or helicopters. Helicopter routes are generally below 10,000 feet mean sea level (MSL) and fixed wing routes are normally above 20,000 feet MSL. Fort Campbell has nine established ARs.

### Exemptions

Exemptions are authorizations to deviate from Federal Aviation Regulations. Most exemptions are granted for national defense purposes or are in the public interest. Due to night vision device training, the Army has been granted an exemption to operate at night without lighted aircraft position lights. The exemption clarifies restrictions that the Army must meet to use the exemption. These restrictions ensure that non-participating military or civilian aircraft will be safely avoided by aircraft operating without position lights. The exemption, authorized in 1984, exists for select areas of airspace within 100 miles of Fort Campbell from the surface up to and including 500 feet above ground level.

**Figure 4** also graphically illustrates the Federal Aviation Administration regulated imaginary surfaces (based on departure and landing directions and traffic patterns) around CAAF and SAH. These imaginary surfaces are used to protect the airfield/airspace during landings and take-offs, and includes the Primary Surface, Runway Clear Zone, Accident Potential Zones I and II, Approach-Departure Clearance Surface, Transitional Surface, Inner Horizontal Surface, Conical Surface and Outer Horizontal Surface. Additional information about each area is contained in the technical appendix. It is essential to control the height of structures in these areas to minimize any physical interference with flight routes. The Army currently owns navigational easements (which restrict structure heights, exterior lighting and certain land uses) in a fan-shaped area (See **Figure 7**) that projects to the northeast of CAAF.



**Legend**

- State Boundary
- Sabre Protected Surfaces
- CAAF Protected Surfaces
- Installation Boundary
- City Boundary
- County Boundary

0 1 2 4  
Miles

**Figure 4**  
**Protected Airspace Surfaces for CAAF and Sabre Army Helicopter**

**RAIL CAPABILITIES**

Rail is the primary method of deploying equipment to the Port of Debarkation. Fort Campbell has 17 miles of on-post track, 10 ramps, and a concrete staging area, supporting a rail operation facility that can process 240 railcars in a 24 hour period. The track connects to the CSX main line.

**LINE HAUL ROUTE CAPABILITIES**

Fort Campbell is within four miles of Interstate 24. The post has the capacity to load 160 commercial carriers in a 24 hour period for transport along the interstate system to the Port of Debarkation.

**BARGE ROUTE CAPABILITIES**

The Army maintains a barge facility on the Cumberland River, approximately 20 miles from Fort Campbell. The barge can transport rolling stock, containers and aircraft, primarily for training deployments.

Summary of Land Use and Training Facilities at Fort Campbell		
TABLE 6	Training and Maneuver Areas	64,000 acres
	Impact Areas	26,000 acres
	Built-up Areas (Cantonment)	15,000 acres
	Facilities	3,918 buildings/structures
	Artillery Firing Points	130
	Basic Weapons Marksmanship Ranges	45
	Live Fire Maneuver Ranges	21
	Observation Points	7
	Drop Zones/Landing Zones	5
	Military Operations Urban Terrain (MOUT) Training Facilities	15
	Modified Qualification Training Ranges	4
	Shoot Houses	7
	Urban Assault Course	
	Demolition Range	
	C130 Flight Landing Strip (Golden Eagle)	
	Campbell Army Airfield	
	Special Operations maneuver range	
	Multi-Purpose Range Complex(MPRC)(RG28)	
	Sabre Army Heliport	
	Distributed Learning Center	
	Multipurpose Training Range (RG46)	
	Special Forces Training Complex	
	School of Combat Medicine	
	Flight Simulators	
	Convoy Live-Fire Training Site	
	Breach Facility (RNG 44)	

Since 1999, Fort Campbell has undertaken \$1.2 billion in construction activity to enhance Power Projection/Deployment capabilities, training facilities, barracks, force protection/physical security, housing, maintenance facilities, utilities, well-being/community facilities, and administrative/support facilities.

## MILITARY ECONOMIC IMPACT

Fort Campbell is a significant economic engine for the region and the largest single mobile employer in Kentucky and Tennessee. According to statistics for FY 2008, the installation circulated more than \$3 billion throughout the area, including direct payroll, construction, and contracts (See **Table 7**). The Army also estimates that over 14,000 soldiers and 40,000 family members live off-post in the Clarksville, TN-KY Metropolitan Statistical Area.

Total Economic Impacts in the Region, FY 2008		
TABLE 7	Major Construction	\$350 Million
	Appropriated Funds Contracts (Montgomery/ Christian)	\$45 Million
	Payroll	\$2.64 Billion
	Additional Sources	\$15 Million
	Total Economic Disbursement	\$3 Billion

Aside from the direct expenditures associated with salaries and contracts, military activity produces significant indirect economic impacts. Active duty and civilian employees, retirees, and dependents spend their paychecks on local goods and services, generating jobs in retail and other supporting sectors. Employers then hire more workers, who in turn make local purchases, further cycling dollars through the economic region. According to a fiscal analysis conducted by the Kentucky Commission on Military Affairs, a gain of 1,000 soldiers at Fort Campbell will result in 1,033 new jobs and a payroll increase of \$30 million in the State of Kentucky alone. The overall estimated employment multiplier associated with the number of military personnel assigned to a military installation typically ranges from 1.08 to 1.80. This means that for each 100 military personnel assigned to the post, the private sector will create between 108 and 180 permanent new jobs. Conservative estimates indicate that Fort Campbell had an additional multiplier impact on the region of at least \$500M in FY08 (based on FY08 payroll figures).

Combat pay further accelerates the multiplier effect within the regional economy by generating more disposable income for military families. As a result of their last deployment, members of the 101st Airborne Division received increased take-home income of approximately \$180 million due to tax-free income/combat pay during deployment. Soldiers also received \$53 million in retention bonuses in FY08.

The Clarksville-Montgomery County Economic Development Council completed a Labor Market Assessment for the Fort Campbell region in May of 2007. The study identified the skilled and

talented potential workforce of Army retirees and spouses as one of the region's strongest economic assets. Retention statistics reinforce the positive relationship between quality of life on the installation and in the surrounding communities. The 101st Airborne Division/Fort Campbell had the highest re-enlistment rate in FY06 with over 60 percent of re-enlisting soldiers choosing to remain at Fort Campbell.

## FUTURE MISSION

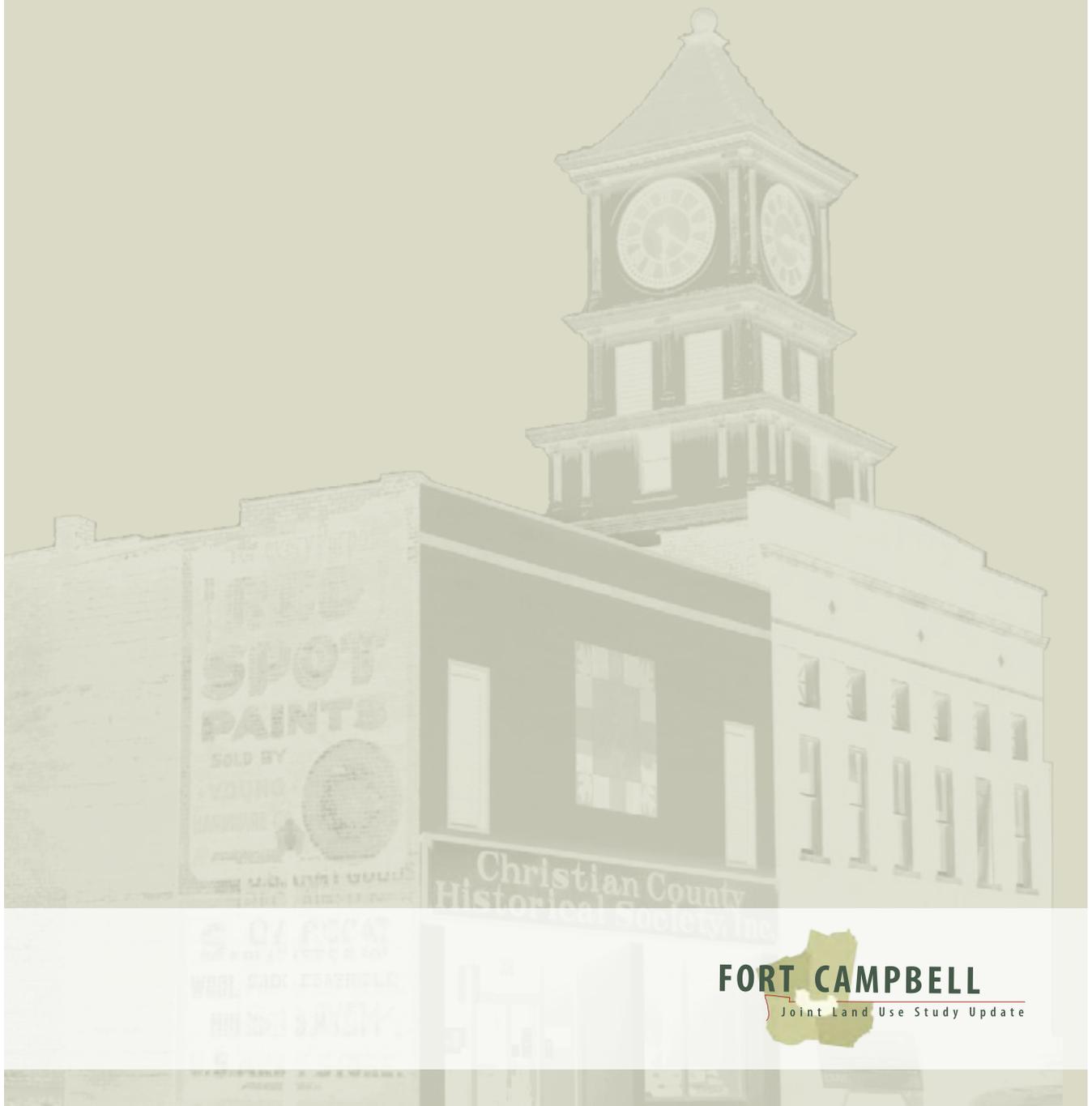
The convergence of several major DoD and Army initiatives has heightened the high operational tempo of the post. The Base Realignment and Closure decision, Global Defense Posture Realignment, Army Modular Force, and the Global War on Terror Support have resulted in a net increase of over 7,000 personnel at Fort Campbell since 2003. Under the latest Army projections, Fort Campbell will continue to support around 30,000 soldiers.

Currently, the planned force modernization and mission transformation are not expected to affect training requirements for ranges or maneuver areas. However, these efforts will likely continue demanding the heavy use of installation facilities into the foreseeable future. The installation has plans for the construction of a number of major range and training facilities through 2013, including the Automated Sniper Field Fire Range, Rappelling Training Area, Infantry Squad Battle Course, Scout Gunnery Range, Shoot House, Urban Assault Course, and Range Operations Command and Control Complex.





# 3.0 Regional Demographics and Growth Trends



**FORT CAMPBELL**

Joint Land Use Study Update



## REGIONAL OVERVIEW

Once in a primarily rural area, Fort Campbell is now part of the Clarksville, TN-KY Metropolitan Statistical Area (MSA), which includes the four counties of Montgomery, Christian, Trigg, and Stewart. The four counties comprise a total land area of more than 1.4 million acres. This JLUS is focused primarily on land within the Area of Concern (AOC) in proximity to training operations and aviation activity conducted at and around Fort Campbell. The AOC covers more than 255,000 acres beyond the installation boundary. As shown in **Table 8**, the surrounding counties have 15 to 20 percent of their total land area inside the AOC, and thus potentially subject to operational impacts associated with the military mission.

TABLE 8	COUNTY	ACRES	AOC ACRES	% ACRES IN AOC
	TN			
	MONTGOMERY	348,104	66,765	19.18%
	STEWART	315,658	49,477	15.67%
KY				
	CHRISTIAN	463,479	92,712	20.00%
	TRIGG	307,985	46,471	15.09%
	<b>TOTAL</b>	<b>1,435,226</b>	<b>255,425</b>	

## POPULATION GROWTH

The presence of Fort Campbell, including the large number of military retirees and families drawn to the area, the comparatively low cost of living, and continued exurban growth from Nashville have all combined to spark regional expansion. According to the Clarksville-Montgomery County Economic Development Council, the MSA will grow significantly over the next decade, reaching a population of approximately 323,000 by 2020 (See **Table 9**).

According to the Tennessee and Kentucky state data centers, the Clarksville MSA is likely to gain over 100,000 net new residents by 2025, equaling a rate of about 5,000 new residents annually for the next 20 years. Moreover, the gains will accelerate over each consecutive five-year period, culminating with a net increase of 27,000 residents between 2020 and 2025. Montgomery County will absorb most of the growth, adding over 20,000 residents between 2020 and 2025.

TABLE 9		1990	2000	% CHANGE 90-00	2010	% CHANGE 00-10	2020	% CHANGE 10-20
		MSA	169,439	207,033	22%	271,793	31%	323,872
	CHRISTIAN COUNTY	68,941	72,265	5%	80,199	5.7%	90,981	6.7%
	CITY OF CLARKSVILLE	75,494	103,455	37%	126,901	23%	155,817	23%
	MONTGOMERY COUNTY	100,498	134,768	34%	163,927	22%	202,680	24%
	STEWART COUNTY	9,489	12,068	27%	14,595	21%	16,960	16%
	TRIGG COUNTY	10,361	12,597	22%	14,016	11%	15,455	10%

Source: Historical and Projected Populations for State of Kentucky, Area Development Districts, and Counties; UT Center for Business and Economic Research; Source: Clarksville-Montgomery County Economic Development Council; Hopkinsville-Christian County Planning Commission



The Kentucky State Data Center and Hopkinsville-Christian County Planning Commission also project steady localized growth in areas north of Fort Campbell. While still primarily rural in character, both Trigg and Stewart Counties also show steady growth rates that could result in the increased risk of land use conflict along the western edge of the installation.

**Figure 5** shows population density around Fort Campbell as of 2005. The highest regional densities are along U.S. Highway 41A adjacent

to the installation's cantonment area and in the urban cores of Clarksville and Hopkinsville. Other significant pockets of housing posing a higher risk of encroachment are along the far eastern portion of U.S. Highway 79 near SAH and in the City of Oak Grove in proximity to CAAF operations.

## COUNTY PROFILES

### MONTGOMERY COUNTY, TN

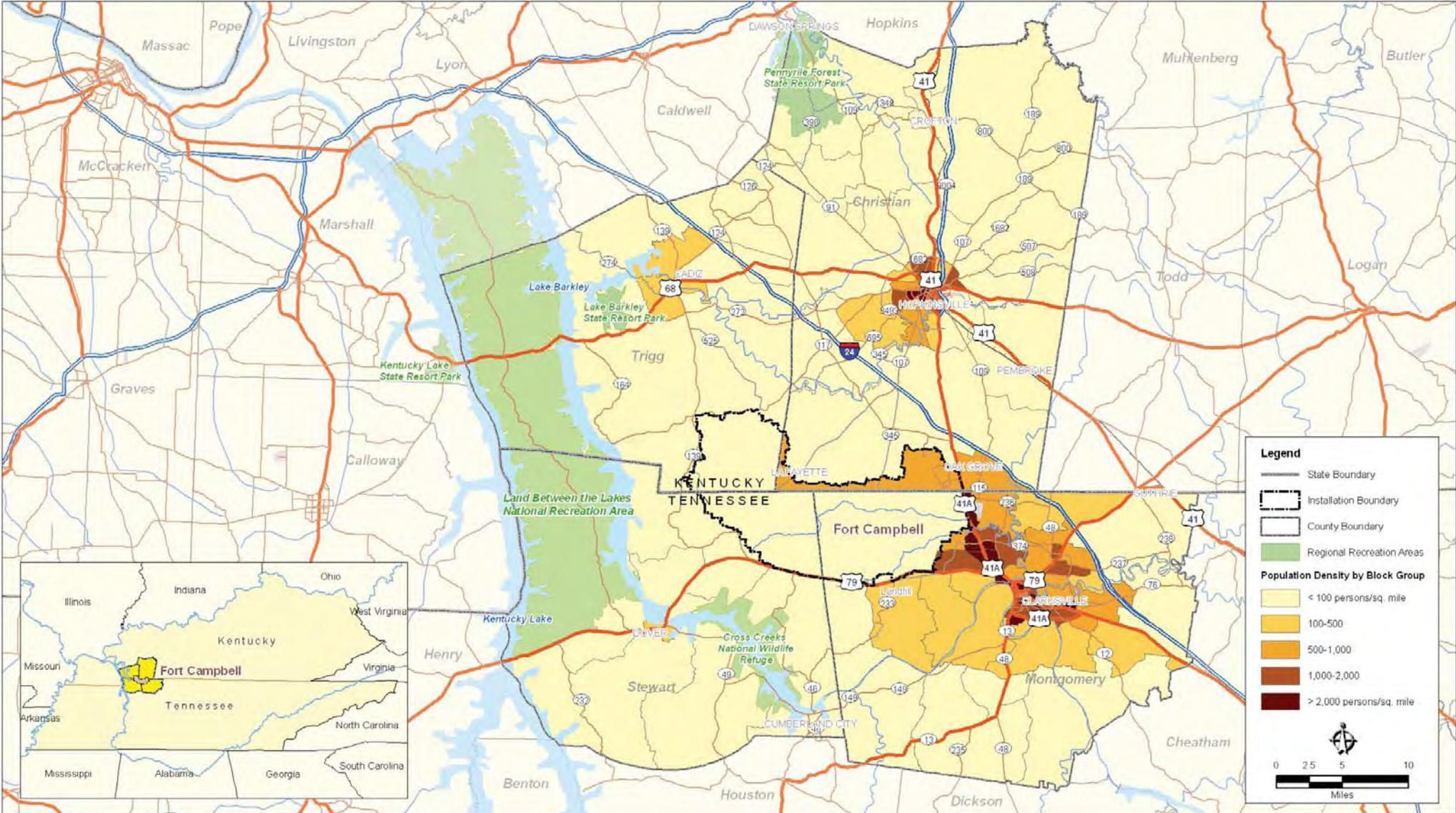
Montgomery County, which lies 40 miles northwest of Nashville, is 543 square miles. The county seat and regional urban center of Clarksville is Tennessee's fifth largest, and one of the state's fastest growing cities. Montgomery County has grown beyond its original agricultural roots to become a major transport, industrial, retail, and professional center in the state. The county is home to many Fort Campbell personnel, the students and faculty of Austin Peay State University, and a vibrant cultural and outdoor recreational scene focused around historic downtown Clarksville and the Cumberland River. Clarksville-Montgomery County lies to the east and south of Fort Campbell with approximately 19 percent of its land area falling within the JLUS Area of Concern.

### STEWART COUNTY, TN

Stewart County, set along the Cumberland River, is celebrated for its cultural and outdoor recreation amenities, including the Fort Donelson National Battlefield and Cemetery, Cross Creeks National Wildlife Refuge, Lake Barkley, Kentucky Lake, Land between the Lakes National Recreation Area, Dover City Lick Creek Park, Dyer's Creek Park and Paris Landing State Park. This mostly rural county has a total land area of 493 square miles and contains a significant proportion of federally owned land. Its two municipalities are the county seat of Dover and Cumberland City. Stewart County sits to the southwest of the post. The JLUS Area of Concern encompasses about 15 percent of county land.

### CHRISTIAN COUNTY, KY

Christian County, Kentucky, which lies north of the Kentucky/Tennessee border is one of the nine counties in the Pennyrile Area Region in Western Kentucky. Its county seat and major municipality



**Legend**

- State Boundary
- ▭ Installation Boundary
- ▭ County Boundary
- Regional Recreation Areas

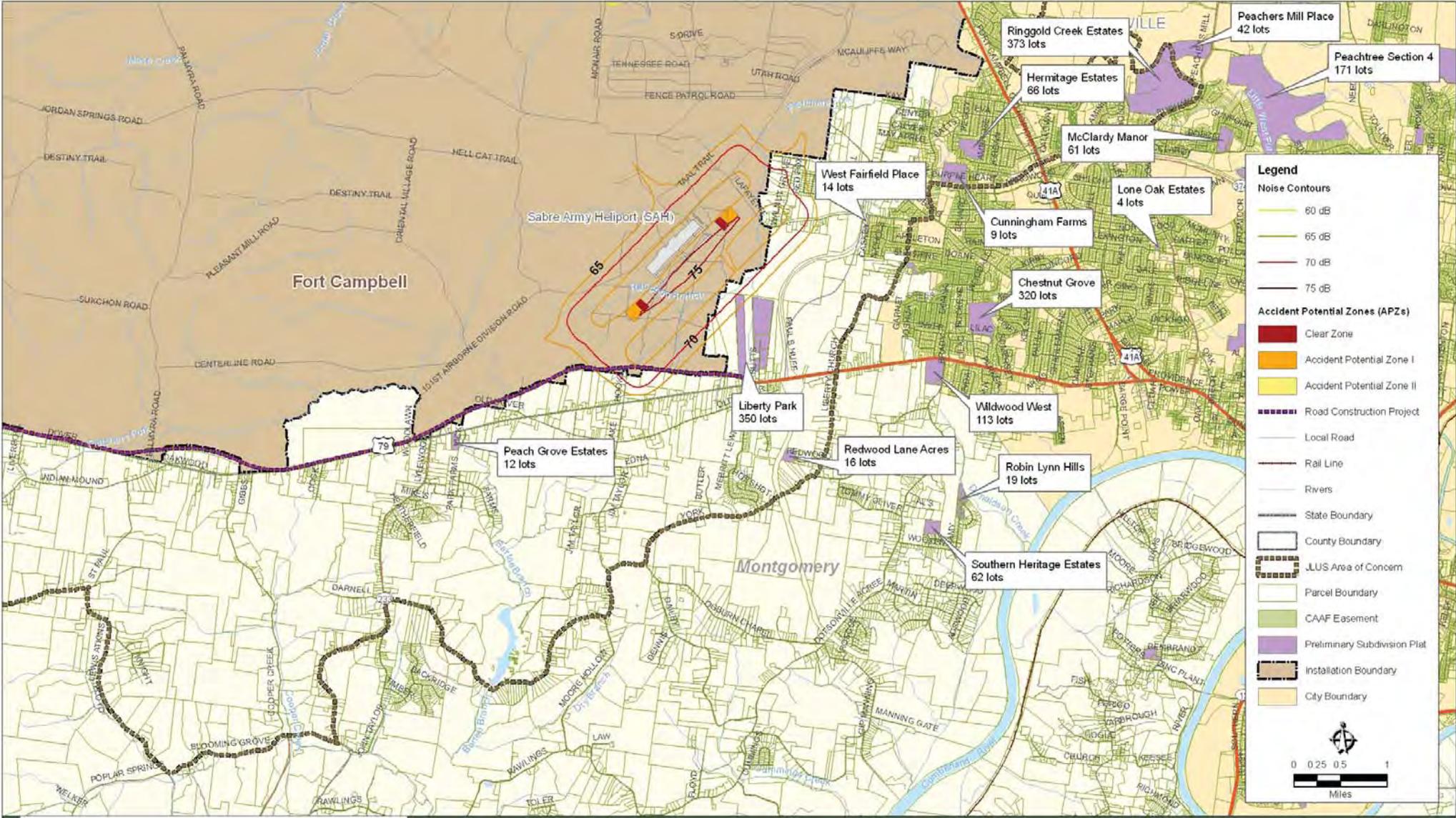
**Population Density by Block Group**

- < 100 persons/sq. mile
- 100-500
- 500-1,000
- 1,000-2,000
- > 2,000 persons/sq. mile

0 2.5 5 10  
Miles

**FORT CAMPBELL**  
Joint Land Use Study Update

**Figure 5**  
**Population Density - 2005**



**Figure 6**  
Recent Development Activity - Sabre Army Heliport Sub-Area

is the City of Hopkinsville, a retail hub for the southwestern part of the state, and the setting for culture and historic architecture. Other municipalities include: Oak Grove, Crofton, LaFayette, and Pembroke. Christian County has a healthy base of jobs in the manufacturing, agriculture, and distribution sectors, and historic ties to Fort Campbell, which lies to its south. Given its proximity to the installation, the City of Oak Grove in particular has a strong military presence within the community. The county is geographically diverse with a total land area of 724 square miles, 20 percent of which are inside the Area of Concern.

### TRIGG COUNTY, KY

Trigg County, KY, whose southern border is the State of Tennessee, is 421 square miles in area and contains a portion of the Land between the Lakes recreation area and the Lake Barkley State Resort Park. Its county seat is the historic community of Cadiz. Along with neighboring Christian County to the east, Trigg County is a member of the nine-county Pennyriple Area Development District. The county lies to the northwest of the installation and has about 15 percent of its land area inside the Area of Concern.

## RECENT DEVELOPMENT ACTIVITY

The community of Clarksville to the east of the post is the fastest growing of the region's population centers. The city's residential and commercial development is along the US 41A corridor across from the post cantonment area and currently buffered from the installation's airfields and ranges. Southeast Clarksville (near the I-24 Exit 4) also has strong commercial growth. The most significant trend shaping compatibility issues near the installation is the demand for residential housing that is increasing pressure to develop the remaining farms and wooded areas on the urban edge. In Clarksville-Montgomery County, the Planned Growth Areas near Exits 1 and 4 continue to absorb growth. In the future, developers may seek opportunities for further residential development in Planned Growth Area # 1 just south of the installation and adjacent to SAH. See **Figure 6**.

The communities north of Fort Campbell are also expanding. In the late 1990s, the City of Hopkinsville annexed an 11-mile corridor along U.S. Highway 41A, bringing its corporate limits to within one mile of CAAF. Annexation has already spurred construction along the corridor, including a Wal-Mart Distribution Center, new residential subdivisions, such as Windmill Farms, and several commercial uses. The corridor will continue to draw development south toward Fort Campbell. Also in Hopkinsville, a developer has purchased two small tracts of land around Bell



Station Road just north of CAAF and has built 20-25 houses along the road. The Army holds an existing easement on a portion of one tract, limiting further development. One of the largest planned developments in the region is the 2,000-acre Interstate 24 Industrial Park just north of the I-24/41A interchange. Currently optioned by Hopkinsville Industrial Foundation, the site sits between Exits 86 and 89 along the I-24 corridor. Developers are seeking a single industrial tenant, such as an automobile plant, for the site. The land currently lacks access to water, sewer, or gas

infrastructure along its southern boundary and would have to connect to existing utility systems along 41A.



The lack of wastewater treatment has historically acted as the major drag on growth in the City of Oak Grove. Facilities operate at 64 percent of available sewer capacity. Despite infrastructure challenges, the city has issued permits for 1,300 new houses. The Hopkinsville Water Environment Authority has proposed to purchase the Oak Grove wastewater collection

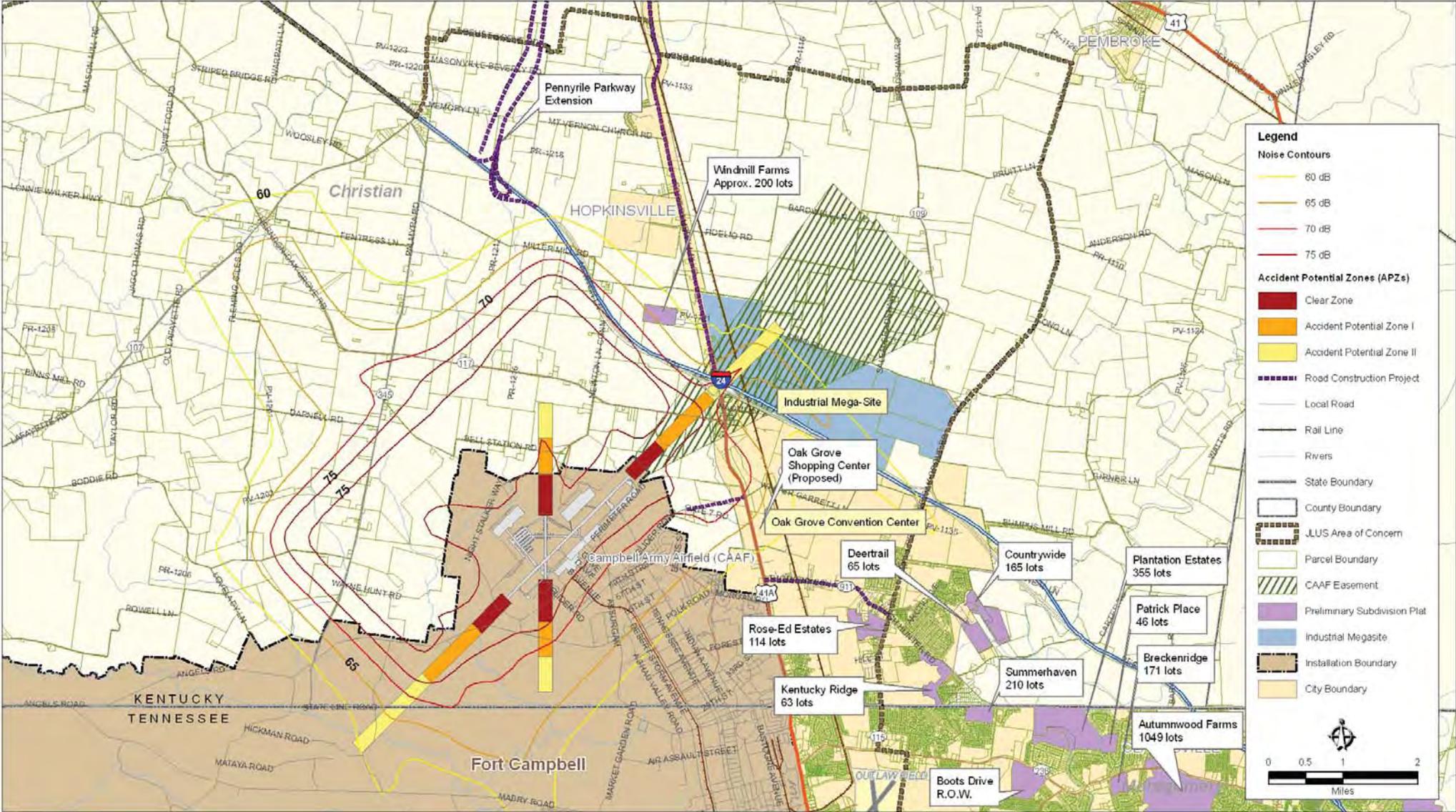
system and treatment plant as part of FY 2010 Project Priority List for the Kentucky Clean Water State Revolving Fund. A development by the Oak Grove Tourism Commission on Walter Garrett Lane off of 41A just east of CAAF will feature a walking trail, playground, city amphitheater, and convention center. The War Memorial Walking Trail and entertainment pavilion are under construction as of 2009. The city also has a proposed open-air pedestrian mall/shopping center planned along 41A near Gate 7. Staff at Oak Grove also noted new development along KY Hwy 911 (Thompsonville Lane), including residential with pockets of commercial and big box retail.

The relatively recent expansion of US 41A to six-lanes has also facilitated commercial activity along the corridor, increasing pressure to convert the unincorporated farmland west of US 41A into more intense residential and retail uses. See **Figure 7**.

Growth to the west Fort Campbell in Stewart County, Tennessee and Trigg County, Kentucky has been slow relative to other parts of the region. The area's appealing rural character and inexpensive land costs have, however, continue to attract scattered development and new strip residential housing focused along county roads.

## REGIONAL INFRASTRUCTURE

Infrastructure, particularly roads and wastewater treatment, strongly influence private property investment decisions and thus overall land use patterns within a region. System extensions enable development in previously rural areas and increased capacities can accommodate bigger scale uses. The tendency of growth to spread to rural/agricultural areas at higher intensities is the primary factor driving land use conflicts around military installations.



**Figure 7**  
Recent Development Activity - Campbell Army Airfield Sub-Area



The current regional transportation network consists of I-24, a major northwest-southeast interstate route through southern Illinois, Kentucky, and Tennessee linking Nashville to Clarksville; US 41A, which runs north-south along the eastern border of the post and provides primary access to Fort Campbell's gates; and US 79, which runs east-west parallel to the post's southern boundary, connecting Clarksville to Dover. Interstate 24 has eight interchanges between Exit 11 in Tennessee and Exit 65 in Kentucky, forming some of the major commercial development nodes in the Clarksville-Hopkinsville metropolitan area. US 41A is a burgeoning commercial corridor that connects Clarksville, Oak Grove and Hopkinsville. Other significant roads in the regional transportation system include the Pennyriple Parkway, running north-south between the Kentucky cities of Hopkinsville, Madisonville, and Henderson; US 41, which connects Nashville to Hopkinsville east of I-24; and US 68, linking the cities of Cadiz and Hopkinsville north of the installation.

In the Fort Campbell region, several major transportation projects will support additional growth, particularly in areas to the northeast and south of the installation (See **Figure 8**). The extension of the state arterial highway, Pennyriple Parkway, from Hopkinsville to I-24 will extend the availability of utilities, thus potentially anchoring more intensive land uses in an area about 2 ½ miles north of CAAF. This area is also likely to emerge as a major commercial hub given interchange access to the interstate. Phase I of the two-to-three year project, the Eagle Way bypass, is currently underway. The likely effect of these combined projects is to draw more growth southward from the City of Hopkinsville toward aviation related activities associated with CAAF.

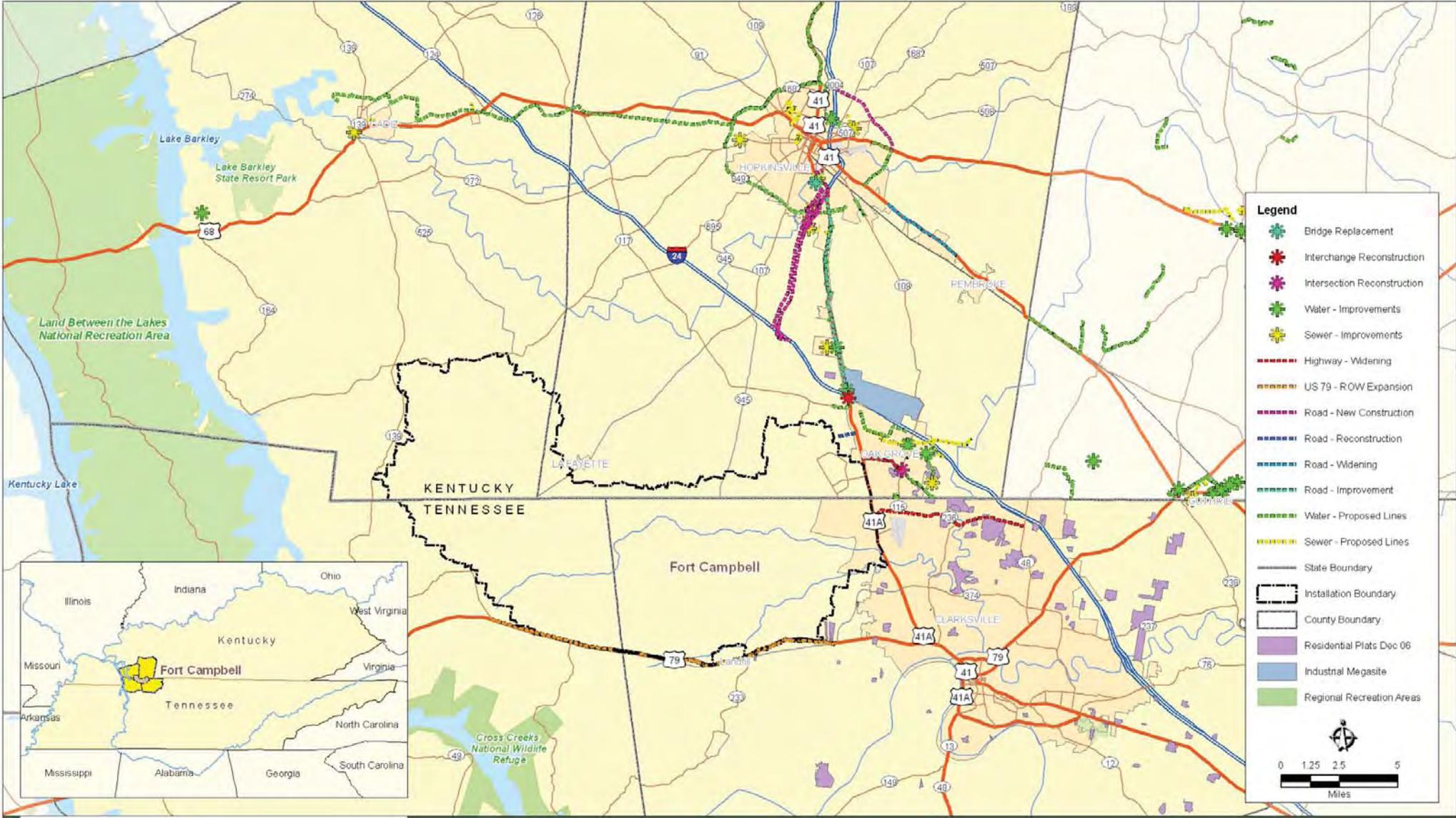
Also to the east of the post in the City of Oak Grove, the Kentucky Department of Transportation is currently designing a project to widen KY911 to five lanes. Along with transportation improvements, Oak Grove has connected to the wastewater infrastructure of the City of Hopkinsville. Since constraints on wastewater availability have previously limited growth in Oak Grove, increased treatment capacity will very likely spur further development. Utility providers have planned

various other improvements focused particularly around Hopkinsville and Oak Grove, reflecting significant development pressure in these areas north and east of CAAF.

One of the region's most significant current transportation initiatives is the widening of U.S. Highway 79, an east-west arterial that parallels the southern boundary of the installation. Previously a rural two lane highway, the expanded four lane corridor will now be able to attract additional commercial and residential development in proximity to SAH and several adjacent installation training areas.

While much of the infrastructure analysis focuses on the tendency of increased capacity to induce potentially incompatible growth around Fort Campbell, the post and surrounding communities also have opportunities to enhance performance and achieve efficiency through the joint delivery of regional services. One of the best examples is the Bi-County Landfill on U.S. Highway 79. The facility provides Montgomery County, Stewart County, and Fort Campbell with over 100 years of solid waste disposal capacity.





**Legend**

- Bridge Replacement
- Interchange Reconstruction
- Intersection Reconstruction
- Water - Improvements
- Sewer - Improvements
- Highway - Widening
- US 79 - ROW Expansion
- Road - New Construction
- Road - Reconstruction
- Road - Widening
- Road - Improvement
- Water - Proposed Lines
- Sewer - Proposed Lines
- State Boundary
- Installation Boundary
- County Boundary
- Residential Plats Dec 06
- Industrial Megasite
- Regional Recreation Areas

0 1.25 2.5 5  
Miles



**FORT CAMPBELL**  
Joint Land Use Study Update

**Figure 8**  
**Regional Infrastructure Projects**

# 4.0 Operational Impacts and Hazards



**FORT CAMPBELL**

Joint Land Use Study Update



## OVERVIEW

As with all active military installations, routine training and readiness activities at Fort Campbell produce various impacts that can affect the quality of life in surrounding communities. Conversely, these military operations are susceptible to physical hazards created by certain proximate civilian activities or to complaint due to the sensitivity of affected nearby uses.

The planning team consulted with the Technical Coordinating Committee (TCC) and interviewed regional stakeholders to identify key impacts from a broader list of potential compatibility issues, including:

- exposure of residents to noise associated with aviation operations
- exposure of residents to noise associated with large arms training
- vibration and dust from training activities
- smoke from prescribed burns on the installation
- exposure of residents and businesses to the risk of an aircraft accident
- vertical structures that protrude into the controlled airspace around the post
- competition for use of the electromagnetic spectrum
- outdoor lighting systems, especially streetlights or exterior security lighting associated with large buildings that allow significant light to travel upward into an otherwise darkened sky; the resulting “light pollution” can obscure pilot vision or interfere with the use of night vision training devices
- activities that tend to attract large bird populations, such as landfills or open water
- activities that release substances into the air, such as steam, dust, or smoke that can impair aviator vision; examples of these activities are industrial plants, refineries, quarries, and sand or gravel pits
- the loss of threatened and endangered species, agricultural lands, and environmentally sensitive resources
- civilian radio frequency devices, such as those used by industry or public safety agencies that overlap with military radio frequencies, affecting on-board electronic systems and communications equipment
- transportation impacts on area roadways

Based upon feedback from the TCC and a review of existing conditions and key documents, such as the Army’s Installation Environmental Noise Management Plan (IENMP), the planning team identified the following issues as the primary threats to mission viability and regional quality of life:

- exposure of residents to noise associated with aviation operations
- exposure of residents and businesses to the risk of an aircraft accident
- visual interference with the night vision training environment associated with exterior lighting

These critical issues, which are described in more detail below, create a series of overlapping spatial patterns around the installation. As shown in **Figure 9**, noise exposure of 60 dB or higher (sufficient to intrude on daily activities) affects approximately 20,000 acres off post and over 400 acres of land fall under an Accident Potential Zone associated with CAAF (See **Figure 12**). **Table 10** indicates the number of acres off post that fall into noise or air safety zones associated with the Small Arms Impact Area, North-South Impact Area, and the airfields.

These areas of off-post impact form the basis for the Fort Campbell Activity Zones identified in the recommendations section of this report. The JLUS also includes a series of strategies to address additional issues that can affect the viability of the mission and regional well-being, such as the loss of threatened and endangered species habitat, agricultural lands, and environmentally sensitive resources due to unmanaged development.

## NOISE

Noise-generating training at Fort Campbell includes ground-based activities such as live-fire weapons training and unit convoy maneuvers, along with aviation activities, including air assault exercises and nap-of-the-earth flight procedures. For purposes of assessing noise impacts on the surrounding communities, the Installation Environmental Noise Management Plan (IENMP)

designates three zones reflecting annualized average decibel levels or day-night sound levels (DNL). It should be emphasized that these zones, which are graphically shown as contours on maps, are not discrete lines that sharply divide loud areas from land largely unaffected by noise. Instead these zones are planning tools that depict the general noise environment around the post based on typical activities. Areas beyond the three zones can also experience levels of noise deemed unacceptable depending upon such variables as training intensity or weather conditions.

The military measures noise in decibels (dB) and assigns a weighting based on the noise frequency and source. A-weighting, expressed as dBA, depicts higher frequency noise caused by small arms firing, aircraft use, and vehicle operations. C-weighting shows the low frequency noise and vibration associated with the firing of larger weapons systems (dBC). Noise in excess of 55 dB can become intrusive and continued exposure to noise above the 85 dBA threshold can, over time, cause hearing loss.

The contours around Fort Campbell reflect an annualized noise measure that converts noise varying from peak bursts to relative quiet into a steady measure of acoustic energy over a 24 hour period. The contours take all operations that occur at the military installation over the year and divide by 365 days, producing the average day-night sound level (DNL). The measure further “penalizes” or places a higher decibel value on

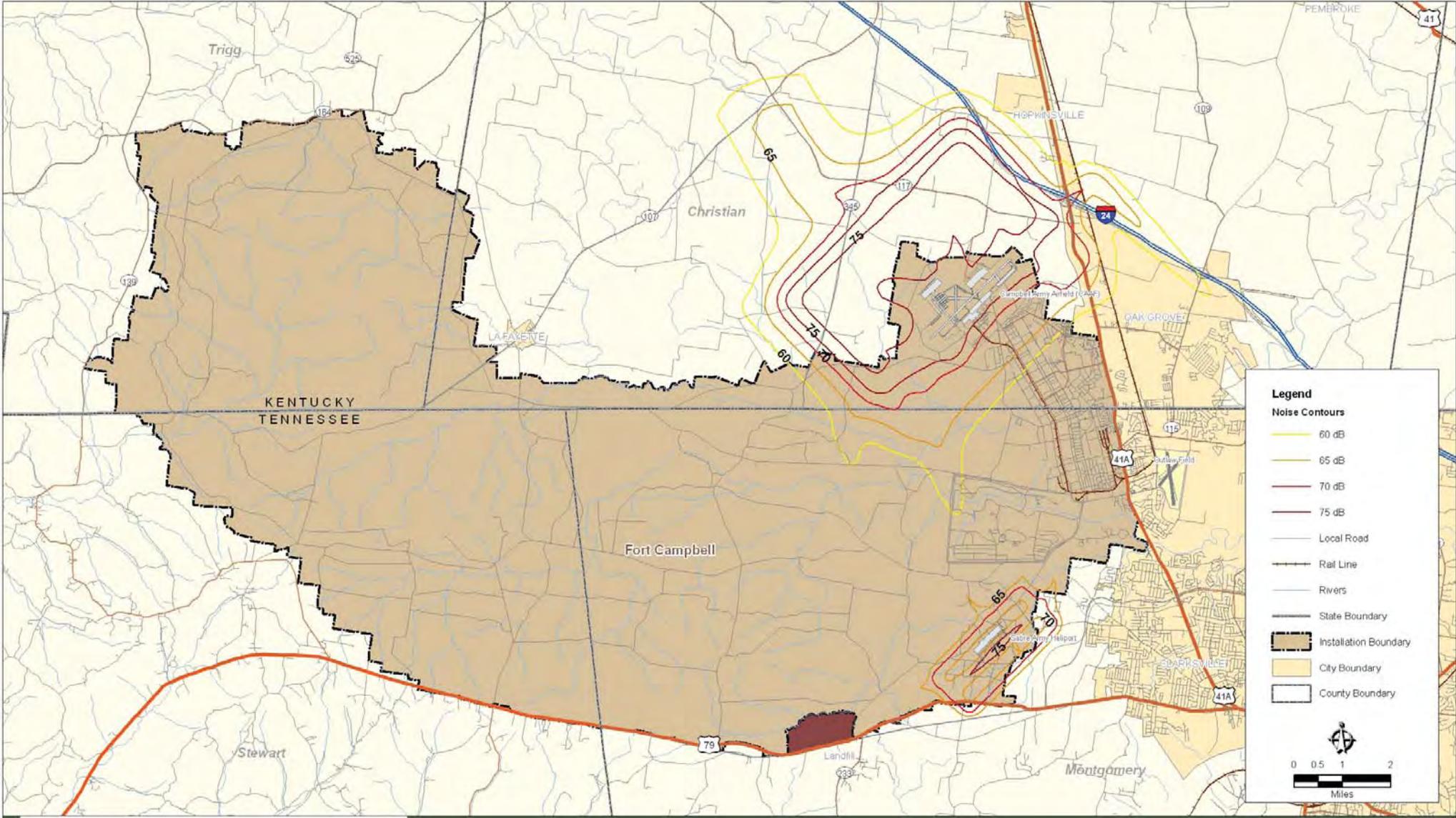
noise that occurs at night because it is more disruptive to the surrounding population. **Table 11** equates decibel levels with common sounds.

It should be noted that the noise modeling around CAAF and SAH give flexibility to the U.S. Army to accommodate increases in operational activity and to maintain the noise footprints on which local land use regulations are based for the foreseeable future. The contour limits for aviation and blast noise activities are 5 dB below Zone II levels and can better predict noise impacts when levels of operations at airfields or large caliber weapons ranges are above average.

**Land in Noise & Air Safety Affected Areas**

IMPACT	ACRES (outside FTC)
<b>CAAF Noise</b>	
60-65dB	6,086
65-70dB	4,099
70-75dB	7,417
75dB	2,137
<b>SubTotal</b>	<b>19,739</b>
<b>SAH Noise</b>	
65-70dB	302
70-75dB	233
<b>SubTotal</b>	<b>535</b>
<b>Accident Potential Zones</b>	
CAAF	433
<b>North Impact Area</b>	
57 -62 CDNL	3,984
<b>Small Arms Area</b>	
57 – 62 CDNL	425
62 – 70 CDNL	298
> 70 CNDL	22
<b>SubTotal</b>	<b>745</b>

TABLE 10



**Legend**

- 60 dB
- 65 dB
- 70 dB
- 75 dB
- Local Road
- Rail Line
- Rivers
- State Boundary
- Installation Boundary
- City Boundary
- County Boundary

0 0.5 1 2  
Miles

**Figure 9**  
Noise Contours for CAAF and Sabre Army Helicopter

Installations can also use peak noise data mapping to supplement the current method of day-night average noise modeling. Peak noise mapping contributes to an improved understanding of the noise environment around the post because it models the noise effects for the single burst of sound associated with a training event and reflects what people exposed to the noise actually hear, rather than a weighted average. Additionally, peak levels correlate well with complaint risk for individual firing activities. The Army's noise expert, US Army Center for Health Promotion and Preventative Medicine (USACHPPM) now recommends that installations use peak level data to measure the impacts of certain training activities.

**NOISE ZONE III.** NZ III consists of the area around the noise-generating activity in which the DNL exceeds 75 decibels for aircraft, vehicles, and small arms (A-weighted), and more than 70 decibels, C-weighted for weapon systems larger than 20-mm. The noise level within NZ III is severe enough to conflict with many civilian activities, particularly sensitive land uses, such as housing, schools, medical facilities, and places of worship.

**NOISE ZONE II.** NZ II consists of an area where the A-weighted DNL is between 65 and 75 decibels and the C-weighted DNL is between 62 and 70 decibels.

Guidance deems noise exposure within this area to be significant and recommends limiting use of land to non-sensitive activities such as industry, manufacturing, transportation, and agriculture. However, if the community determines that land in NZ II areas must be used for residential purposes, guidance suggests that the design and construction of the buildings incorporate noise level reduction (NLR) features to minimize annoyance.

**LAND USE PLANNING ZONE.**

The Land Use Planning Zone consists of an area where the day-night sound level (DNL) is between 60 and 65 dBA or 57 and 62 dBC. Exposure to noise within this area is considered significant during periods of increased operations. The LUPZ accounts for the variability of noise levels caused by

Comparable Noise Levels			
	SOUND	dBA	EFFECT
TABLE 11	Jet Engines (Near)	140	
	Shotgun Firing	130	
	Jet Takeoff	130	Threshold of pain (125 dBA)
	Thunderclap (Near)	120	Threshold of sensation (120 dBA)
	Power Saw (Chain Saw)	110	
	Jet Fly-over	103	
	Garbage Truck/Cement Mixer	100	Regular exposure for 1 minute or more risks permanent hearing loss
	Farm Tractor	98	
	Lawnmower, Food Blender	85-90	Level at which hearing loss begins (8 hour exposure)
	Recreational Vehicles, TV	70-90	
	Diesel Truck (40 Mph, 50 Fort)	84	
	Garbage Disposal	80	Annoyance; constant exposure may cause hearing loss
	Washing Machine	78	
	Dishwasher	75	
	Vacuum Cleaner	70	Intrusive, interference with conversation
	Hair Dryer	70	
	Normal Conversation	60-65	Comfortable (under 60 dBA)
Refrigerator Humming	40		
Whisper	30	Very quiet	
Rustling Leaves	20	Just audible	
Normal Breathing	10		
		0	Threshold of normal hearing (1000-4000 Hz)

higher daily numbers of operations than the annual average. It shows where levels of annoyance usually associated with Noise Zone II can be found during periods of increased operations. The LUPZ provides the installation with a means to predict possible complaints, and meet the public demand for a description of what will exist during a period of increased operations.

It should be noted that the other military services, through comparable AICUZ land use compatibility guidelines, already recommend that residential uses be considered as incompatible uses within the 65db-75db noise contour. This guidance further states that “Although local conditions regarding the need for housing may require residential use in these zones, residential use is discouraged. 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 within these Zones.”

### AVIATION

The high number of annual aircraft operations at CAAF generates noise levels beyond the installation that can interfere with the daily activities of nearby residents. Noise contours from 75+ to 65 dBA extend north from the airfield affecting portions of Oak Grove, Hopkinsville, and unincorporated Christian County (See **Figure 9**). With the equivalent of NZ II and NZ III exposure, these areas will experience aviation-related noise that poses conflicts for sensitive uses, such as housing, schools, offices or places of assembly. Similarly, activity at SAH produces NZ II equivalent noise exposure for areas just to the east and south of the heliport. The risk of noise related incompatibilities, however, is less for the post’s southern airfield due to the comparatively small area affected by operations. Fort Campbell also has two major low-level helicopter training routes, the Red and Blue Routes that mostly parallel the installation boundary. Due to high use and low flight levels, aircraft utilizing these two routes sometimes generate noise contours at noise zone II and III levels, contributing to significant noise exposure for areas adjacent to the post (see **Figures 10 and 11**). Noise contours along the Blue Route reach noise zone III at 150 feet from the centerline, noise zone II levels at 500 ft, and LUPZ levels at 800 ft. Noise contours along the Red Route reach noise zone III levels at 100 feet from the centerline, noise zone II levels at 300 feet, and LUPZ levels at 550 feet.

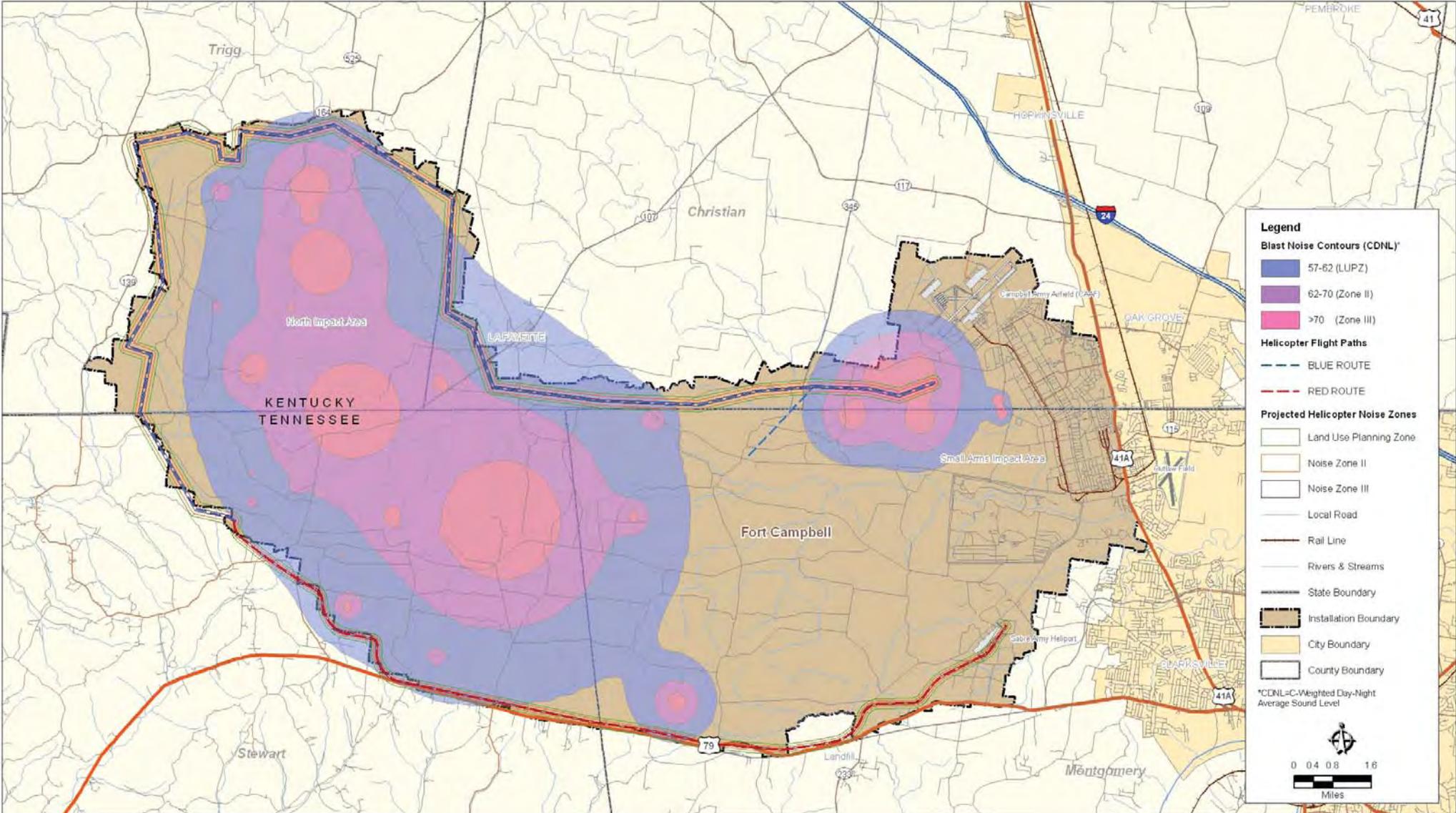
### SMALL AND LARGE ARMS

Live training exercises at Fort Campbell include the direct and indirect firing of both small and large arms systems, including:

- small arms (.30 cal and below) at the Small Arms Impact Area west of the cantonment area and south of CAAF
- artillery and mortar at the North and South Impact Areas
- tank gunnery at Ranges 28 (South Impact Area) and 46 (North Impact Area); training consists of tactical movements in combination with weapons fire to simulate battlefield
- aerial gunnery, including 7.62 mm door gun, 20 mm gun, 30 mm gun, inert TOW missile and HELLFIRE missile
- Grenade/Claymore Mines at Range 24, Ranges 26A and 26B (inert and high explosive), Ranges 25A and 47, and Range 1

As noted earlier, most of the noise issues at Fort Campbell are aviation, rather than arms related. Small arms range activities produce noise contours that extend beyond the installation boundary, but currently do not pose significant compatibility issues with surrounding uses. The firing of large





**Legend**

**Blast Noise Contours (CDNL)\***

- 57-62 (LUPZ)
- 62-70 (Zone II)
- >70 (Zone III)

**Helicopter Flight Paths**

- BLUE ROUTE
- RED ROUTE

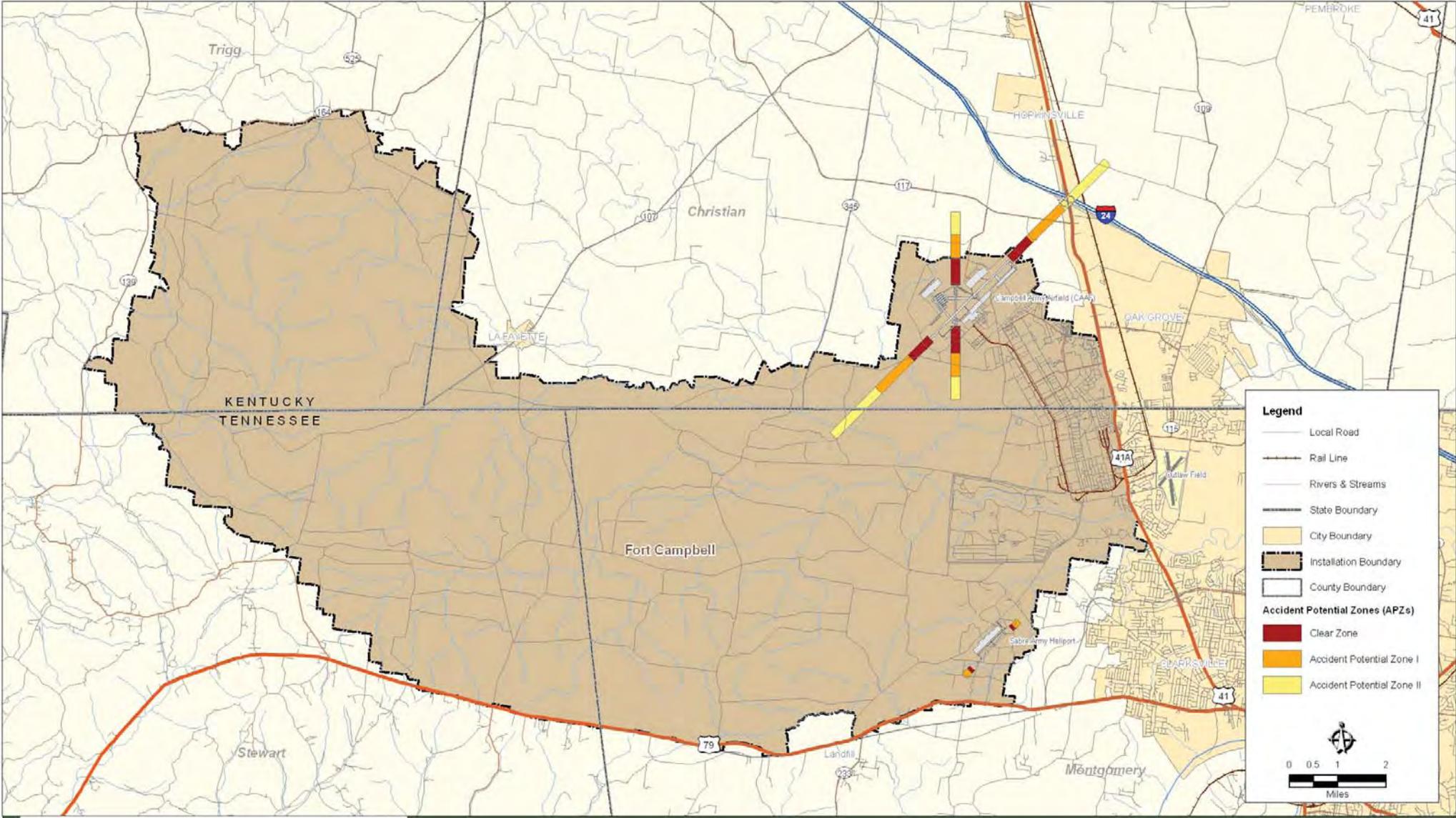
**Projected Helicopter Noise Zones**

- Land Use Planning Zone
- Noise Zone II
- Noise Zone III
- Local Road
- Rail Line
- Rivers & Streams
- State Boundary
- Installation Boundary
- City Boundary
- County Boundary

\*CDNL=C-Weighted Day-Night Average Sound Level

0 0.4 0.8 1.6  
Miles

**Figure 11**  
Large Caliber Weapons and Projected Helicopter Training Noise Contours



**Legend**

- Local Road
- Rail Line
- Rivers & Streams
- State Boundary
- City Boundary
- Installation Boundary
- County Boundary

**Accident Potential Zones (APZs)**

- Clear Zone
- Accident Potential Zone I
- Accident Potential Zone II

0 0.5 1 2 Miles

**Figure 12**  
Accident Potential Zones for CAAF and Sabre Army Helicopter

caliber weapons (20mm and greater) can, however, affect areas off-post, particularly portions of Stewart County to the south and Christian County and communities such as Lafayette to the north (see **Figure 11**). The new EOD units at Fort Campbell will likely increase the number of blast-related training activities conducted on-post, which may lead to a higher incidence of noise levels heard off-post.

## AIR SAFETY

In addition to noise, the IENMP assesses the potential hazards associated with aviation activity. Military airfield planning analyzes historical data on military aircraft accidents to determine where a mishap is most likely to take place and the size of the area likely to be affected. The analysis does not assess the statistical probability of an accident, which is a very low risk, but high consequence occurrence for both pilot and nearby civilians. The findings of the analysis result in three air safety zones around the airfield.

**CLEAR ZONE (CZ).** The CZ is an area 1,000 feet wide by 3,000 feet long at the immediate end of a Class B runway. The CZ for a Class A runway is an area 1,000 feet wide by 3,000 feet long. CAAF has both Class A and Class B designated runways. The primary runway at CAAF, 05-23, is a Class B runway, and the secondary runway, 18-36, is Class A. The accident potential in these areas is sufficient to warrant the prohibition of any structures in the CZs. For safety reasons, the Army has the authority to purchase the land (or development rights) for these areas if they are not already part of the installation.

**ACCIDENT POTENTIAL ZONE I (APZ I).** APZ I is less critical than the Clear Zone but still possesses significant potential for accidents. The APZ I is just beyond the CZ, forming an area that is 1,000 feet wide by 2,500 feet long for a Class A runway and 1,000 feet wide by 5,000 feet long for a Class B runway. A wide variety of industrial, manufacturing, transportation, open space and agricultural uses can exist safely in this zone, though activities that concentrate people are not compatible.

**ACCIDENT POTENTIAL ZONE II (APZ II).** APZ II is the least critical of the three air safety zones, but still carries some risk of an accident. APZ II is 1,000 feet wide and extends 2,500 feet beyond APZ I for a Class A runway and is 1,000 feet wide by 7,000 feet long for a Class B runway. Compatible land uses include those of APZ I, as well as low density single family residential, and lower intensity commercial activities (See **Figure 7**). High density functions such as multi-story buildings and places of assembly (e.g., theaters, schools, churches and restaurants), however, raise compatibility issues.

The CAAF APZ I, APZ II, and CZs extend to the north and northeast beyond the installation boundary into Christian County. Notably, an APZ II lies over the interchange of I-24 and the 41A corridor. The CAAF Avigational Easements extends over the main runway and includes the CZ and both APZs for this approach. The air safety zones associated with SAH in contrast are fully contained on the post, thereby limiting aviation related risks on surrounding lands. (See **Figure 12**)

## LIGHT INTRUSION

Night vision flight training, in which aviators use night vision goggles (NVGs) or other types of night vision systems, is essential to the missions of the modern Army. The level of aircraft and personnel at CAAF and SAH makes Fort Campbell one of the most intensively used night vision training posts in the country. Night vision systems are designed to operate away from civilization and electric lighting. Exposure to stray light can cause the vision screen to white-out, temporarily robbing the aviator of vision. The light intrusion into the night vision device training environment of the post is a leading threat to mission capabilities. A later section discusses this issue in detail.

Historically, the performance of night vision systems has been based on percentages of full moon ambient light. While prior generations required at least some ambient moonlight, the current (3rd) generation of goggles performs effectively without any ambient moonlight. Currently, it appears that aviators cope with light pollution through experience and learning to look away or remove goggles to prevent loss of night vision.



# 5.0 Compatibility Analysis





## COMPATIBILITY GUIDELINES

The following analysis assesses the compatibility of existing civilian land uses around the installation. When compatible, land uses can exist next to each other without causing interference with military exercises or exposing people to undue safety risks or nuisance. In this JLUS context, Army training activities raise compatibility issues when next to the following nearby land uses:

- Noise sensitive uses, such as housing, schools, medical facilities or places of worship;
- Uses that tend to concentrate people (certain higher residential densities, certain retail/commercial uses, schools, churches, hospitals); and/or
- Uses as noted above that can interfere with safe air navigation, such as tall structures, or activities that throw off excessive lighting, smoke or dust and may impair vision.

For purposes of evaluating compatibility in designated noise and air safety zones, the JLUS draws guidance from Department of Defense and The Federal Interagency Committee on Urban Noise land use guidelines (FICUN 1980) as shown in **Tables 12** and **13**. Uses shown as “Y” are typically compatible with the level of noise exposure or safety risk associated with each particular zone. Use depicted as “YC” are conditionally compatible and may require further protection measures, such as indoor noise reduction. The guidelines deem activities shown as “N” as unacceptable within the given zones, indicating that strict prohibition of the use is the most appropriate regulatory action.

Land Use Compatibility Guidelines, Noise Contours A-Weighted							
TABLE 12	FICUN	NZ I		NZ II		NZ III	
		< 55 DB	55 to 65 DB	65 to 70 DB	70 to 75 DB	75 to 80 DB	80 to 85 DB
Households	Y	YC	YC	YC	YC	N	N
Manufacturing	Y	Y	Y	Y	YC	YC	YC
Retail – General	Y	Y	Y	Y	YC	YC	N
Restaurants	Y	Y	Y	Y	YC	YC	N
Personal Services	Y	Y	Y	Y	YC	YC	N
Hospitals	Y	YC	YC	YC	YC	N	N
Government	Y	YC	YC	YC	YC	YC	N
Education	Y	YC	YC	YC	YC	N	N
Public Assembly	Y	Y	Y	Y	N	N	N
Parks	Y	YC	YC	YC	YC	N	N
Agriculture	Y	Y	Y	YC	YC	YC	YC

Source: FICUN 1980    Y = Compatible; YC = Conditionally Compatible; N = Not Compatible

## NOISE GUIDANCE

In general, guidance as shown in **Table 12** states that housing is compatible with noise exposure up to DNL 55 dB (shown as Y). Standards indicate that with exposure between DNL 65–75 dB, additional protective measures, such as indoor noise reduction, for residential uses may be warranted (shown as YC). For conditionally compatible residential land uses, guidelines suggest consideration of the following factors:

- Is there a demonstrated community need for residential use that would not be met if development were prohibited in these zones?
- Where the community determines that residential uses are desired, structures should incorporate noise level reduction measures of at least 25 dB (65-70 ADNL) and 30 dB (70-75 ADNL).
- Noise level reduction criteria will not eliminate outdoor noise problems. However, building location and site planning, design, and use of berms and barriers can help mitigate outdoor noise exposure particularly from ground level transportation sources. Measures that reduce noise at a site should be used wherever practical in preference to measures that only protect interior spaces.

**TABLE 13**

**Land Use Compatibility Guidelines, Air Safety Zones**

LAND USE	CLEAR ZONE	APZ I	APZ II
Single Family Unit	N	N	YC
Multifamily Dwellings	N	N	N
Industrial/ Manufacturing	N	Y	Y
Trans, Comm and Utilities	YC	Y	Y
General Retail	N	N	Y
Restaurants	N	N	Y
Personal Services	N	N	Y
Other Services	N	N	Y
Government Services	N	N	YC
Educational Services	N	N	N
Cultural Activities	N	N	N
Medical Services	N	N	N
Churches	N	N	N
Playgrounds	N	N	Y
Regional Parks	N	YC	YC
Assembly Areas	N	N	N
Other Outdoor Recreation	N	YC	YC
Agriculture	Y	Y	Y
Livestock Farming	N	Y	Y
Forestry Activities	N	Y	Y
Permanent Open Space	Y	Y	Y

Guidelines deem noise exposure that exceeds DNL 75 dB to be incompatible (shown as N) with all residential uses. Many uses, such as manufacturing, retail, government facilities, and agriculture, however, can be suitable even within a relatively high noise setting.

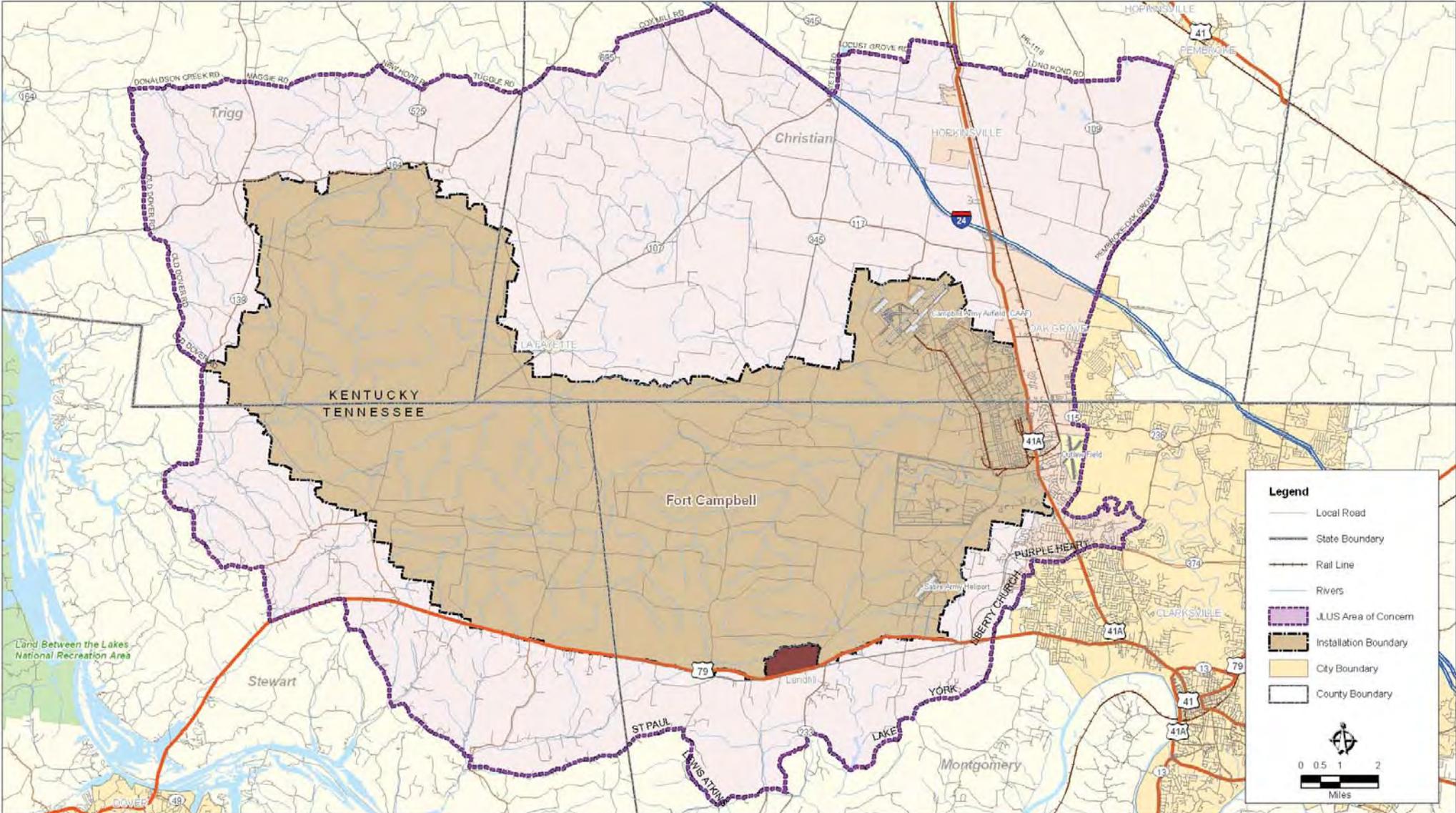
**AIR SAFETY GUIDANCE**

Guidance for the air safety zones indicates that the statistical risk of an aircraft mishap in the Clear Zone is sufficient to warrant a strict prohibition of structures and all land uses other than agriculture or protected open space. Though slightly lower in risk exposure, Accident Potential Zone I still limits suggested uses to open space, certain passive recreational uses, and some industrial and manufacturing activities. Accident Potential Zone II is the least restrictive of the air safety planning areas and can, according to the guidelines, safely accommodate housing in a very low density pattern and small scale retail operations. Compatibility standards recommend against placing any gathering spaces or uses that concentrate people in an air safety zone.

**AREA OF CONCERN**

In addition to the noise and accident potential zones, a broader JLUS Area of Concern (AOC) around the installation draws from Army guidance to highlight lands that may be periodically subject to noise or other military

related impacts (See **Figure 13**). The Area of Concern is based on specific Fort Campbell and U.S. Army parameters, but local government members of the TCC recommended modifying the AOC boundary to follow man-made features, such as roadways. Aligning the AOC with readily



**Figure 13**  
JLUS Area of Concern

distinguishable physical features facilitates use of the boundary as a planning tool and enables property owners to identify if their land falls within this designated area of possible impact.

## ANALYSIS OF CURRENT LAND USE COMPATIBILITY

As shown in **Figure 14**, most of the region's residential and commercial development is east of the post, focused along the 41A corridor and the eastern segment of U.S. Highway 79. The biggest risk of land use conflict is development that is directly adjacent to CAAF or falls below the airfield's overflight areas. New subdivisions just north of CAAF along 41A within the Area of Concern and new development east of 41A in Oak Grove and immediately north of I-24 in Hopkinsville also raise compatibility issues. An emerging pattern of strip commercial development and subdivisions along 41A poses an ongoing risk of light intrusion for CAAF operations.

The risk of light pollution and noise pose similar compatibility issues in the vicinity of SAH in the southeastern portion of the installation. Several new residential subdivisions are just outside of SAH's designated "light-sensitive" area, a 2-mile radius around the heliport critical for NVD operations. Several older manufactured housing developments also fall within the high noise environment around SAH.

Land in western Christian County, Trigg and Stewart Counties is primarily in use for agriculture or forestry. Scattered pockets of large lot residential and strip commercial activity line county roads adjacent to the installation, particularly along the northern and southern boundaries. Residents in these communities have noted noise from military overflights. Some established communities north of the post such as Lafayette also experience periodic noise from large arms firing.

## ANALYSIS OF FUTURE LAND USE COMPATIBILITY

While existing land use incompatibilities are not severe in most areas around the installation, growth trends combined with transportation and other infrastructure improvements signal an increasing risk of encroachment in two areas critical for the safe and effective performance of training and readiness activities:

- The area north of CAAF, particularly along the 41A corridor between Hopkinsville and Oak Grove; and
- That section of U.S. Highway 79 running parallel to the installation's southern perimeter, especially Clarksville's Planned Growth Area #1 in the vicinity of SAH.

Growth in the region has increased demand for housing in turn placing pressure on the market to convert farmland into housing and supporting commercial uses. A particular concern of Fort Campbell is that the rising cost and dwindling availability of lands east of U.S. Highway 41A will shift development west of the corridor in unincorporated rural lands directly adjacent to the installation. Similarly, the widening of the U.S. Highway 79 corridor and the limited capacity of other planned growth areas in Clarksville to absorb market needs are increasing pressure to develop on the western fringe of the city in proximity to SAH and its light sensitive zone.

Development in both areas could significantly compromise the training and deployment mission of the installation, resulting in the loss of flight corridors, less realistic training, and reduced operating

hours at airfields and firing ranges. For example, as nearby housing exceeds a density threshold of 2 to 3 residential dwellings per acre aviators must fly above 1,000 AGL (above ground level), effectively eliminating the ability to conduct nap-of-earth and other low-level flight operations.

Growth in portions of western Christian, Trigg and Stewart Counties remains mostly scattered. The absolute number of people living near the installation represents only one dimension of possible land use incompatibility. New residents drawn to large lot home sites or ranchettes introduce the demographics associated with amenity-based development. Some of these residents may be unaccustomed to the noise produced by firing range activity and aircraft operations conducted along the installation perimeter.

## LAND USE COMPATIBILITY ASSESSMENT

Existing and future land use plans were compiled from planning documents prepared by the municipal, county, and regional planning agencies operating in the four-county region, and analyzed within the JLUS Area of Concern by the planning team. By far the most common existing land use (ELU) within the AOC is Agriculture/Vacant, which comprises over 77% of the total

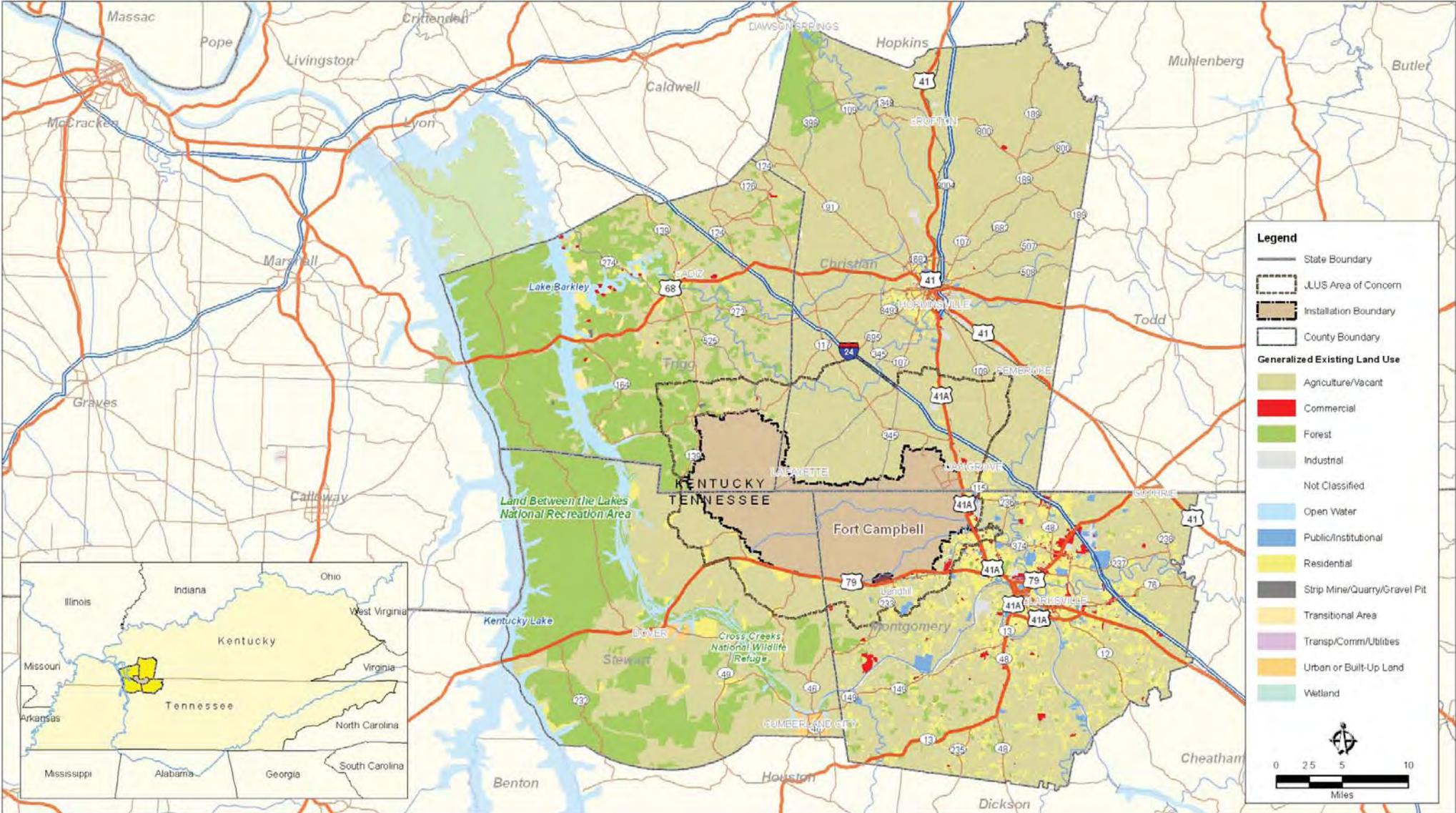
land area, not including Fort Campbell (see **Table 14**). Future land use (FLU) plans anticipate that some of this land will transition to other land uses while still remaining the most significant land use within the AOC. Residential land use will grow most substantially in the AOC, shifting from 6.27% of the total in existing land use to 10.34% in future land use plans. This trend bears particular importance for future land use compatibility, as residential land uses are the most sensitive with regards to military operations.

To more fully assess encroachment trends around the installation, the planning team evaluated the existing and future land use of each parcel in the Area of Concern, noise contours, and air safety zones based upon the

compatibility guidelines identified in **Tables 12 and 13**. If the guidelines listed the designated use as compatible under some conditions and incompatible under other conditions, then the team coded the parcel as a “conditionally compatible” yellow color. Fully compatible uses, as in the case of “forest,” are green. Due to the minimal encroachment of the most restrictive Accident Potential Zones (Clear Zones and Accident Potential Zones I), the analysis did not identify any specific uses as incompatible under all circumstances. Typically even within noise contour areas and Accidents Potential Zones, many land uses may not pose a conflict under certain development conditions; therefore, **Figure 15** highlights existing compatibility issues in the form of conditionally compatible residential and commercial activity, primarily along U.S. Highway 41A and U.S. Highway 79.

Land Use Acreage Summary, Existing & Future Land Use

Land Use Acreage Summary, Existing & Future Land Use			
TABLE 14	Acreage Statistics		
	ELU	Acres	% of AOC
	Agriculture/Vacant	114,274	77.39%
	Commercial	1,440	0.98%
	Industrial	342	0.23%
	Residential	9,256	6.27%
	Forest	10,510	7.12%
	Other	11,836	8.02%
	FLU	Acres	% of AOC
	Agriculture/Vacant	111,270	75.36%
	Commercial	2,236	1.51%
	Industrial	1,407	0.95%
	Residential	15,268	10.34%
	Forest	10,484	7.10%
Other	6,993	4.74%	



**Legend**

- State Boundary
- - - JLUS Area of Concern
- ▬ Installation Boundary
- ▭ County Boundary

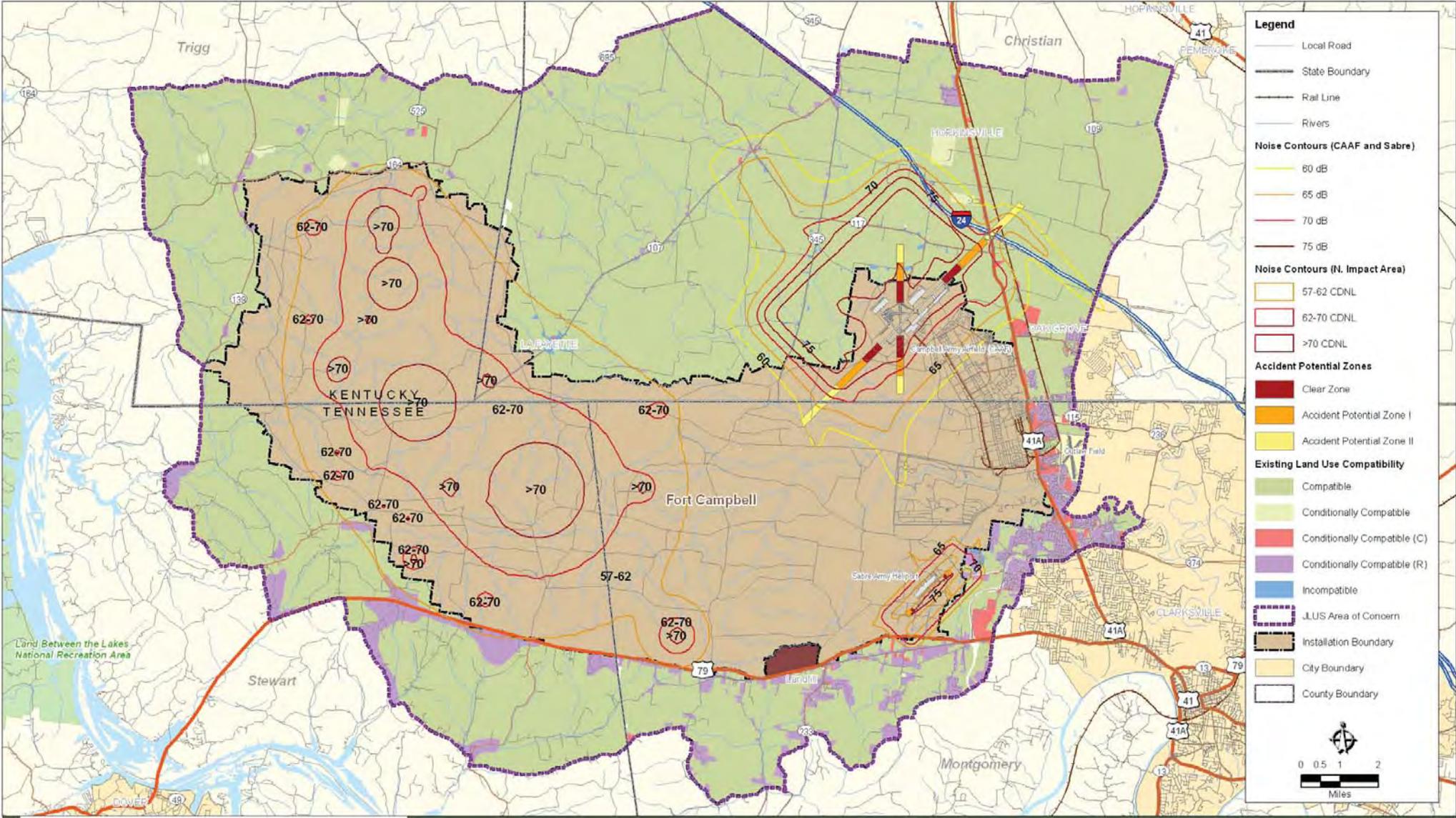
**Generalized Existing Land Use**

- Agriculture/Vacant
- Commercial
- Forest
- Industrial
- Not Classified
- Open Water
- Public/Institutional
- Residential
- Strip Mine/Quarry/Gravel Pit
- Transitional Area
- Transp/Comm/Utilities
- Urban or Built-Up Land
- Wetland

0 2.5 5 10  
Miles

**FORT CAMPBELL**  
Joint Land Use Study Update

**Figure 14**  
**Regional Existing Land Use**



- Legend**
- Local Road
  - State Boundary
  - Rail Line
  - Rivers
- Noise Contours (CAAF and Sabre)**
- 60 dB
  - 65 dB
  - 70 dB
  - 75 dB
- Noise Contours (N. Impact Area)**
- 57-62 CDNL
  - 62-70 CDNL
  - >70 CDNL
- Accident Potential Zones**
- Clear Zone
  - Accident Potential Zone I
  - Accident Potential Zone II
- Existing Land Use Compatibility**
- Compatible
  - Conditionally Compatible
  - Conditionally Compatible (C)
  - Conditionally Compatible (R)
  - Incompatible
- Other Features**
- JLUS Area of Concern
  - Installation Boundary
  - City Boundary
  - County Boundary

**Figure 15**  
JLUS Area of Concern - Existing Land Use Compatibility

The analysis then evaluates each parcel in the Area of Concern on the assumption that it develops as designated under each local government’s future land use plan. The findings highlight land around the installation that is the most susceptible to change and potential land use conflicts based upon existing land use and growth policies and current trends. In Oak Grove along US 41A near CAAF, a long strip of land is in transition from agriculture to commercial, all the way up to the easements around the Accident Potential Zones. A significant amount of agricultural land is also converting to housing just east of U.S. Highway 41A and inside the Area of Concern.

In Clarksville, agricultural land is giving way to residential uses around the Sabre Heliport. Additional parcels are becoming residential within the 70db noise contours, potentially raising compatibility issues. Conditionally compatible growth is occurring within the noise contours of both Fort Campbell airfields; however, while there is some development within 70 db contour, no activity falls within the more heavily exposed and restrictive 75 db noise areas. The ability to establish a clear baseline of compatibility-coded parcels and to compare these existing conditions (ELU) to foreseeable development conflicts under future land use scenarios (FLU) allows planners to better quantify and track the level of encroachment around the installation. **Table 15** shows the acreage of land that is compatible or conditionally compatible under existing and future land use designations.

Acreage Statistics	
ELU	Acres
Compatible	135,779
Conditionally Compatible	774
Conditionally Compatible Commercial	1,408
Conditionally Compatible Residential	9,293
Incompatible	404
FLU	Acres
Compatible	126,686
Conditionally Compatible	1,841
Conditionally Compatible Commercial	2,108
Conditionally Compatible Residential	16,542
Incompatible	481

As shown in **Table 15** just over 400 acres of land pose a conflict with existing operational impacts generated by Fort Campbell. Under future land use designations, this encroachment could increase to 481 acres. The table also indicates that without the implementation of local government growth management measures to reshape established future land use policies, an additional 9,000 acres around Fort Campbell could under current plans convert to a use that is less compatible than today. While the acreage of land affected may not be extraordinary, the emergence of potential land use conflicts along U.S. Highway 79 and U.S. Highway 41A may significantly hinder future operations at SAH and CAAF. (See **Figure 16**)

**Table 15** further distinguishes Conditionally Compatible Commercial and Conditionally Compatible Residential uses. Uses identified only as Conditionally Compatible consist of non-residential or non-commercial uses. The conditional designation does not indicate that housing and commercial development are inappropriate in all areas identified, but that local governments should consider additional measures to reduce the risk of conflicts with Fort Campbell operations. Commercial uses in this area, for example, can achieve compatibility through application of the shielded outdoor lighting practices described in the Implementation section of this report. Real estate disclosure (described later in the Implementation section), indoor noise attenuation, and limits on density can assist in protecting quality of life for residents living in housing near noise and air safety impacts.

## BUILD OUT ANALYSIS

In determining a reasonable forecast for future build out, the planning team analyzed the zoning space requirements/regulations for residential, industrial, and commercial designations within the JLUS Area of Concern. This forecast reflects a “worst case” or full build out scenario. Market forces combined with public decisions regarding infrastructure will limit full development. The analysis does, however, indicate the capacity for significant future development within the Area of Concern (AOC).

**RESIDENTIAL** - In determining build out potential for future residential, the planning team determined the density by dividing minimum lot sizes by the total area of a given parcel. In the case of Clarksville-Montgomery, the County has numerous residential zoning designations with differences in minimum lot sizes often within a few thousand square feet of each other. Therefore, the analysis used the minimum given in the ordinance for calculations. Oak Grove, on the other hand,

has significantly fewer residential designations, often with a range of minimum lot sizes, which are determined based upon other criteria, such as the housing type. In this case, the analysis used a number closer to the upper minimum in the range under the assumption that residential density will reflect lower density in Oak Grove. The only other area that has land use changes within the AOC is Stewart County. These parcels are low density residential, and the analysis assumed that lot requirements for Stewart County would be approximately two dwelling units per acre.

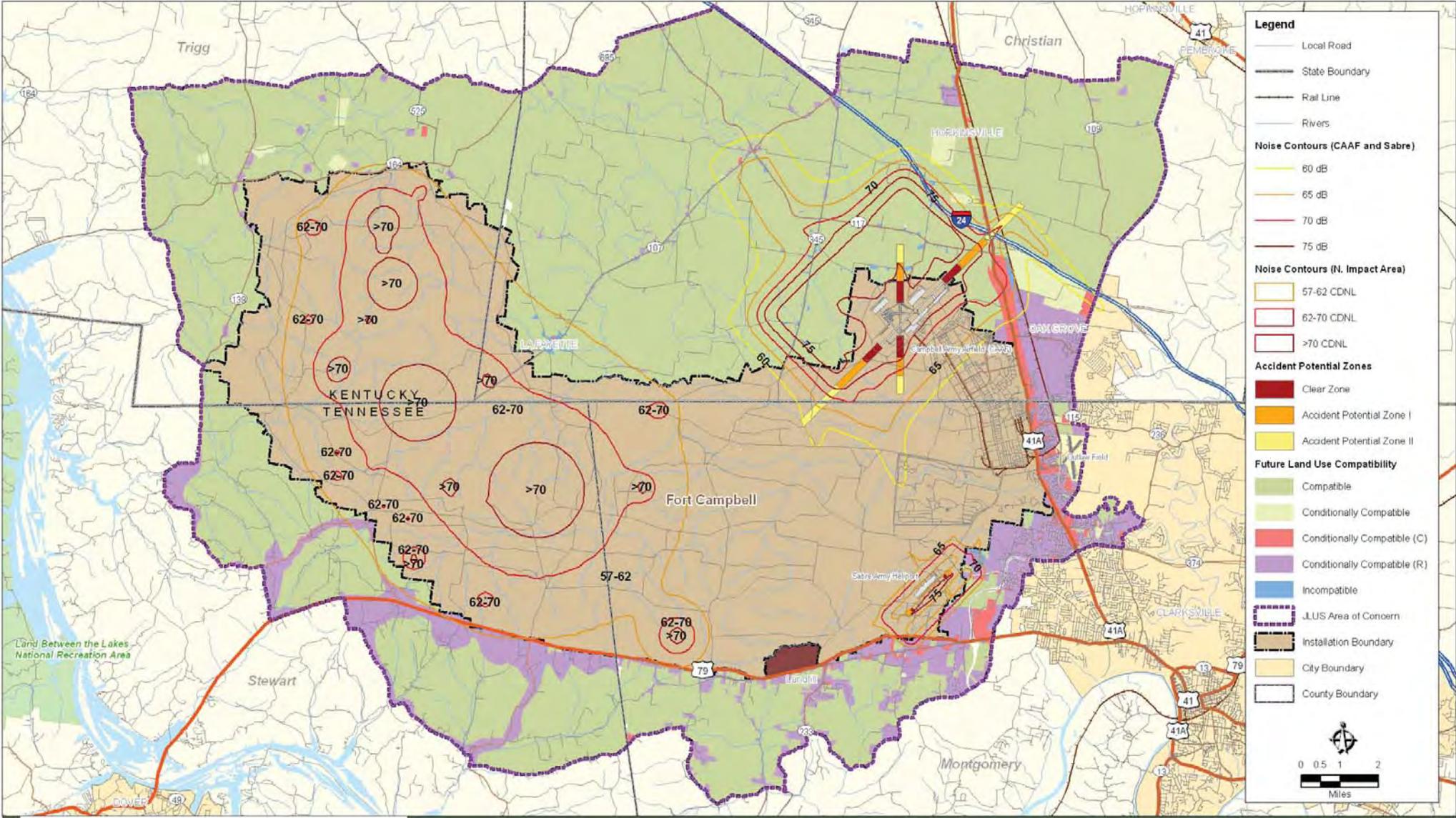
**COMMERCIAL** - For commercial land use changes, the number used for the analysis was maximum lot coverage. In some cases, maximum lot coverage was not provided, so the analysis used 50 percent, which was the most common for both Clarksville and Oak Grove. The planning team then calculated the area in square footage for each parcel that was showing a change in

TABLE 16

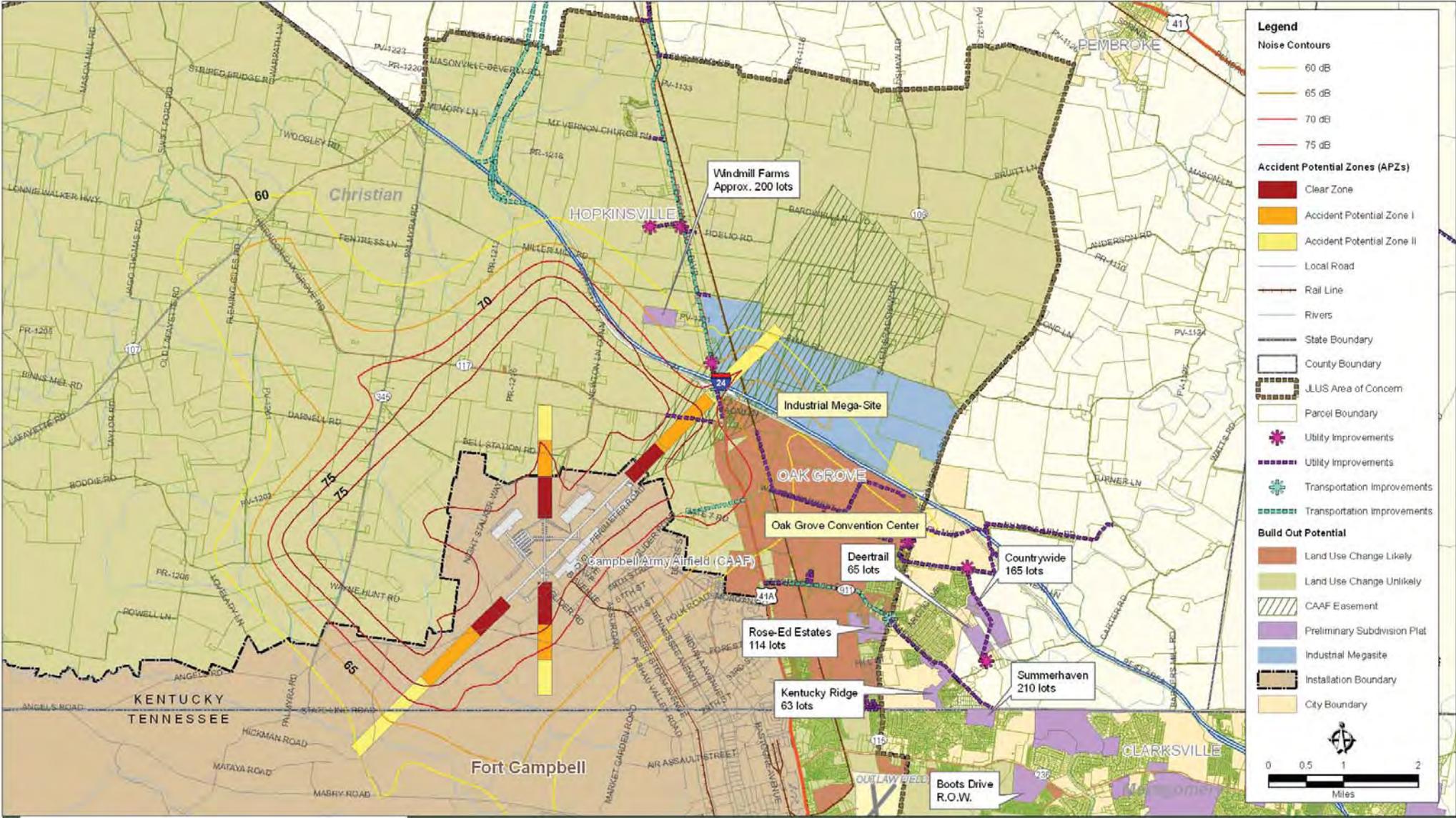
Acreage & Square Footage Summary, Full Build Out Scenario				
Summary Table for Buildout Analysis within the Area of concern				
LAND USE	AREA (SF) OF LAND USE CHANGE	ACRES	UNITS/SF	
MONTGOMERY COUNTY				
Residential	167,860,866	3,854	14,218	Units
Commercial	9,786,755	225	255,649	SF
Industrial	5,917,267	136	3,550,360	SF
STEWART COUNTY				
Residential	126,529,698	2,905	5,806	Units
Commercial	N/A	N/A	N/A	
Industrial	N/A	N/A	N/A	
CHRISTIAN COUNTY				
Residential	90,720,049	2,083	16,556	Units
Commercial	29,856,964	685	16,418,681	SF
Industrial	27,626,005	634	27,626,005	SF
TRIGG COUNTY				
N/A	N/A	N/A	N/A	
<b>Totals for all counties inside Area of concern</b>				
Residential	385,110,613	8,841	36,583	Units
Commercial	39,643,719	910	16,674,330	SF
Industrial	33,543,272	770	31,176,365	SF
<b>Total Changing Land Use</b>				
SF	ACRES			
458,297,604	10,521.07			

land use, and multiplied that number by the coverage requirement.

**INDUSTRIAL** - In determining build out potential for industrial land use, the team employed the same methodology as for the commercial uses.



**Figure 16**  
JLUS Area of Concern - Future Land Use Compatibility



**Legend**

**Noise Contours**

- 60 dB
- 65 dB
- 70 dB
- 75 dB

**Accident Potential Zones (APZs)**

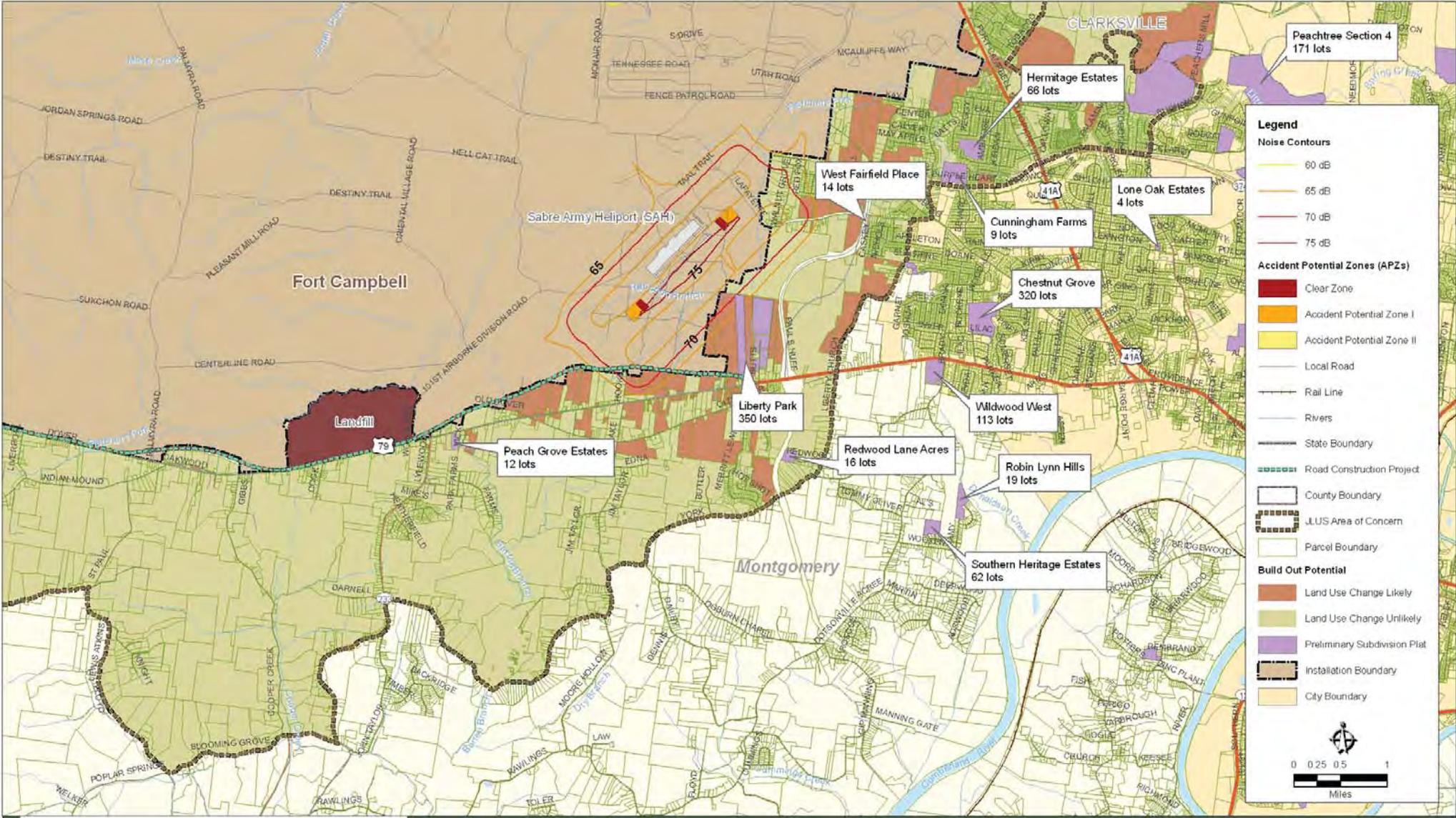
- Clear Zone
- Accident Potential Zone I
- Accident Potential Zone II
- Local Road
- Rail Line
- Rivers
- State Boundary
- County Boundary
- JLUS Area of Concern
- Parcel Boundary
- Utility Improvements
- Transportation Improvements

**Build Out Potential**

- Land Use Change Likely
- Land Use Change Unlikely
- CAAf Easement
- Preliminary Subdivision Plat
- Industrial Megasite
- Installation Boundary
- City Boundary

0 0.5 1 2 Miles

**Figure 17**  
JLUS Area of Concern - Campbell Army Airfield Build-Out Potential



**Figure 18**  
JLUS Area of Concern - Sabre Army Heliport Build-Out Potential

Based on the analysis, a reasonable build out potential within the AOC could include: 36,583 new residential units, 16,674,330 square feet (SF) of commercial space, and 31,176,365 SF of industrial space (see **Table 16**). Given its currently mostly rural/agricultural condition, Christian County has the highest potential for future development.

**Figures 17** and **18** show the full build-out scenario for the sub-areas focused around CAAF and SAH. Each parcel identified as having a land use “likely to change” reflects a zoning designation, such as residential or commercial, that differs from the parcel’s currently undeveloped state. As apparent in both maps, significant parcels in proximity to CAAF and SAH have attached development rights that could produce compatibility issues under favorable market conditions. It should be noted that other sub-area parcels currently without a developed zoning designation, such as agricultural (and thus shown as “land use change unlikely” on each figure) could receive additional development rights through a local re-zoning or development process. Parcels in proximity to proposed road construction and infrastructure projects are the likeliest to transition to more developed activities and thus potentially conflicting uses.

## NIGHT VISION TRAINING ENVIRONMENT

As noted earlier, night vision flight training, in which aviators use night vision goggles (NVGs) is a critical component of training for the Army and provides the U.S. military with a significant tactical advantage during operations. These night vision systems are designed to operate away from civilization and electric lighting. Exposure to stray light can cause the vision screen to white-out, temporarily robbing the aviator of vision. The light intrusion into the night vision device training environment of the post is a leading threat to mission capabilities.

Historically, the performance of night vision systems has been based on percentages of full moon ambient light. While prior generations required at least some ambient moonlight, the current (3rd) generation of goggles performs effectively without any ambient moonlight. Currently, it appears that aviators cope with light pollution through experience and learning to look away or remove goggles to prevent loss of night vision.

A 1999 study conducted a survey of light pollution and its effects on night goggles. The resulting report proposed a system for addressing stray electric lights as a function of ambient moonlight, size and distance and recommended that criteria be developed “...to insure that required training is conducted safely.”

A scientific system for describing the impact of light pollution on night vision as a function of light source, size, and brightness of the offending source(s) does not exist, but would be highly desirable both for the purposes of developing regulations and maintaining the safety of the night vision training environment.

The analysis of land use and growth trends clearly indicates that continued growth around the installation is imminent. **Figure 19** and **Figure 20** show night time aerial imagery of the study area in 1993 and 2003. The major population centers, such as Hopkinsville and Clarksville produce

significant sky glow around the post in both images. However, after a decade of growth, the sky glow has spread further along the region's major corridors, linking previous islands of light.

Development from the east and northeast around Hopkinsville and Oak Grove will exacerbate this trend, directly affecting night aviation at CAAF. To the south, the size and continued growth of Clarksville pose long term concerns for increased light pollution around SAH. The widening of the 79 corridor also places the heliport and a primary flight corridor at further risk of light intrusion.

The distant sky glow from the installation is significant and rivals the sky glow observed for either Hopkinsville or Clarksville. Throughout the post's developed areas, a significant percentage of the installed lighting is inadequately shielded to prevent light pollution. Aviators have identified some of this unshielded lighting on the installation as the cause of ongoing problems with night vision equipment and operations.

The area generating the most complaints of light interference is northeast of Fort Campbell at the US Highway 41A/I-24 interchange. The area is generally beneath the approach path for most landings at the main airfield.

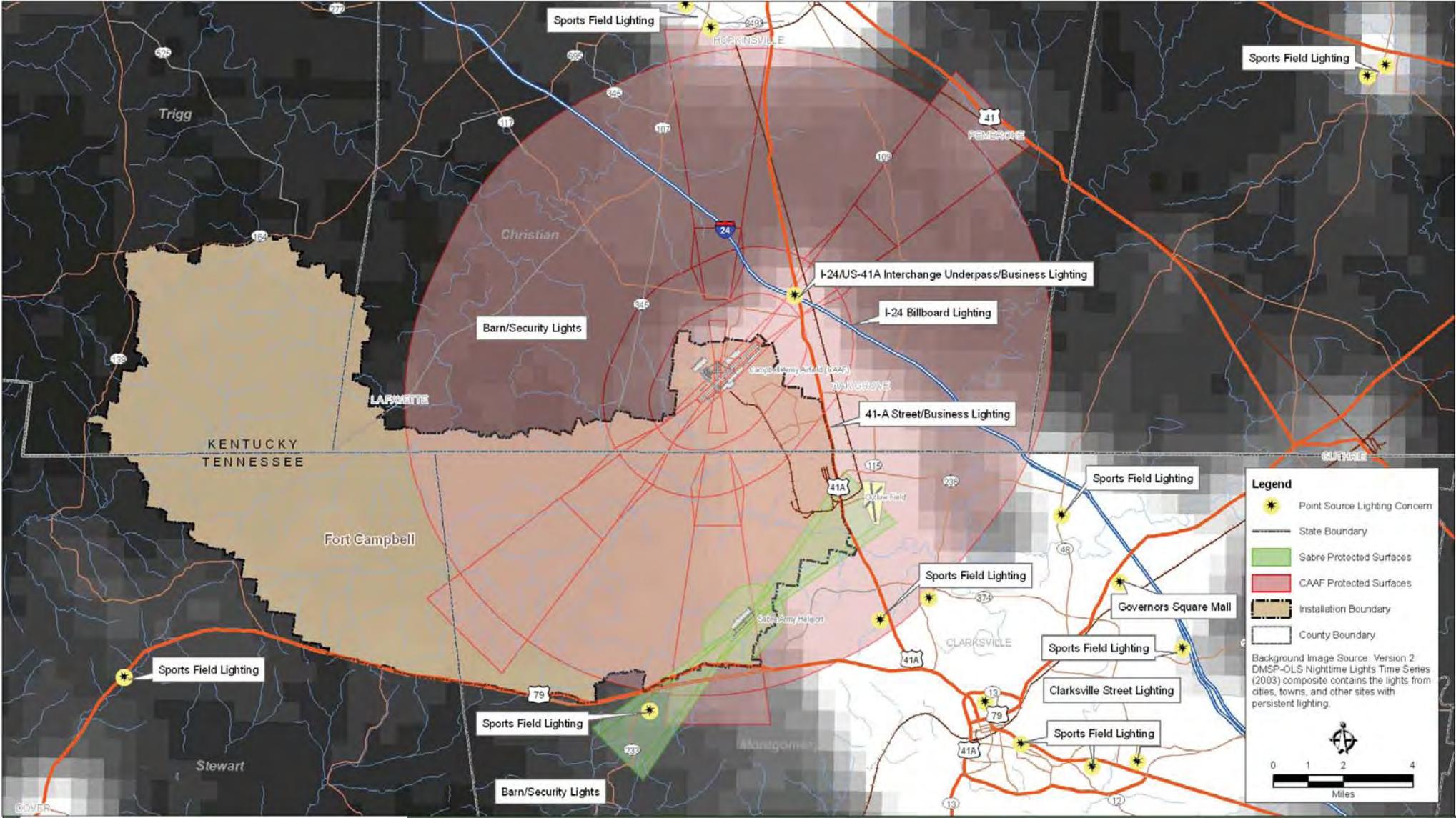
Aviators have cited a gas station at this intersection, along with several other gas stations at other exits as significant sources of light pollution. In general, the lighting of these stations is consistent with practices across the country in areas without lighting ordinances and likely exceeds recommendations (Illuminating Engineering Society of North America RP-33-99 Lighting for Exterior Environments) for service station lighting in areas of low ambient lighting. The worst case service station was unusual in having an all-concrete apron, while most other stations have concrete under the canopy but bituminous paving (blacktop) all around.

The Wal-Mart distribution center, also cited as a major problem by aviators, did not have poorly shielded lighting, high lighting levels, or any other obvious lighting issue. However, illumination of the façade of the entire loading dock zone makes the facility a very large lighted area.

Billboards along the freeway are uplighted, a technique that runs the risk of temporarily blinding even a bare-eyed aviator.

Street lighting throughout the region employs mostly drop lens cobrahead luminaires. Offset unshielded roadway luminaires were noted along the 101st Airborne Division Parkway in Clarksville. Some flat lens luminaires were noted, including downtown Hopkinsville. Commercial lighting throughout the area is a modern mixture of well designed fully-shielded lighting, less-desirable sag-lens luminaires and a number



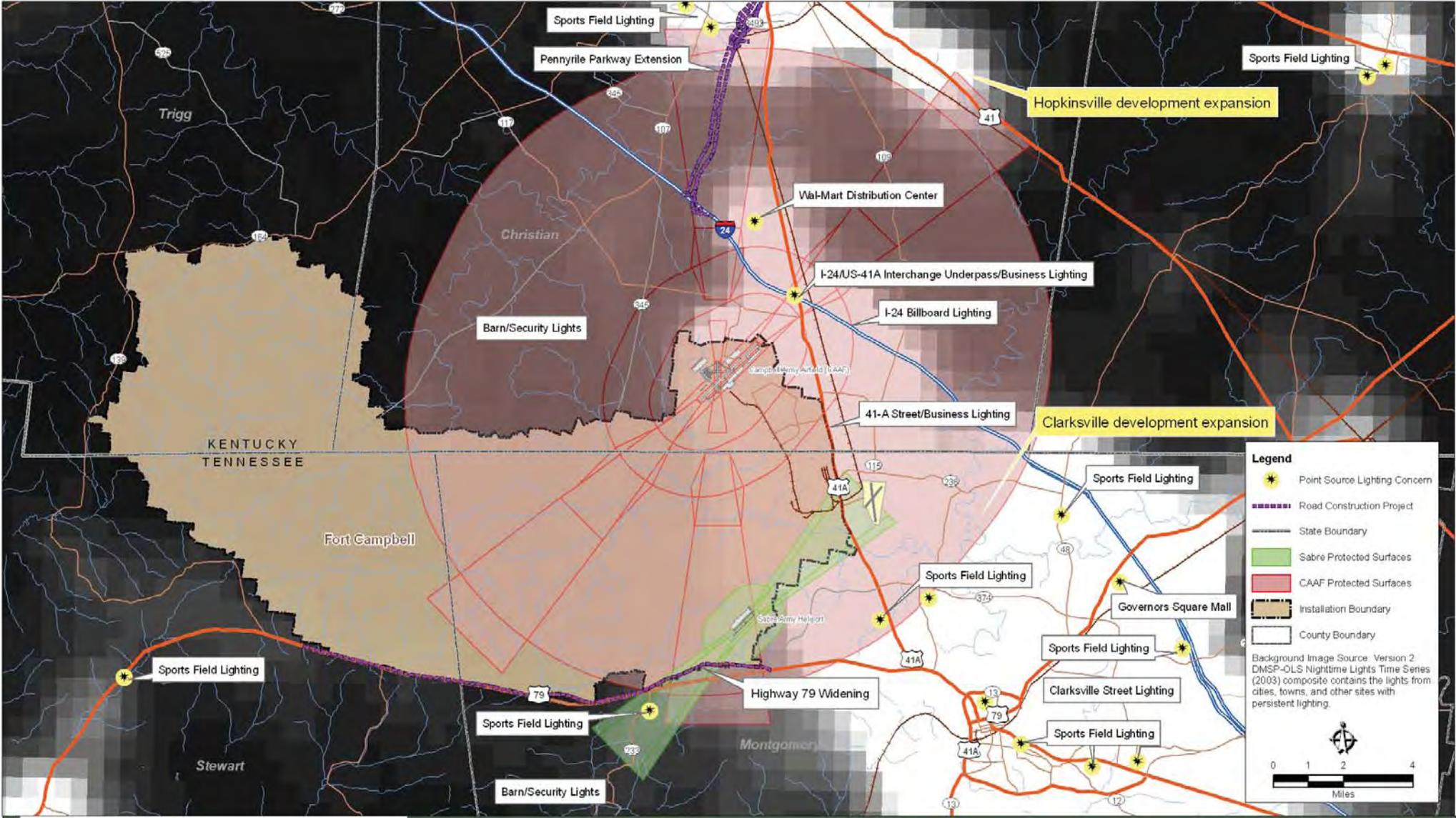


**Legend**

- Point Source Lighting Concern
- State Boundary
- Sabre Protected Surfaces
- CAAF Protected Surfaces
- Installation Boundary
- County Boundary

Background Image Source: Version 2 DMSP-OLS Nighttime Lights Time Series (2003) composite contains the lights from cities, towns, and other sites with persistent lighting.

0 1 2 4  
Miles



**Figure 20**  
2003 Lighting Concerns and Protected Airspace Surfaces for CAAF and Sabre

of poor lighting practices, such as unshielded HID floodlighting and wallpacks.

Commercial and industrial over-lighting and the resulting light pollution are internationally recognized issues. Standards for lighting levels, which are expressed in footcandles, are typically exceeded, especially in commercial districts. While often linked to safety or security, overlighting is more often the result of “light wars” between competing big box store chains, service stations, and auto dealerships. The region around Fort Campbell displays the typical characteristics of commercial lighting.

However, restrictions to lighting levels, which are typically measured as footcandles of horizontal illumination, do not address the type of light pollution caused by unshielded sources. While sometimes attractive when viewed from an overlook, upward lighting is wasteful, and to an aviator it is a source of disability glare.

Overlighting and unshielded light both act as sources of light pollution that affect night vision equipment. For instance, both the 1999 report and comments concerning the Wal-Mart distribution center suggest that large lighted areas cause problems as severe, or perhaps more severe, than small, very bright objects. The Sam’s Club property near I-24 Exit 4 in Clarksville poses similar challenges to aviators.



# 6.0 Overview of Compatibility Efforts





## OVERVIEW

The complexity of coordinating land use issues across jurisdictional boundaries and the limited authority and resources of any individual entity requires concerted action among multiple stakeholders, including federal, state, regional and local government governments; the military and civilian sectors; non-profit organizations; and private landowners. This section gives an overview of compatibility efforts undertaken to date and assesses the degree of partner adherence to the recommendations of the 1996 JLUS.

## CURRENT ARMY COMPATIBILITY TOOLS

The Army uses several key tools to promote land use compatibility and minimize operational impacts on surrounding lands, including ongoing outreach strategies and mitigation procedures laid out in planning documents, such as the Installation Environmental Noise Management Plan (IENMP), sustainability initiatives, including the Army Compatible Use Buffer (ACUB) program, and regional land use planning efforts such as this Joint Land Use Study.

### INSTALLATION ENVIRONMENTAL NOISE MANAGEMENT PLAN

As noted earlier, the post's IENMP lays out the primary strategies for addressing land use conflicts related to noise and accident potential. In addition to establishing compatibility guidelines and defining areas of concern, the IENMP promotes education for the military and civilian community, the management of noise complaints, mitigation, the "Fly Neighborly" program, and noise abatement procedures.

Examples of noise mitigation measures include:

- using designated corridors and visual flight rule routes to minimize the effect of aircraft noise;
- restricting the altitude for aircraft flying over urbanized areas to 1,000 feet above the ground;
- avoiding residences, buildings, and farm-related facilities during overflights; and
- directing aircraft away from several designated "flight avoidance" properties due to excessive noise complaints.

As described in the next section, Fort Campbell has also implemented several of the recommendations of the 1996 JLUS, including developing a user-friendly brochure on compatibility issues, signing a Memorandum of Agreement with surrounding communities on communication procedures, and conducting routine briefings with the local governments on post activities and projects.

### SUSTAINABILITY/ARMY COMPATIBLE USE BUFFER PROGRAM

#### ***FORT CAMPBELL 25-YEAR SUSTAINABILITY PLAN***

The U.S. Army has embraced sustainability as an overarching framework for addressing multiple threats to its operational capabilities, from the diminishing availability of training areas and aging infrastructure to the use of scarce resources and the increasing stringency of the regulatory environment. Sustainability reflects a long-term, strategic perspective that urges the Army to look beyond the installation to the broader region and to recognize economic, social, and natural interdependencies between the military and its neighbors. Based on this guidance, the Fort Campbell Sustainability Plan seeks to balance protection of the mission, environment and

community. The goal of the plan is to meet current and future mission requirements, while safeguarding human health, improving quality of life, and enhancing the natural environment.

The Sustainability Plan completed in 2004 addresses a series of interrelated themes including:

- ensuring that installation lands and infrastructure will support training and combat readiness;
- providing infrastructure that meets the needs of users, reduces overall costs, and limits dependence on non-renewable energy sources;
- promoting sustainable regional development that protects and enhances the mission of Fort Campbell, the regional environment, and the regional quality of life; and
- maintaining cost-effective, reliable, safe, secure, and pollution-free transportation systems in partnership with the local communities and states.

The sustainability plan encourages installation planners to integrate efforts across previously separate functional areas and to conduct community outreach efforts that include awareness, engagement, support, and education. Planners monitor various aspects of the sustainability program through the Fort Campbell Environmental Management System and the Fort Campbell Strategic Plan. The installation intends to update its Sustainability Plan in 2009-2010.

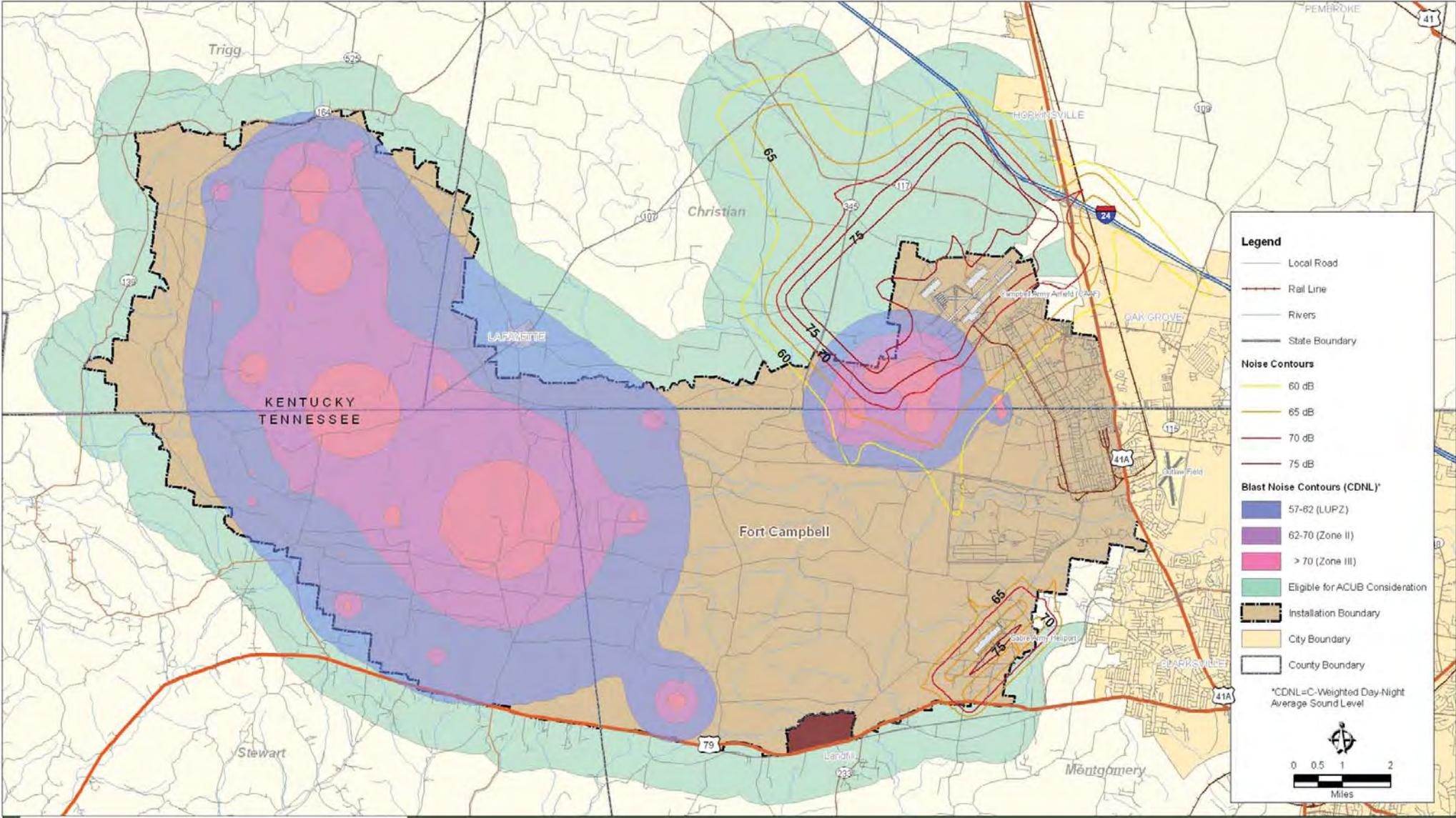
#### **ARMY COMPATIBLE USE BUFFER PROGRAM**

Combat success requires sufficient land for maneuvers, live fire, testing and other operations to prepare and train soldiers. Army Compatible Use Buffers (ACUBs) support the Army's mission to fight and win the nation's wars by establishing buffer areas around installations that limit effects of encroachment and maximize the lands inside the installation that can be used to support training and readiness activities. The ACUB program is an integral component of the Army's sustainability efforts to protect mission, environment, and community and is an innovative tool in preventing incompatible development around installations.

Title 10, Section 2684a of the United States Code authorizes the Department of Defense to partner with non-Federal governments or private organizations to establish buffers around installations. The Army uses this authority to reach out to partners to identify mutual priorities for conserving land and to prevent development of critical open areas.

The core implementation strategy of the ACUB program is to acquire conservation easements on lands with high conservation value that prohibit incompatible development in perpetuity, while allowing the fee interest ownership of the land to remain in private hands. The program allows the Army to contribute funds to the partner's purchase of easements or properties from willing landowners. While the restrictive covenant prohibits urban development, it accommodates low impact uses such as farming and forestry that do not pose a risk of encroachment to nearby training activities. The ACUB program thus achieves the complementary goals of limiting disruptions to training capabilities or flexibility, while protecting key environmental resources and high-value habitat, thus producing a win-win transaction for property owners, the environment, and the military.

The specific training needs of the post's tenant units depend upon the presence of compatible uses on privately owned adjacent lands that serve as over-flight and/or noise buffers. After exploring various options, the U.S. Army and Department of Defense determined



**Legend**

- Local Road
- Rail Line
- Rivers
- State Boundary

**Noise Contours**

- 60 dB
- 65 dB
- 70 dB
- 75 dB

**Blast Noise Contours (CDNL)\***

- 57-62 (LUP2)
- 62-70 (Zone II)
- > 70 (Zone III)

Eligible for ACUB Consideration

- Installation Boundary
- City Boundary
- County Boundary

\*CDNL=C-Weighted Day-Night Average Sound Level

0 0.5 1 2  
Miles

**Figure 21**  
**Army Compatible Use Buffer (ACUB) and Noise Contours**

that the ACUB was less costly, time-consuming, and controversial than fee-simple real estate acquisition as a means to reduce encroachment. Fort Campbell sought approval for multi-year funding (beginning in FY06) to implement an ACUB program around the installation (See **Figure 21**). The program allows installations to partner with conservation organizations to coordinate habitat conservation planning at the ecosystem level. Fort Campbell identified four ACUB priority areas based in part upon the following criteria:

- the land is in a designated high noise area;
- it is under or near a major flight corridor;
- it is within a 1+ mile zone of influence;
- it is within the designated “light sensitive” area;
- it is in the Military Operations Area that has been approved by FAA for low-level flights; and/or
- it has high conservation value.

The purpose of ACUB priority #1 is to protect Fort Campbell’s two airfields, CAAF and SAH. The airfields are vital to the military mission, but remain vulnerable to emerging land use conflicts. The ACUB includes sub-areas created for each airfield, including the entire CAAF overflight area. Both sub-areas satisfy all six criteria; land around CAAF also features some of Kentucky’s most fertile farmland. The overall size of this priority zone is approximately 9,900 acres.

ACUB priority #2 is a 29,100 -acre buffer zone consisting of a one-mile buffer in Christian County, KY and a one-mile buffer in Montgomery County, TN. The area adjoins US 79 and includes mostly undeveloped farmland with some residential strip development. This area is intended to buffer the southern flight approaches into Golden Eagle FLS, SAH, and Suckchon Drop Zone, a perimeter flight corridor, and maneuver areas near the installation boundary from future commercial and residential development along a widened US 79 corridor.

ACUB priority #3 is a 19,680 -acre area includes a one-mile buffer portion of Trigg County, KY and Stewart County, TN. The primary objectives of ACUB area #3 are to limit development in the high noise zones associated with the North-South Impact Area, as well as to preserve a primary Fort Campbell flight route. The land is mainly agricultural, but is at risk for conversion to strip residential development along county roads adjacent to the post.

ACUB priority #4 is a 40,000-acre area located between the Land Between the Lakes Recreational Area and Fort Campbell in Trigg County, KY and Stewart County, TN. The zone, which is largely forest and agricultural land, has a high conservation value due to the presence of habitat for several endangered species. Since this expansive, privately owned area is at somewhat lower risk of encroachment relative to the other priority areas, Fort Campbell ACUB Partners will focus on securing easements for certain properties with high mutual benefit.

It should be noted that growth just outside the installation fence poses risks to mission viability beyond exposure to noise and accident potential. The continued loss and fragmentation of surrounding natural habitat due to unmanaged development can, for example, cause species to seek out the remaining intact open lands on post. The presence of threatened and endangered species on the installation can in turn lead to training restrictions. Fort Campbell is currently home to two listed threatened and endangered species: the Gray bat (*Myotis grisescens*) and the Indiana bat (*Myotis sodalis*); and another four species of state concern. While protection of these species



does not yet result in operational limitations, the continued loss of nearby habitat places an additional burden on the Army to maintain open space, thus restricting training flexibility.

Fort Campbell's training areas also contain around 4,000 acres of unique grasslands referred to as barrens and recognized as an area of exceptional ecological importance in the Interior Low Plateau Ecoregion and some of the best remnants of native grasslands east of the Mississippi River. Along with its ACUB partners—the Land Trust for Tennessee, the Kentucky Department of

Agriculture—Fort Campbell has identified over 80,000 acres around the installation that are eligible for ACUB consideration. Conservation efforts will likely be limited to a relatively small portion in the foreseeable future. The Recommendations section of this report explores additional strategies for promoting sustainability partnerships throughout the region.

### OTHER REGIONAL PARTNERING EFFORTS

In addition to addressing its operational impacts, Fort Campbell has engaged regional partners in a series of broader efforts related to land use and transportation planning. The installation participated in an exchange of 358 acres of Army property for 670 acres owned by Bi-County (Montgomery and Stewart Counties) Solid Waste Management. The exchange, completed in 2008, allowed Bi-County to expand its public landfill and provides Fort Campbell with replacement training land and long-term refuse disposal rights.

As part of a second initiative, the Army conveyed 200 acres of land to TDOT to facilitate the widening of U.S. Highway 79 to four lanes. Under an MOA updated in 2006, TDOT provided Fort Campbell with funds to acquire replacement property, which is currently underway. Both actions reduced the amount of privately-owned land located adjacent to installation training areas.

Fort Campbell also launched an effort in 2004 to acquire restrictive easements on 4,000 acres of privately owned land adjacent to the CAAF main approach, using MCA funding acquired through the efforts of the Citizens for Fort Campbell. The objective of the Army project is to protect the main runway and flight approach from height obstructions and incompatible land uses. The Army completed almost all easement acquisitions under this project in 2008. The Army also is in the process of conveying an unused portion of its railroad property to the City of Hopkinsville for use as a utility and recreational corridor.

The Kentucky Transportation Cabinet is widening Cole Rd/Gate 7 to relieve congestion on US 41A and to improve installation access. The Cabinet is currently acquiring right-of-way and completion is scheduled for 2011.

Under a second transportation/infrastructure effort, the Army is installing concrete barrier walls along US 41A to provide security from potential terrorist attacks and to serve as a noise and privacy barrier for installation housing areas. The project is slated for completion in 2009.

The Clarksville-Metropolitan Planning Organization, the Departments of Transportation (DOT) in Kentucky and Tennessee, and Fort Campbell are jointly planning the installation of variable message

boards along US 41A, KY 911, and Tiny Town Road. The DOTs will primarily use the boards to notify motorists of traffic-related events, but Fort Campbell will also use them to provide information to the public, such as access control point changes and gate closures. Kentucky Transportation Cabinet is scheduled to complete its portion of the project in 2009.

Finally, Kentucky Transportation Cabinet is planning reconstruction of the KY Highway 911/115 intersection. The objective of the project is to improve safety and access to the installation, as well as improve mobility in Oak Grove. The project is slated for completion in 2010.

## 1996 JLUS AND PROGRESS SURVEY

### 1996 JOINT LAND USE STUDY

The Fort Campbell region was an early adopter of coordinated military/civilian land use/encroachment prevention planning. In 1996, the Army and participating local governments completed a JLUS for the surrounding four-county area of Montgomery, Stewart, Christian and Trigg Counties. The study articulated the following mission statement:

*Recognizing the vital role of Fort Campbell and related facilities for the Kentucky and Tennessee communities and recognizing the vital role of Kentucky and Tennessee communities on the region, it is important that a military and community partnership is developed, which encourages balanced growth and development.*

The plan also established both community and military goals, including:

- Controlling development in the vicinity of Fort Campbell and Outlaw Field;
- Planning for the orderly accommodation of new development;
- Minimizing the impact of growth on existing development, streets, and resources;
- Promoting the public health, safety, comfort, and general welfare of the inhabitants of Fort Campbell, Montgomery County and Stewart County, Tennessee and Christian County and Trigg County, Kentucky;
- Restricting land uses that are recognized as incompatible in noise sensitive areas and those prohibited in clear zones for aircraft safety;
- Limiting the density of development and intensity of use in areas below the take-off and approach flight paths that are exposed to significant danger of aircraft accidents;
- Basing land use compatibility standards on noise sensitivities; and
- Basing land use planning and zoning in the military environs on non-military issues, such as existing land use patterns and socio-economic considerations.

To achieve these stated goals, the JLUS recommended a series of encroachment reduction strategies for the surrounding communities and Fort Campbell. Tools emphasized included special purpose zoning to reduce the exposure of development to excessive noise and safety risks, height restrictions to protect the navigability of air space, indoor noise reduction requirements, real estate disclosure, the coordination of infrastructure policy, and participation in memoranda of understanding among affected interests.

1996 JLUS Recommendations by Community Partner

ACTION	Oak Grove	La Fayette	Christian Co./ Hopkinsville	Clarksville/ Montgomery Co.	Stewart & Trigg Counties
Adopt zoning to restrict height of structures and protect airspace	√	√	√	√	√
Special district guidelines in zoning and subdivision regulations that reflect APZs and noise zones	√	√	√	√	
Include indoor noise reduction standards	√	√	√	√	√
Establish noise disclosure procedures	√	√	√	√	√
Meet regularly with Fort Campbell representatives to coordinate the planning of water, wastewater and transportation	√	√	√	√	√
Sign an MOU with Fort Campbell	√	√	√	√	√
Distribution of brochure/handouts	√	√	√	√	√
Prepare a land use plan to manage growth around Fort Campbell		√			
Amend zoning to include annexed property along 41A			√		
Prepare an Urban Fringe Area Plan to minimize encroachment			√	√	√
Revise Comprehensive Plan to promote compatibility goals			√	√	√
Adopt special purpose zoning for areas near Fort Campbell			√	√	√

T A B L E 17

The purpose of this update is to build on the 1996 study by assessing the degree of partner adherence to suggested strategies and further refining recommendations to reflect current development issues, growth trends, and changing mission needs. **Table 17** illustrates specific recommended actions by local government partner under the 1996 JLUS.

The 1996 report recommended the following recommendations for Fort Campbell to:

- Developing a procedure for managing noise complaints
- Developing an easy to understand brochure on noise impacts
- Providing cities with periodic updates on studies being conducted to reduce building vibration from blast noise
- Making data from noise monitors available to public officials and planning agencies
- Establishing a waiver on the firing of artillery on Sundays from 9 AM to Noon (Lafayette, KY)
- Meeting regularly with community representatives to coordinate the planning of water, wastewater and transportation
- Signing an MOU with affected local governments
- Relocating the NAVAID at CAAF
- Clearly delineating installation boundary in the vicinity of Lafayette, KY
- Using Explosive Research Group evaluation of good/bad firing conditions to reduce complaints
- Securing avigation easements & noise agreements on properties surrounding Fort Campbell

Fort Campbell has complied with seven of the 1996 recommendations including: managing noise complaints; developing an outreach brochure; periodically briefing cities; participating in MOUs; relocating NAVAID; evaluating firing conditions; and securing avigation easements.

### JLUS PROGRESS SURVEY

To assess the priorities of decision-makers and to determine the effectiveness of previous compatibility actions, as well as interest in exploring new anti-encroachment tools, the planning team administered a short JLUS Progress Survey to members of the Executive Committee. Members of the Technical Coordinating Committee also provided responses. **Tables 18** and **19** display the results of the survey.

The survey asked respondents to answer the following questions on a scale of 1 to 4 with a score of 1 indicating a weak response and 4 indicating a strong response. All respondents recognized Fort Campbell as a significant economic driver of the region. Both committees viewed the level of collaboration and communication between Fort Campbell and local governments as moderately strong, though Technical members tended to rate the strength of the military/community relationship slightly higher. Technical Committee members believed that existing community policies have been more effective in limiting incompatible growth than their senior official counterparts. Respondents indicated relatively limited concern in the surrounding communities about noise and other operational impacts, but suggested the need for increased community awareness of the constraints that incompatible growth can impose on the military mission.

The survey then asked respondents to evaluate the need for exploring a series of possible

strategies to promote compatible land uses around the installation. A score of 1 indicates no need to pursue a particular tool and a score of 4 indicates a strong need. All respondents viewed land use and zoning controls as an essential tool in managing encroachment. Technical Committee members also placed strong emphasis on outdoor lighting standards to protect the night vision training device environment. Improved communication and regional coordination, the use of real estate disclosures and the securing of conservation easements scored favorably. The Executive Committee saw less value in the direct acquisition of land by the Army, indoor noise reduction requirements, and controls on transportation improvements.

Progress Survey Results, Question Responses			
	QUESTION	Executive Committee Avg. Score	Technical Coordinating Committee Avg. Score
TABLE 18	1. How would you characterize the overall level of collaboration between your community and Fort Campbell?	3	3.5
	2. How would you characterize the level of communication between your local community and Fort Campbell?	3.2	3.5
	3. How important is the continued mission of Ft Campbell to your community in terms of sustaining economic growth and job creation?	4	3.8
	4. How effective do you think that existing community policies have been in limiting incompatible growth around the installation?	2.8	3.3
	5. What is the level of concern in your community about noise or other impacts generated by operations and training activities at Fort Campbell?	2.4	2.8
	6. What is the level of awareness in your community about the effects of incompatible development on the Fort Campbell mission?	2.4	2.7

## CURRENT LOCAL GOVERNMENT COMPATIBILITY TOOLS

The local governments surrounding Fort Campbell have adopted various measures to promote compatible land use around the installation. The major encroachment reductions implemented by community to date are:

### STEWART COUNTY

- The County has signed an MOU with Fort Campbell; increased emphasis on implementation of the MOU is recommended

### TRIGG COUNTY

- The County has signed an MOU with Fort Campbell; increased emphasis on implementation of the MOU is recommended
- The Trigg County Planning Commission attaches noise warnings to plats within an established distance from the installation

Progress Survey Results, Question Responses Ranking of Possible Compatibility Tools			
TABLE 19	TOOL	Executive Committee Avg. Score	Technical Coordinating Committee Avg. Score
	Land use/zoning	3.4	3.8
	Improved communication with military	3.3	3.6
	Conservation easements	3.0	3.4
	Acquisition of land by the Army	2.0	3.6
	Real estate disclosure	3.2	3.2
	Outdoor lighting standards	3.2	3.8
	Improved regional coordination	3.0	3.2
	Indoor noise reduction standards	2.3	3.0
	Controls on infrastructure improvements	2.8	3.0
	Controls on transportation improvements	3.2	3.6

**OAK GROVE**

- The city has signed an MOU with Fort Campbell and implemented its provisions
- City agencies send development plans to Fort Campbell for review as though it were another city department
- Oak Grove passed a city-wide lighting ordinance in August of 2007; the ordinance requires that all lighting installed face downward
- The city adopted a sign ordinance in 2008 regulating the height of signs

**HOPKINSVILLE**

- The city has signed an MOU with Fort Campbell and implemented its provisions
- Hopkinsville has adopted a military overlay district that includes height restrictions, noise attenuation standards, and exterior lighting design criteria
- Hopkinsville grants the Army an opportunity for site/subdivision review and comment

**CHRISTIAN COUNTY**

- The county has signed an MOU with Fort Campbell and implemented its provisions
- The MOU also requires plats in noise zones to carry noise warnings
- The county allows the installation an opportunity to review development proposals in south Christian County
- The county has incorporated supportive compatibility language into their Comprehensive Plan
- Christian County supported the State’s enactment of the KY Airport Zoning around CAAF

**CLARKSVILLE/MONTGOMERY COUNTY**

- Clarksville/Montgomery County has signed an MOU with Fort Campbell and implemented its provisions
- The planning commission grants the Army site/subdivision review within a one+ mile buffer surrounding the installation

- Montgomery County has adopted the Sabre Heliport Overlay District ordinance, which regulates land use and lighting design criteria within the Aircraft Light Sensitive Area, Noise Zones, Military Noise Disclosure Areas, and Approach Departure Surface Areas
  - » The ordinance requires noise level reduction for new residences, offices, churches, and schools built in Noise Zones 2 and 3
  - » In the Military Noise Disclosure Area, all subdivision plats and site review plans require disclosure
  - » Also, building permit applicants must sign a noise disclosure stating that premises may be exposed to excessive noise levels from the heliport in Noise Zones 2 and 3
- Clarksville-Montgomery County has updated the Comprehensive Plan to reflect compatibility with Fort Campbell; specific language includes:
 

*It was deemed important by the Coordinating Committee to maintain lower level of residential development in the areas surrounding Fort Campbell because of problems with noise and light pollution. Residential development is adversely affected by the bright lights associated with development which could interfere with night flight training exercises. Reference should be made to the Joint Land Use Study of 1996.*
- Clarksville is in the process of revamping zoning districts to incorporate smart growth and compact development; these are tools that can enhance the ability to manage growth in transitional areas near the installation
- The Clarksville-Montgomery County Growth Plan encourages higher density residential, commercial, and industrial development in an Urban Growth Boundary contiguous with the City of Clarksville; designated Planned Growth Areas are appropriate for low to moderate density growth; the plan designates rural areas outside the Urban Growth Boundary and the Planned Growth Areas; these plans facilitate land use compatibility with the military mission and reduce the risk of encroachment by guiding new growth away from rural areas in proximity to the installation

It should be emphasized that Fort Campbell and the partner communities of the JLUS maintain a close and collaborative relationship. As evident from the list of actions taken, local governments are planning proactively to protect the mission viability of the post and to reduce the exposure of residents to noise, air safety hazards, and other operational impacts. However, the review of current policy also suggests key gaps in compatibility planning, including the lack of appropriate land use controls in Trigg, Christian and Stewart Counties. The recommendations of this report focus on strengthening the encroachment reduction tools available to local planners and decision-makers.

## FEDERAL AND STATE INITIATIVES

### SUSTAINABLE RANGE PROGRAM

The Department of Defense (DoD) developed the Sustainable Range Program (SRP) to give Army installations access to an array of planning, facilities management, environmental management, munitions management, and safety program tools. The SRP is a comprehensive approach to improve the way the Army plans, manages, and uses its ranges in support of long-term viability, more efficient and effective training, and reduced demands on scarce resources, such as land, air, water, and energy. The SRP includes several major efforts:

- The Range and Training Land Program (RTLTP) plans for the safe day-to-day management of

range lands and enhanced training performance;

- The Integrated Training Area Management (ITAM) Program seeks to achieve the optimum use of lands for combat realistic training through planning, rehabilitation, maintenance, mapping, assessment, and monitoring; and
- The Readiness and Environmental Protection Initiative (REPI) is a collaborative effort to reduce the risk of encroachment from off-post activity as described below.

### READINESS AND ENVIRONMENTAL PROTECTION INITIATIVE

Once specifically sited in remote areas, military installations are now often in the path of advancing exurban development or have generated external growth through spin-off economic activities. Over the past decade, the DoD has increasingly recognized encroachment as a major constraint in safely and effectively carrying out the training and readiness activities of the military.

In an effort to protect the future use of installations and training land, the FY2003 National Defense Authorization Act authorized the Military Services (Army, Navy, Marine Corps and Air Force) to enter into agreements with non-federal conservation organizations to acquire real estate (from willing sellers only) in the vicinity of military installations such as bases, posts and forts. The statutory authority can be found in the United States Code at 10 U.S.C. 2648a.

The Readiness and Environmental Protection Initiative (REPI) grants the military the ability to enter into agreements with eligible entities, such as local governments, non-governmental organizations, and willing land owners to secure conservation easements on property in the vicinity of, or ecologically related to, a military installation or military airspace. The Army implements REPI strategies through the Army Compatible Use Buffer program described earlier. The agreements enable private organizations to acquire, on a cost-shared basis, development interests in the properties of voluntary sellers. The property owner typically continues to hold the title for the land, but receives monetary compensation and tax breaks to maintain the encumbered property in a highly limited use that preserves habitat and avoids interference with the operational procedures of the nearby installation. REPI is the fastest growing conservation-based program in the federal government today.

### STATE INITIATIVES

Complementing federal policy efforts, states have increasingly mandated collaborative planning among military installations and local governments. The State of Kentucky, for example, requires jurisdictions near military installations to include a military compatibility component in their comprehensive plans, but does not require local entities to consult with the military installation regarding proposed land use changes. The State of Tennessee does not mandate local compatibility planning around installations. In 2006, state legislators introduced a measure to require local governments or regional planning commissions to notify military installations of proposed land use or zoning decisions on land within one mile of any installation. The bill did not pass. It should be noted, however, that Montgomery County already performs consultation as proposed under the 2006 Tennessee bill.

Various states have also formed advocacy bodies to strengthen the relationship between state agencies, installations, and local communities. The Kentucky Commission on Military Affairs has adopted a strategic plan to protect military interests within the state and has performed an economic analysis of the military presence in Kentucky. Current efforts, to date, have focused

primarily on Fort Knox, Kentucky. Tennessee also has a state military affairs commission, but that body is not currently active.

Kentucky Revised Statute 183.861 establishes a state-operated Airport Zoning Commission and delegates all powers to establish zoning and land use regulation within and around publicly owned airports to this Commission. This authority explicitly includes military airports. This Commission operates out of the Kentucky Transportation Cabinet, Department of Aviation.



The Kentucky Airport Zoning Commission is authorized to consider the following factors in developing zoning and land use regulations around publicly owned airports:

- Safety of airport users
- Safety of surface persons and property
- Character of flying operations
- Terrain
- Height of existing structures or trees
- FAA guidance
- Future development plans of the airport
- Densities of dwellings with regards to public safety
- Protection of the public investment in airports
- Views of surrounding land owners

As such, the Kentucky Airport Zoning Commission is empowered to regulate land use, including density and building height, in order to ensure the future compatibility of military operations at airports with surrounding land uses. The powers of the Kentucky Airport Zoning Commission, however, do not prevent local governmental authorities from also regulating land use. Local governmental authorities may also use land use regulations to protect safety and the public interest in and around airports; however they must defer to the Kentucky Airport Zoning Commission where the Commission's requirements are more stringent.

# 7.0 Compatibility Tools



**FORT CAMPBELL**

Joint Land Use Study Update



## OVERVIEW

The JLUS Update document is intended as a series of tools that the Army and the local governments can choose to adopt during the implementation phase of the JLUS process. All of the entities participating in the JLUS, including the Army and cities and counties, retain the responsibility of selecting those compatibility tools that best reflect the specific issues, concerns, and needs of each stakeholder.

The tools identified below are the result of a thorough, good-faith effort on the part of the Technical Coordinating Committee (TCC) and the Executive Committee (EC) to assess the existing and foreseeable effects of Fort Campbell, Campbell Army Airfield (CAAF), and Sabre Army Heliport (SAH) on adjacent land and to develop a set of options that promote collaborative regional decision-making and balance community and military interests while meeting the following goals:

- Protect the military mission
- Protect the health, safety and welfare of the military and civilian communities
- Sustain economic development and protect property rights
- Protect the environment
- Tailor options to each community
- Secure proper funding and administrative resources for implementation
- Maintain political feasibility

This section organizes findings into two parts:

1. An overview of available encroachment reduction strategies
2. A prioritized list of feasible encroachment reduction measures

The supporting Appendices include land use compatibility guidelines, specific examples of recommended ordinances, agreements, and public outreach materials.

## AVAILABLE ENCROACHMENT REDUCTION STRATEGIES

The TCC evaluated a wide range of tools based on criteria such as: feasibility; likely effectiveness; the availability of resources for implementation; the ability to protect the military mission and installation sustainability; the ability to protect the economic health of the region and individual property rights; and the overall ability to protect health, safety, welfare, and quality of life.

The tools are also intended to address a variety of possible land use and operational issues, including physical adjacency to Fort Campbell/CAAF/SAH, conservation or natural resource value, noise, air safety (both for people on the ground and for aviators), and light pollution.

The descriptions below include strategies that may not yet be fully feasible in the Fort Campbell region, but have value as long-term approaches to minimizing incompatible development around the installation. In other cases, the participating entities have partially adopted available strategies and the prioritized recommendations focus on enhancing these current measures. As development conditions and mission impacts evolve, the JLUS encourages local officials and planners to revisit this list of strategies to further refine and strengthen their set of encroachment reduction tools.

## CONSERVATION

Conservation refers to a series of tools designed to eliminate land use incompatibilities and preserve critical lands through voluntary transactions in the real estate market and local development process. These strategies are particularly effective because they advance the complementary goals of shifting future growth away from the installation, while protecting the environment and wildlife habitats, maintaining agriculture/silviculture, and conserving open spaces and rural character.

As part of this strategy, Fort Campbell has partnered with the Land Trust for Tennessee and the Kentucky Department of Agriculture to explore the purchase of conservation easements from willing property owners within high priority acquisition areas identified under the Army Compatible Use Buffer (ACUB) Program. The Army has identified priority areas near CAAF and other lands to the north and south of the installation. The ACUB program has emerged as one of the most effective of the sustainability initiatives in preventing encroachment around installations. The core implementation strategy of the program is to acquire conservation easements that prohibit incompatible development in perpetuity, while allowing the land to remain in private hands. While the restrictive covenant prohibits urban development, it accommodates low impact uses such as farming and forestry that do not pose a risk of interference with nearby training activities.

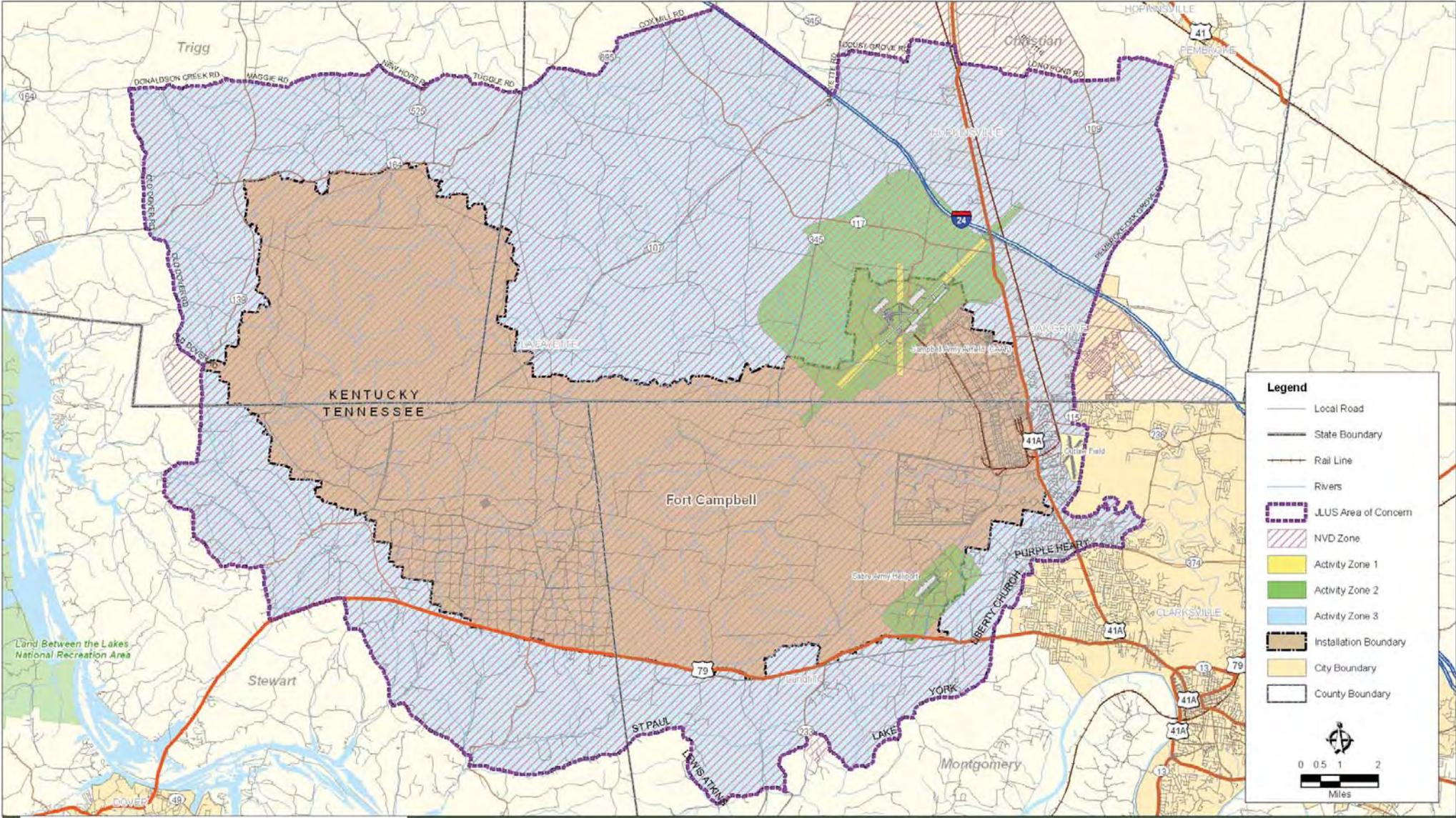
Local governments can participate in the conservation process by acting as direct cost-sharing partners in conservation easement purchases or by aligning their infrastructure and land use policy to reinforce the rural/agricultural character of areas near or within the designated ACUB. The prioritized actions identify specific complementary roles for adjacent local governments in the acquisition of development rights or the use of quality growth strategies to direct public services and new growth away from undeveloped areas in proximity to the installation.

## ZONING

Zoning requires activities, such as industry, retail, recreation, agriculture, and very low density/rural residential that maintain compatibility with post and airfield operations and overflight areas. Compatible activities generally avoid the concentration of people and show lower sensitivity to noise and other possible operational impacts. Zoning typically also regulates the effects of private land uses on nearby military training by, for example, minimizing light pollution or limiting the height of structures that may interfere with navigable airspace. As part of this strategy, local governments would create a specialized Military Activity Zoning District that governs uses within established noise zones contours and Accident Potential Zones.

While several jurisdictions, including the City of Oak Grove, the City of Hopkinsville, and Montgomery County have zoning procedures in place to promote the compatibility of development near military activity, unincorporated portions of adjacent counties, particularly to the north and southwest of the post, are not subject to comparable land use controls under a county-wide zoning ordinance. Currently, Christian, Trigg, and Stewart Counties do not have county-wide zoning in place.

The JLUS emphasizes that county-wide zoning in Christian, Trigg and Stewart Counties can be an effective long-term strategy for managing eventual residential and commercial growth around the installation, as well as promoting quality, cost-efficient development throughout the



**Legend**

- Local Road
- State Boundary
- Rail Line
- Rivers
- ⬡ JLUS Area of Concern
- ▨ NVD Zone
- Activity Zone 1
- Activity Zone 2
- Activity Zone 3
- ▭ Installation Boundary
- ▭ City Boundary
- ▭ County Boundary

0 0.5 1 2  
Miles

**FORT CAMPBELL**  
Joint Land Use Study Update

**Figure 22**  
Fort Campbell Activity Zones

counties. However, it should be noted that zoning can only be implemented at the discretion of the local jurisdiction. Fort Campbell or the JLUS Partnership does not have any authority to impose zoning regulations/land use controls on local jurisdictions.

Appendix H contains a model ordinance for possible zoning districts around Fort Campbell. The ordinance divides land into three zones based upon the level of impact from military operations and then regulates residential density, intensity of non-residential uses, building height, and exterior lighting, and requires indoor noise attenuation and real estate disclosure.

Three districts are established for the Fort Campbell Activity Zones (FCAZ): FCAZ I, FCAZ II, and FCAZ III. FCAZ I includes the Clear Zones and Accident Potential Zone I associated with Campbell Army Airfield. FCAZ II includes Accident Potential Zones II and all areas within the noise zone LDN 70 (see the Public Safety Buffer Area on **Figure 22**). FCAZ III includes all land inside the JLUS Area of Concern. Regulations are the most restrictive in FCAZ I and relax for FCAZ II and III.

While this section identifies zoning as a long-term strategy that warrants ongoing consideration by local officials and residents, the list of prioritized actions below explores near-term alternative land use policies that can assist in reducing emerging conflicts at the community/military interface, as well as other mechanisms for addressing lighting and height issues.

### SUBDIVISION REGULATIONS

Even communities without zoning often have subdivisions regulations at the engineering and site planning stage in the development process that govern the size, shape, configuration, orientation and utility access for a tract of land or an individual lot. Special environmental considerations have become accepted as part of the subdivision development process and are justified under the delegated police powers to protect the public health, safety, and general welfare.

In the interest of protecting public health and safety, a subdivision regulation may prohibit the subdividing of property into residential lots if the tract is within a designated ICUZ/ENMP high noise zone recognized by the local approving authority as the maximum threshold for intrusive noise. Similarly, commonly used local police powers can prohibit the subdivision of land into residential building lots if the subject property is in one of the more restrictive air safety zones, such as a Clear Zone or Accident Potential Zone I.

### NOISE ATTENUATION

Attenuation refers to special design and construction practices intended to lower the amount of noise and vibration that penetrates the windows, doors, and walls of a building. Local governments should require attenuation as part of building code enforcement for new residential and other noise sensitive construction in certain noise affected areas (typically in excess of 60 dB). Attenuation practices are most effective for areas subject to A-weighted noise, generated by aviation activity. Air operations are the major source of noise affecting surrounding lands. Both the City of Hopkinsville and Montgomery County have adopted military noise reduction standards for development in proximity to CAAF and SAH.

Sound attenuation guidelines are available in the latest advisory document: *Guidelines for Sound Insulation of Residences Exposed to Aircraft Operations, 2005*.

### REAL ESTATE DISCLOSURE

Disclosure requires the release of information on possible impacts (dust, smoke, noise/vibration, air safety zones) to prospective buyers or renters as part of real estate transactions for properties close to Fort Campbell/CAAF/SAH (i.e. inside the JLUS Area of Concern). Local governments would implement this tool by adopting a local real estate disclosure ordinance and seeking the participation of real estate professionals.

Montgomery County requires that building permit applicants sign a noise disclosure stating that premises may be exposed to excessive noise levels from the heliport in Noise Zones 2 and 3.

Appendix C contains a sample real estate disclosure form and real estate disclosure ordinance.

### AVIGATION EASEMENTS

An avigation easement is a form of disclosure aimed at the developer, rather than the individual buyer, during the initial stages of platting. An easement is the right granted to a third person to use private real property in a specified manner. An easement may be given, for example, for overhead wires, underground gas, power, sewer or storm drain lines, and sidewalks or roads. An avigation easement is a property right acquired from a land owner that grants the right of military training activities in proximity to the affected parcel, including the right to:

- cause noise, vibration, dust, etc.
- restrict or prohibit certain lights, electromagnetic signals, or land uses that could interfere with communications technology and safe aircraft operation; and
- ensure unobstructed airspace over the property above a specified height

The easement runs in perpetuity with the deed to the property. Local governments increasingly rely on such easements to protect military operations against encroachment from nearby developing areas. Local governments, for example, may establish the granting of an avigation easement by the developer as a condition for the approval of a proposed new residential subdivision in areas subject to military training impacts, such as a high noise zone or Accident Potential Zone.

Appendix D contains a sample avigation easement form.

### COMPREHENSIVE PLANS

As part of this option, local governments would include specific language on JLUS coordination as part of Comprehensive Plan development or update. The Comprehensive Plan establishes a firm legal basis for the implementation of compatibility actions and sets the policy framework to regulate development through local land use regulations.

The plan can emphasize the relationship between the community and the military, the desire to promote cooperative land use planning and complementary land use goals, such as agricultural conservation and environmental protection, and clear guidelines about appropriate future land use in areas vulnerable to encroachment.

An increasingly popular strategy is for local governments to develop a Military Influence Planning

District (MIPD) Element within the Comprehensive Plan. This element is devoted exclusively to the collaborative relationship between the local government and military installation and integrates all policies that may promote compatible development, including communication procedures, conservation and land use policy, and transportation and infrastructure policy. The current Clarksville-Montgomery County and Hopkinsville-Christian County Comprehensive Plans already contain some language on military compatibility. In the State of Kentucky, KRS 183 requires a military compatibility section in Comprehensive Plans for those jurisdictions in proximity to an installation.

Appendix F contains sample Comprehensive Plan language.

## INFRASTRUCTURE

The provision of infrastructure is typically based on public need and necessity and reflects the Comprehensive Plan of the city or county. As part of this strategy, local governments would consider the impacts of both public and private infrastructure installation/extension (e.g. water and sewer facilities) into noise and safety affected areas around Fort Campbell/CAAF/SAH. New infrastructure can induce or support incompatible growth patterns, such as denser residential development, especially if compatible zoning and land use guidelines are not in place.

Since capital investment decisions in turn influence private market location decisions, it is critical that local governments link their Work Programs and Capital Improvement Plans to compatibility goals. Installing infrastructure such as water, sewer and roads in planned growth areas and away from areas of operational impact clearly reduces the conflicts associated with denser development near the installation. Regional Transportation Improvement Plans (TIP) should also reflect the need to limit road capacity projects in areas near the installation where development can interfere with the military mission. Community officials should also consult with military installation planners as part of the local planning and facilities programming decisions.

## COMMUNICATION

Under this approach, participating jurisdictions would develop appropriate mechanisms to ensure that residents, developers, businesses, and local decision-makers have adequate information about Army operations, possible impacts on lands surrounding Fort Campbell/CAAF/SAH, procedures to submit comments, and any additional local measures to promote land use compatibility around the installation. Governments should use all available media, including posters, brochures, and city and county web sites to convey the information.

In addition to the actions of the local governments to communicate the impacts of Fort Campbell/CAAF/SAH, the Area Development Districts and Regional Councils should post maps on their websites of properties within the designated noise, safety and planning buffers. Ideally, land owners, developers, and prospective renters or buyers could access a searchable database of properties in these areas.

Similarly, the Army would build on existing communication with its neighbors through methods such as publishing planned training schedules (training schedules change day-to-day) and operational guidelines for night training on the post web site; ensuring a continued role for a highly visible Fort Campbell liaison to address noise and other issues and brief the communities; enhancing current noise reporting procedures; providing a central (toll-free) contact number for the public to report military concerns; and updating the brochure/poster on post mission and

activities, operational impacts and mapped noise contours, and other compatibility issues.

### COORDINATION

Under this approach, local governments would promote collaboration by sharing information on specific community development proposals (rezonings and subdivisions) within designated buffers around Fort Campbell/CAAF/SAH. Several local governments (the City of Oak Grove, the City of Hopkinsville, Clarksville-Montgomery County, Christian County) have established procedures for consulting military representatives regarding development activity within a designated buffer of the installation (typically one mile).

It should be noted that only the local government can approve or disapprove zoning and subdivision proposals. Fort Campbell consults strictly on an advisory basis. The JLUS recommends enhancing current coordination measures by including jurisdictions that have not yet established a comparable consultation process and by encompassing all property within the JLUS Area of Concern.

A Memorandum of Understanding (MOU) is a “good faith” document that further establishes procedures for communication among affected parties and formalizes collaboration among multiple stakeholders. Several jurisdictions currently have active MOUs in place with Fort Campbell, including the City of Oak Grove, the City of Hopkinsville, Clarksville/Montgomery County, and Christian County. Prioritized actions suggest enhancing existing agreements to include additional provisions related to lighting, conservation, and infrastructure extensions and broadening participating entities to include all counties around the installation, as well as Departments of Transportation and local utility providers.

Appendix E contains examples of MOUs.

### CLUSTERING

Clustering can be an effective tool in promoting land use compatibility around a military installation, particularly on larger parcels that straddle a noise or safety boundary. Under clustering (also known as conservation design), developers can separate the buildable areas of the parcel from areas that have a development constraint, such as noise or safety risk exposure. The district then allows more compact lots in the developable portion of the site in exchange for the permanent protection of land in the constrained area. This essentially becomes a density-neutral transfer of development rights onto another portion of the same parcel outside of areas adjacent to the post, targeted conservation areas or designated noise or air safety zones. Also as part of this strategy, local governments could require developers to use low impact site design principles, including the creation of green space/conservation buffers that can support noise and safety impact mitigation.



### TRANSFER OF DEVELOPMENT RIGHTS

Local governments could also pursue a pure transfer of development rights (TDR) program, which shifts growth from a designated “sending area” with development constraints (noise or air safety

zones, areas adjacent to the post, conservation buffers) to a designated “receiving area” that does not have site limitations. This transaction takes place voluntarily in the free market. The owner of the constrained land sells the development credits established under zoning to a buyer who then can develop additional residential density on another property based on the number of credits purchased. Both Kentucky (KSR 100.208 Transferable development rights) and Tennessee state laws grant local governments the authority to adopt a local TDR program. This option poses more of an administrative challenge than the simple clustering of houses and requires strong market pressures for development combined with a limited supply of available land. Given the relatively rural character of the region, a TDR program is not be feasible tool in the near-term, but may have long-term applicability in select areas, particularly in Clarksville-Montgomery County as population growth continues.

### **OUTDOOR LIGHTING STANDARDS**

While military flight operations generate noise and pose a statistically measurable, albeit low, safety risk to surrounding areas, nearby civilian uses can, in turn, produce conditions that interfere with aircraft operations. Among the most common of these hazards stems from the use of excessive and unshielded outdoor lighting. Outdoor lighting systems, especially lighting associated with billboards, gas stations, major roadways, athletic fields, and large commercial or industrial uses often allow significant light to travel upward into an otherwise darkened sky. The resulting “light pollution” can obscure pilot vision or interfere with the use of night vision training devices.

Montgomery County has established the Sabre Heliport Overlay District ordinance, which regulates design criteria within the Aircraft Light Sensitive Area and the City of Hopkinsville adopted lighting design criteria in 1999 as part of its zoning overlay. The City of Oak Grove adopted an ordinance for outdoor lighting standards in August of 2007. The consistent application of exterior lighting standards around the installation is critical for maintaining the safety of aviation operations.

Appendix G contains two models of proposed outdoor lighting regulations.

## **PRIORITIZED LIST OF ENCROACHMENT REDUCTION MEASURES**

As noted earlier, the four surrounding counties have adopted some of the best compatibility practices available to defense communities throughout the country. A review of current measures, however, indicates critical gaps in the region’s encroachment reduction approach, both in the form of geographic areas that remain unregulated and or in existing policies that require stronger provisions.

The following is a list of feasible, near-term measures developed on the basis of the planning team’s compatibility findings and feedback from area stakeholders and officials. While the communities and the Army should continue to broaden and refine their array of compatibility planning tools, these high priority actions seek to address the most pressing land use conflicts around Fort Campbell.

## 1. ADOPT OUTDOOR LIGHTING STANDARDS TO PROTECT THE NIGHT VISION DEVICE ENVIRONMENT FROM LIGHT INTRUSION

Previous descriptions of Fort Campbell's military mission emphasize that the installation is one of the most intensively used night-time training facilities in the U.S. Army. Continued community growth, particularly along U.S. Highway 41A and U.S. Highway 79 in the vicinity of CAAF and SAH will continue to exacerbate current issues of overlighting and unshielded lighting. The resulting light pollution adversely affects night vision device (NVD) operation and could curtail future night time training and readiness activities at the post. Regulations that minimize interference with the NVD environment do not require the strict prohibition of exterior lighting or the complete replacement of existing lighting fixtures. Instead, regulations focus on installing less intrusive lighting applications either for new development or as part of the routine maintenance/replacement of public utilities.

Local governments and Fort Campbell have two options for implementing exterior lighting standards:

- A zoning-based method that regulates the performance of new lighting applications within a geographically targeted area, through a zoning overlay district
- Use of building permit process as the regulatory vehicle to control poor quality exterior lighting

### 1.A Zoning Based Lighting Regulations

Based upon analysis of planning team members assessing the night vision device environment, a regionally-based model lighting ordinance with standards for the following property types and facilities would be the most effective tools for protecting aviator and overall safety.

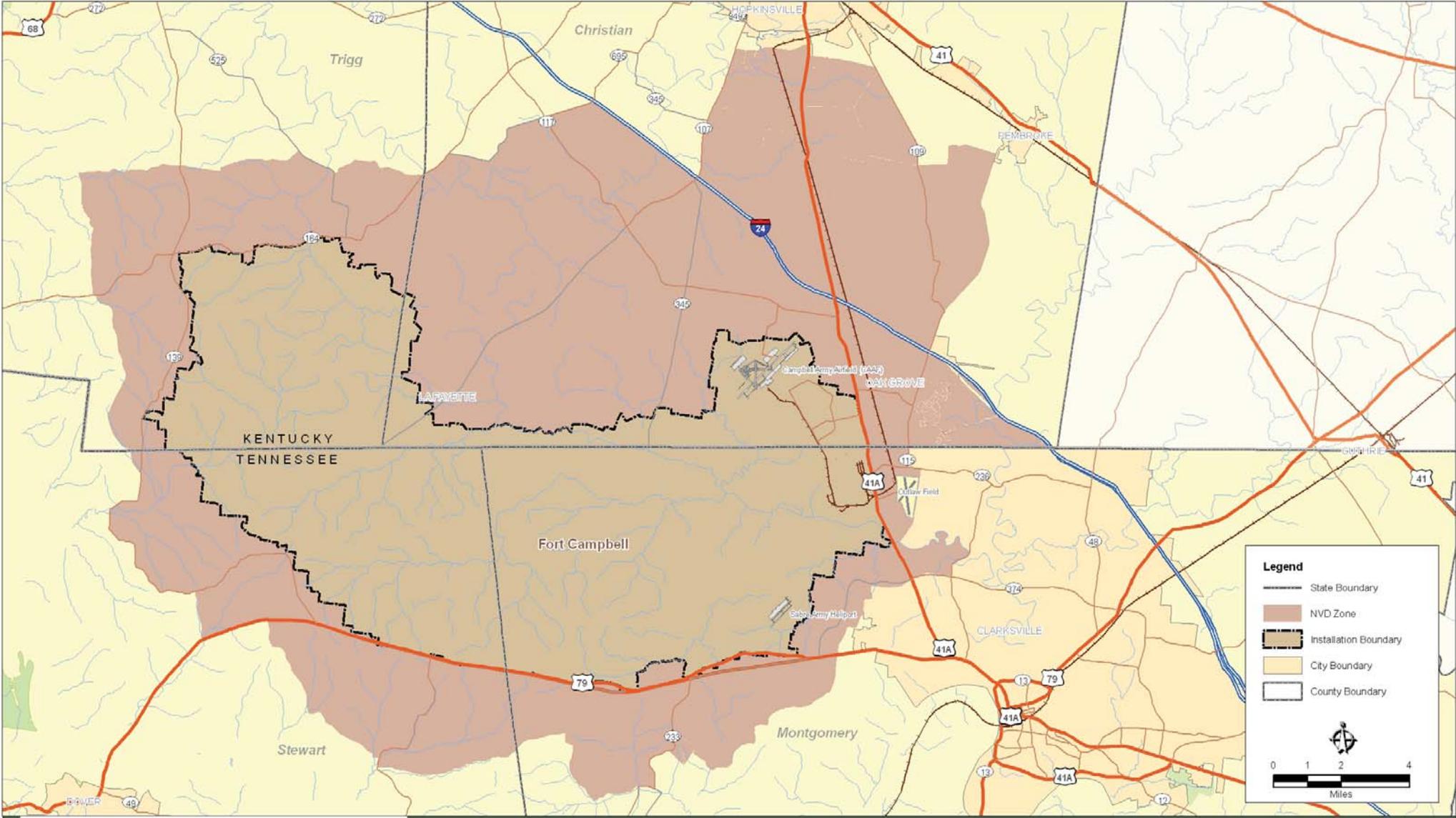
- Commercial applications
- Utility company provided residential lighting systems
- Public streets, roads and highways
- Public structures
- Fort Campbell
- Signs
- Temporary lighting

The supporting Appendix contains a model lighting ordinance that requires fully shielded lighting applications for new non-residential uses within the designated Night Vision Device (NVD) Lighting Zones (See **Figure 23**).

This model is intended as an interim ordinance that local governments can readily adapt to conform to the National Model Lighting Ordinance (MLO) now being developed jointly by the Illuminating Engineering Society and the International Dark Sky Association.

The ordinance proposes an NVD zone as shown on **Figure 23**. This zone is intended to encompass all property in proximity to airfield operations and the post's low level flight corridors. The proposed ordinance refers to this area as the "Night Vision Device (NVD) Influence Area." The recommended NVD Influence Area includes the following features:

- flight approaches of SAH & CAAF



**Figure 23**  
**Night-Vision Device Lighting Zone**

- primary flight corridors surrounding the installation
- Fort Campbell Zone of Influence
- key interchanges in close proximity to Fort Campbell and/or major aviation routes
- existing light-sensitive zones (SUD-41A, SAH Overlay & Oak Grove Lighting Ordinance)

The boundary of the NVD zone is tied to nearby local roads or other easily-identifiable features to ease identification of regulated areas. Fort Campbell operations can also be affected by large highly-lit projects (such as large interchanges or major industrial/commercial developments) constructed outside of the NVD. Beyond this boundary, the installation has indicated an interest in working with local officials on a case-by-case basis.

Under the Tier 1 Ordinance, all unzoned land or property zoned for agricultural and residential uses within this boundary defaults to Lighting Zone 2 (LZ2). All other zoned property, including commercial, industrial and institutional uses falls under the standards set for Lighting Zone 3 (LZ3). Property owners may request a re-designation to a higher and therefore less stringent lighting zone as part of the rezoning or development process.

- **LZ 2.** Low-density suburban and urban neighborhoods and suburban commercial districts. This zone is intended to be the default condition for suburban areas.
- **LZ 3.** Medium to high-density urban neighborhoods and districts, shopping and commercial districts, industrial parks and districts. This zone is intended to apply only to Central Business District(s) and areas having unique character such as auto malls.

The ordinance is a prescriptive-based code that regulates the installation of new lighting systems, modifications to existing lighting systems or the replacement of lighting fixtures for non-residential uses, common residential areas and street lights. Property owners outside of these zones are encouraged, but not required to comply with the lighting provisions.

See Appendix G for two sample model ordinances. The Tier 1 sample is a more comprehensive ordinance appropriate for mid- to long-range implementation by partner jurisdictions that includes provisions to control the impacts of unshielded and overly intense lighting, as well as reduce light trespass on neighboring properties. The more basic Tier 2 ordinance is intended to address the immediate need for preventing improper lighting practices that lead to uplighting. The lighting zones (LZ 2 and LZ 3) described above are only applicable for the more advanced Tier 1 ordinance.

### **1.B Building Code Based Regulations**

Jurisdictions that lack the formal powers to enact land use regulatory language based on zoning ordinances can use the building permit process as the regulatory vehicle to control poor quality exterior lighting. Local governments would require that site plans submitted as part of the commercial, industrial, and multi-family permitting process include information on the design of outdoor lighting to be installed in the project. Failure to comply with the requirement for fully shielded lighting would result in a building denial or a required modification of lighting practices prior to permit approval.

In addition to developing regulatory or code enforcement tools to promote the use of shielded lighting applications within the Night Vision Devis Influence Area, local communities should continue to conduct an aggressive outreach campaign to educate business owners, developers,

and representatives from State Departments of Transportation and local utilities about the importance of installing less intrusive lighting fixtures. Street lighting in particular is an ongoing source of light pollution. The integration of shielded fixture designs in roadway projects can play a major role in reducing night sky degradation. Similarly, private utility companies often provide property owners with security and agricultural lighting. The distribution of more sensitive lighting applications within the surrounding four-county area would also assist in eliminating sporadic light intrusion inside and outside of the Night Vision Device Influence Area. A later recommendation includes examples of agreements with transportation and utility officials intended to reinforce their cooperation.

Appendix G contains a series of supporting documents to facilitate community outreach on lighting issues: an Ordinance narrative intended for use as a handout to members of the public; Sample Lighting Applications by User Type; and International Dark-Sky Association Information Sheets on topics such as billboards, gas stations, sports lighting, towers, canopy lighting, cobra head style lighting, full cut off fixtures, and good and bad lighting examples.

## 2. CONTROL DEVELOPMENT DENSITY IN THE PUBLIC SAFETY BUFFER AREA AT CAAF

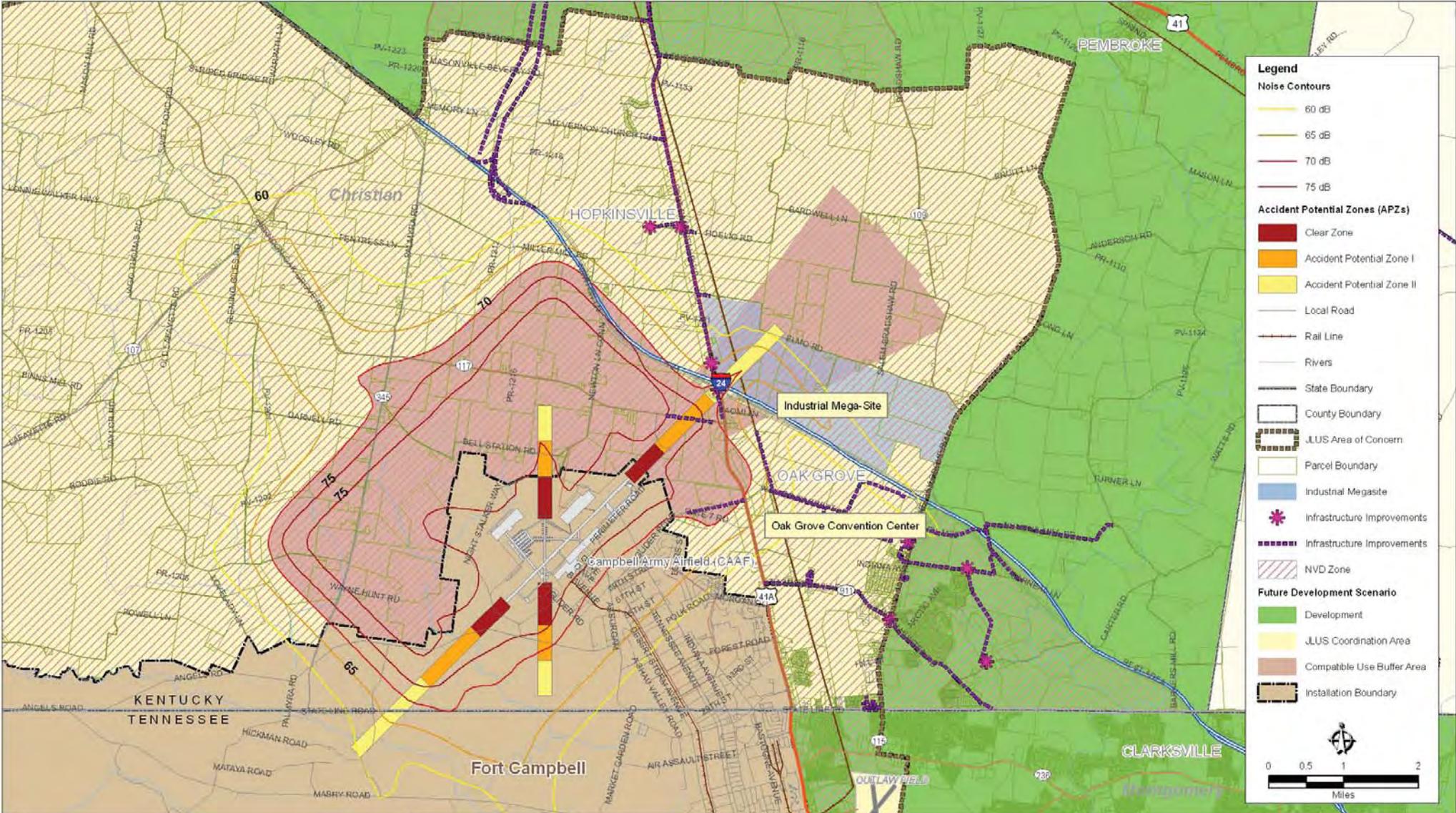
The JLUS compatibility analysis has identified the Public Safety Buffer to the northwest of Campbell Army Airfield as the most critical area around the installation to protect from future residential and intensive commercial growth. The buffer as shown on **Figure 24** includes land that falls within the 70 dB noise contours, the Accident Potential Zone I and Accident Potential Zone II associated with the north-south CAAF runway, and the previously secured aviation easements for property under the primary runway oriented to the northeast of CAAF.

Land use compatibility guidelines from the Department of Defense suggest that multi-family homes or single-family housing in excess of one dwelling unit per acre may pose a conflict with the noise and air safety risks associated with nearby aircraft operations. Any housing construction in this zone should also incorporate indoor noise reduction practices. The guidelines indicate that less people-intensive non-residential uses, such as warehousing, agriculture, and very small scale retail may be an appropriate fit. Certain noise sensitive uses and/or uses that concentrate people, such as schools, churches, and medical facilities are particularly vulnerable to the risks of aircraft operation and are accordingly deemed incompatible. These lower residential densities are also desirable for maintaining the rural agricultural character of this area.

Typically, local communities can regulate the size, intensity or type of land use in a specific area through zoning procedures. The Public Safety Buffer at CAAF falls within unincorporated Christian County, which does not currently exercise zoning authority. As noted earlier, comprehensive county-wide zoning would be an effective local vehicle for preventing incompatible development around Fort Campbell and promoting quality growth outcomes.

The county, however, has several policy tools available to restrict future development in the Public Safety Buffer without county-wide zoning. Feasible near-term options include:

- Limiting the public extension of centralized wastewater services into the designated Public Safety Buffer; or
- Restricting the subdivision of land for residential purposes in a higher noise zone or Accident



**Legend**

**Noise Contours**

- 60 dB
- 65 dB
- 70 dB
- 75 dB

**Accident Potential Zones (APZs)**

- Clear Zone
- Accident Potential Zone I
- Accident Potential Zone II

**Other Symbols**

- Local Road
- Rail Line
- Rivers
- State Boundary
- County Boundary
- JLUS Area of Concern
- Parcel Boundary
- Industrial Megasite
- Infrastructure Improvements (pink star)
- Infrastructure Improvements (purple dashed line)
- NVD Zone (hatched)

**Future Development Scenario**

- Development (green)
- JLUS Coordination Area (yellow)
- Compatible Use Buffer Area (brown)
- Installation Boundary (dashed line)

Scale: 0 0.5 1 2 Miles

**Figure 24**  
JLUS Area of Concern - CAAF Sub-Area Future Compatibility Scenario

Potential Zone based on a public health, safety, and general welfare provision.

#### ***Limitations on Wastewater Treatment Infrastructure Extensions***

The provision of sewer capacity has the well-documented effect of physically shaping a community's growth patterns and supporting more intense development within its service areas. While land in the Public Safety Use Buffer is currently without access to centralized wastewater lines, the eventual extension of such infrastructure could facilitate land subdivision and development. This strategy does not recommend a prohibition of central system connections to privately financed infrastructure installations, but instead urges local utility authorities to minimize publically funded improvements that could have the unintended result of inducing incompatible development near Fort Campbell. Limitations on access to public sewer specifically within the Public Safety Buffer (See **Figure 24**) would alter the economics of land development (making development more costly and thus less appealing to developers) and require larger lots to support individual septic systems, thus effectively capping potential residential density.

The county could put this strategy in place by developing infrastructure extension guidelines for the Hopkinsville Water Environment Authority and the Oak Grove Water District that restrict public expenditures for the installation of new sewer lines in the Public Safety Buffer.

#### ***Public Safety Subdivision Regulation Provisions***

Even without zoning, the local subdivision process commonly includes special environmental considerations that protect the public health, safety, and general welfare of the community based on delegated police powers. Regulations could, for example, deny approval for the subdivision of land for residential purposes in areas with characteristics such as the floodplain of streams and rivers and steep or unstable slopes. The regulations could therefore justifiably recognize the inherent risk of placing housing in proximity to active aviation operations by adding similar provisions to prohibit the creation of individual housing lots within a designated high noise zone (deemed as 70 dB+) and within a designated APZ-I.

#### ***Hopkinsville-Christian County Industrial Mega-Site***

Along with protecting the Public Safety Buffer, local officials should ensure that any future development of the industrial mega-site in Christian County follows several development conditions to minimize the risk of air safety conflicts, including:

- prohibiting the manufacture or storage of chemical and hazardous materials on the site;
- prohibiting the use of the site in any manner that creates electrical interference with navigational signals or radio communication between CAAF and aircraft;
- prohibiting the use of the site in any manner that interferes with aviator vision, including any type of reflective/glare-producing building exterior; unshielded, high-intensity exterior lighting or signage; highly reflective surface lot or roadway materials; smoke, gas or steam emissions
- prohibiting any site elements or land uses that may attract birds or water fowl, such as water features or landfills;
- enforcing consistency with existing CAAF avigational easement conditions on the site;
- minimizing the placement of structures or labor-intensive activities in Accident Potential Zone 1 (APZ I); site design should set a maximum total lot coverage of 20 percent; establish

a one-story maximum for any buildings; and direct activities that concentrate employees during regular shift hours away from APZ I

The site must also comply with the airspace regulations enacted by the KY Airport Zoning Commission. If the industrial mega site anchors a major economic generator, such as an automobile assembly site, it could also spur ancillary development in the form of suppliers, supporting retail, and workforce housing. Local officials should prepare for such induced development by identifying suitable growth areas away from the noise zones and active airspace associated with CAAF.

### **3. CONTROL DEVELOPMENT DENSITY IN THE RURAL PLANNING AREA WEST OF SAH**

The Sabre Heliport Overlay District ordinance in Montgomery County, TN effectively governs land use in the Public Safety Buffer that encompasses noise contours from the airfield and land that is in close proximity to the installation boundary north of the old U.S. Highway 79 alignment. The ordinance regulates development and lighting, requires disclosure and indoor sound attenuation, and restricts structure height in Approach and Departure Surface Areas.

This recommendation instead focuses on an area of the county to the west of State Road 233, shown as the Rural Planning Area on **Figure 25**. New roadway capacity along U.S. Highway 79 will very likely induce commercial growth and residential subdivisions along this corridor in the years ahead.

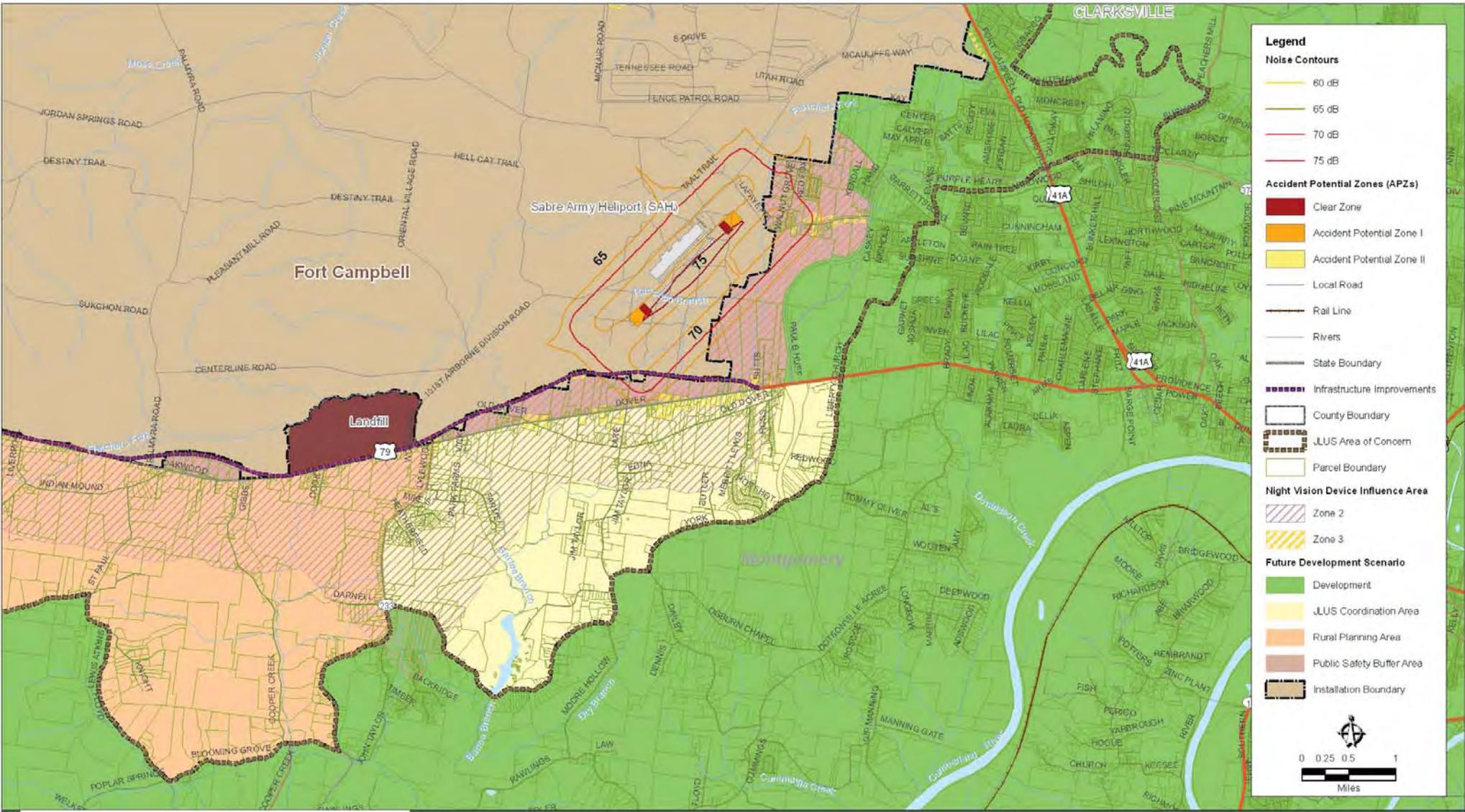
Clarksville/Montgomery currently designates this area as rural because it is outside of the Urban Growth Boundary and the Planned Growth Areas. The city/county should seek to preserve the rural character of this area even as market conditions evolve by directing future development back to land that is contiguous with existing development and public infrastructure. Under quality growth planning, mixed use nodes and traditionally designed neighborhoods in Planned Growth Areas could readily absorb future population increases, while relieving pressures to develop on the urban fringe.

All infrastructure, land use, and environmental protection policies should work in concert to reinforce this critical boundary and minimize scattered residential and commercial uses along U.S. Highway 79. Future development permitted in this area should not exceed more than one dwelling unit per acre and should fully comply with measures to reduce night sky degradation from exterior lighting sources.

### **4. CONDUCT CORRIDOR MANAGEMENT STUDIES ALONG U.S. HIGHWAY 41A AND U.S. HIGHWAY 79**

Growth along U.S. Highway 41A between Oak Grove and Hopkinsville and on U.S. Highway 79 west of Liberty Church Road represents the most significant foreseeable land use compatibility threat to Fort Campbell. Early access management along developing corridors is one of the most effective mechanisms for controlling the vehicular, aesthetic, and development impacts of strip commercial activity.

Access management entails the coordination of driveway design and spacing, median openings, interchanges, traffic lights, and street connections. The primary purpose of the management plan is to create access for future land development, while preserving the safety and efficiency of the transportation system. The State of Kentucky has implemented an Access Management Program.



**Legend**

**Noise Contours**

- 60 dB
- 65 dB
- 70 dB
- 75 dB

**Accident Potential Zones (APZs)**

- Clear Zone
- Accident Potential Zone I
- Accident Potential Zone II

Local Road

Rail Line

Rivers

State Boundary

Infrastructure Improvements

County Boundary

JLUS Area of Concern

Parcel Boundary

**Night Vision Device Influence Area**

- Zone 2
- Zone 3

**Future Development Scenario**

- Development
- JLUS Coordination Area
- Rural Planning Area
- Public Safety Buffer Area
- Installation Boundary

0 0.25 0.5 1 Miles

**Figure 25**  
JLUS Area of Concern - Sabre Sub-Area Future Compatibility Scenario

Tennessee has less comprehensive regulations controlling driveway spacing on interstate highways.

While access management efforts are mainly geared toward easing the flow of vehicular traffic, corridor management plans can also include a land use and design component. As part of this broader effort, participating stakeholders can develop a long-term vision for the corridor under study and identify supporting land use policies to cluster development at key intersections and to protect open space along strategic stretches of the roadway. Active planning is essential to counteract the common market tendency to evenly spread low density commercial in a linear pattern along road frontage.

Adherence to quality growth principles could, for example, reinforce green space separators between communities such as Hopkinsville and Oak Grove and guide new commercial uses toward designated activity nodes at major intersections contiguous with developed areas and existing infrastructure. This nodal, rather than linear, form of growth could reduce commercial activity near CAAF and SAH and along the installation's southern boundary. Corridor planning efforts are best conducted as a regional and multi-jurisdictional process that includes all affected communities and their key stakeholders.

## 5. EXPAND COORDINATION AND COMMUNICATION POLICIES FOR DEVELOPMENT WITHIN THE JLUS AREA OF CONCERN

Communities should continue or expand the use of two essential communication practices to maintain an ongoing dialogue about compatibility among local governments, the military, and affected private property owners:

- Consultation with Fort Campbell military planners on development proposals; and
- Area of Military Impact notification on plats.

### *Development Consultation*

While communities to the east of Fort Campbell, including Christian County, Clarksville-Montgomery, Hopkinsville, and Oak Grove have established procedures for consulting with Fort Campbell on proposed development activity near the installation, Trigg and Stewart Counties do not have comparable mechanisms for seeking input on the possible effects of adjacent development on the military mission. As development pressure increases and spreads west, Trigg and Stewart Counties should regularly consult with Fort Campbell military planners on plans for major residential subdivisions (i.e. in excess of five housing units) and large commercial and industrial uses. The intent is not to require the review of all development projects, but to ensure adequate coordination on new planned communities, retail plazas, industrial parks and other large land users that may concentrate people or generate secondary issues such as light intrusion. Consultation is recommended only for those proposed developments inside the JLUS Area of Concern.

Local governments to the east of the installation should continue to consult with Fort Campbell regarding development proposals for land inside the JLUS Area of Concern. This consultation would include property designated as part of the JLUS Coordination Area shown in **Figures 24** and **25**. Fort Campbell should also consult with local jurisdictions on military actions that may significantly affect surrounding communities.

***Area of Military Impact Plat Notification***

In addition to promoting coordination between the community and military sectors, local officials should ensure that property owners receive adequate information on the impacts of nearby military activity. At a minimum, all plats inside the Area of Concern should contain language on possible exposure to noise and military overflights.

**6. CONTINUE AND EXPAND REGIONAL COORDINATION**

The stakeholders of the region have a history of collaboration dating back more than a decade to the 1996 Joint Land Use Study effort. Community representatives meet as part of the JLUS Partnership and Fort Campbell conducts regular briefings for civilian officials on compatibility and conservation projects and mission-related activities. This JLUS effort strongly urges the continuance of these regional forums on approximately a bi-annual basis to maintain an open dialogue between military and community leaders and planners. It is also critical that communities that have been previously less engaged in the joint planning process designate a clear point of contact to interact consistently with Fort Campbell military planners.

The JLUS Partnership should also consider updating its charter to reflect emerging issues related to transportation and utilities infrastructure, regional waste, and regional development.

**7. CONTINUE TO IMPROVE OVERALL COMMUNICATION**

Under this approach, participating jurisdictions would ensure that residents, developers, businesses, and local decision-makers have adequate information about Army operations, possible impacts on lands surrounding Fort Campbell/CAAF/SAH, procedures to submit comments, and any additional local measures to promote land use compatibility around the installations. Governments should use all available media, including posters, brochures, and city and county web sites to convey the information.

In addition to the actions of the local governments to communicate impacts of Fort Campbell/CAAF/SAH, the Area Development Districts and Regional Councils should post maps on their websites of properties within the designated noise, safety and planning buffers. Ideally, land owners, developers, and prospective renters or buyers could access a searchable database of properties in these areas.

Similarly, the Army would maintain and improve communication with its neighbors through methods such as publishing planned training schedules (training schedules change day-to-day) and operational guidelines for night training on the post web site; continuing a role for a highly visible Fort Campbell liaison to address noise and other issues in the community; and creating a brochure/poster on post mission and activities, operational impacts and mapped noise contours, and other compatibility issues. The Army would also enhance on-post procedures for the public to obtain information and report concerns.

## 8. STRENGTHEN AND EXPAND MEMORANDA OF UNDERSTANDING WITH REGIONAL STAKEHOLDERS

Several local governments have signed memoranda of understanding (MOUs) with Fort Campbell laying out procedures for sharing information and promoting land use compatibility around the installation. These agreements, though not binding, are essential for maintaining continuity in regional actions to reduce encroachment.

The JLUS recommends that local governments that have previously participated in MOUs revisit their agreements and sign a more robust document that specifically references designated Public Safety Buffer Areas and additional policies related to conservation and sustainability partnerships, exterior lighting controls, and public infrastructure improvements. The Appendix contains an example of a Tier 1 MOU intended for communities such as Clarksville-Montgomery County, the City of Oak Grove, and the City of Hopkinsville. A more basic Tier 2 MOU (see Appendix) is appropriate for local governments, such as Trigg County and Stewart County that have less severe compatibility issues and growth pressures to address. Trigg County and Stewart County, however, could be more aggressive in carrying out the provisions of previously signed MOUs and in identifying a clear point of contact to assist in coordinating compatibility issues with Fort Campbell and participating in ongoing regional initiatives.

While local governments are typically the signatories on such MOUs, the JLUS also recommends that Fort Campbell seek similar agreements with other regional partners whose cooperation is essential in minimizing incompatible development. The Appendix contains examples of MOUs appropriate for representatives of state Departments of Transportation and Metropolitan Planning Organizations (MOU-DOTs/ADDs/MPOs) and local utilities (MOU-UTILITIES). These MOUs address issues related to public infrastructure improvements and outdoor lighting applications.

## 9. EXPLORE STATE COMPATIBILITY MEASURES

State legislatures may choose to pass legislation to require, by local planning statute, compatible land use plans that support the readiness missions of a nearby military installation. The State of Kentucky, for example, has a statutorily enabled (KRS 183.861) Kentucky Airport Zoning Commission and delegates all powers to establish zoning and land use regulation within and around publicly owned airports to this Commission. This authority explicitly includes military airports. This Commission operates out of the Kentucky Transportation Cabinet, Department of Aviation.

The Kentucky Airport Zoning Commission is authorized to consider the following factors in developing zoning and land use regulations around publicly owned airports:

- Safety of airport users
- Safety of surface persons and property
- Character of flying operations
- Terrain
- Height of existing structures or trees
- FAA guidance
- Future development plans of the airport
- Densities of dwellings with regards to public safety

- Protection of the public investment in airports
- Views of surrounding land owners

As such, the Kentucky Airport Zoning Commission is empowered to regulate land use, including density and building height, in order to ensure the future compatibility of military operations at airports with surrounding land uses. The Commission could be requested to enact land use regulations in order to enforce the recommendations of the JLUS study.

The powers of the Kentucky Airport Zoning Commission, however, do not prevent local governmental authorities from also regulating land use. Local governmental authorities may also use land use regulations to protect safety and the public interest in and around airports; however they must defer to the Kentucky Airport Zoning Commission where the Commission's requirements are more stringent.

The State of Tennessee does not currently have a comparable body, but the JLUS recommends that regional officials advocate for state-based legislative measures to bolster local planning efforts around military installations.

As an example, Florida is one of the innovators of state-wide planning to prevent encroachment around military facilities. In 2004, the state Legislature revised Chapter 163, Part II, Florida Statutes, by adding section 163.3175 and revising sections 163.3177, 163.3187 and 163.3191 of the Growth Management Act. These sections require each affected jurisdiction to consult with the commanding officer of any nearby installation regarding proposed changes to the comprehensive plan and land development regulations that would affect the intensity, density or use of land adjacent to military operations. The law required affected local governments to amend their comprehensive plans by 2006 to include criteria that promote the compatibility of surrounding land uses with military installations. To facilitate the exchange of information, local jurisdictions must include a representative of a military installation as an ex officio, nonvoting member of the local government's land planning or zoning board. The four county governments participating in this effort will prepare amendments to their comprehensive plans after reviewing the results of the study with the Department of Community Affairs and the Navy.

Similarly, the State of Georgia requires local planning entities to request written recommendations from the military commander regarding any rezoning activity within 3,000 feet of an installation or the Clear Zone and Accident Potential Zones Numbers I and II of a military airport. Specifically, planning entities are to consider the following given the proposed land use's proximity to the military facility:

- If the proposal will permit a suitable use to the nearby uses;
- If the proposal will adversely affect the existing use or usability of nearby property;
- If the affected property has a reasonable economic use as currently zoned;
- If the proposed use could cause safety issues to existing infrastructure such as streets, transportation facilities, utilities or schools
- If the proposed change conforms with the policy and intent of the adopted land use plan; and
- If there are existing or changing conditions that would affect the use of nearby property.

## 10. EXPLORE USE OF STATE CONSERVATION PROGRAMS

The conversion of agricultural land to housing and other uses is one of the growth trends that puts America's military installations at risk. As market conditions change, farmers often seek economically viable alternative uses for their large land holdings. Various state programs recognize the value of protecting farming and silvicultural functions. Kentucky's Purchase of Agricultural Conservation Easement (PACE) Corporation, for example, authorizes the state to purchase agricultural conservation easements. The owner agrees to maintain the land in agricultural production and gives up the right to develop the tract in return for compensation. Such tools are a highly effective way to reduce the risk of incompatible development in rural areas in proximity to Fort Campbell such as Christian and Trigg Counties.

As an example of statewide conservation efforts around military installations, Florida has used its land acquisition program, the Florida Forever program to purchase land surrounding military installations for the purpose of reducing future encroachment risks. In 2003, the State of Florida, the U.S. Department of Defense and The Nature Conservancy entered into a partnership to establish a 100-mile protected corridor that connects Eglin Air Force Base and the Apalachicola National Forest. Similarly under its Encroachment Partnering Program, the Navy partnered with the State of Florida in September 2005 to acquire 1,650-acres of buffer land on the eastern and northeastern border of the Outlying Landing Field Whitehouse in Jacksonville. Contributing \$1,695,000 in funds, combined with about \$2,000,000 from the DoD and \$11,000,000 from the State of Florida, the Navy acquired permanent deed restrictions on the property, limiting its use to light recreational activities. The state has now placed the property in its conservation program.

## 11. DEVELOP REGIONAL SUSTAINABILITY PARTNERSHIPS

Fort Campbell is a relatively land-constrained installation and therefore must obtain maximum use of its existing training areas through scheduling, infrastructure improvements, and the protection of adjacent buffers. This notion of the judicious use of available resources is at the heart of the sustainability movement. As with the Army, the surrounding local communities must also get the highest benefit from their limited access to water, farmland, wildlife habitat, and local public funds.

Traditionally, the JLUS process has focused on the careful use of private lands around installations to minimize physical encroachment. The U.S. Army, however, has been actively seeking partnerships with surrounding communities to conserve a broader array of vital resources, such as water and energy. Under Executive Order 13148 "Greening the Government through Leadership in Environmental Management," the Army required all of its installations to implement an Environmental Management System (EMS).

These emerging sustainability partnerships not only protect the long-term viability of the military mission, but improve the efficiency of local governments and enhance overall quality of life for both military personnel and residents. Beyond the widely accepted realm of land development planning, Fort Campbell and the region's counties and cities can collaborate on a variety of strategies intended to improve public infrastructure capacity, increase opportunities for joint service delivery, protect the environment, and promote economic activity, including, but not limited to:

- Evaluating the recreational use of Fort Campbell's training lands to increase recreational access for the region's residents;
- Initiating an outreach/education/awareness program that explores sustainability strategies;
- Creating on-post pilot programs to demonstrate sustainable practices and technologies (such as fully shielded lighting) and participating in a joint web site that contains links to sustainability resources;
- Exploring reduction, reuse, recycling, and composting methods to lower the quantity of solid waste diverted to the Bi-County Landfill and other area landfills;
- Jointly pursuing watershed protection strategies, such as wetlands banking, low impact site development techniques, maintenance of natural vegetative buffers, and stream restoration to ensure surface and ground water quality;
- Sharing regional GIS data on land uses, environmental features, and infrastructure to assist in tracking and monitoring trends;
- Establishing a pilot project to demonstrate alternative energy sources, such as hydrogen fuel cell power or hybrid fuel power;
- Requiring military, as well as new publically funded community facilities to incorporate green building and site design standards or to comply with the Leadership in Energy and Environmental Design (LEED) Green Building Rating System;
- Encouraging the construction of more sustainable systems that use less energy and water;
- Participating in a Sustainable Transportation Plan process that includes community partners, MPOs and ADDs and focuses on long-term performance in areas such as renewable energy, reducing hazardous air emissions, and promoting alternative transportation options;
- Adopting both military and local government procurement practices that support sustainability, such as environmentally preferable cleaning products and more energy efficient building systems;
- Developing a series of sustainability indicators to monitor quality of life in the region and to specifically track growth patterns and encroachment issues around the installation;
- Publishing an annual Sustainability Report that highlights joint military/community initiatives and success stories.

# 8.0 Implementation Plan





## ACTIONS STEPS BY PARTNER

The following section organizes recommended actions by regional partners and divides the suggested measures into near-term (1 to 2 years); mid-term (3 to 5 years); and long-term actions (5 years +). Near-term actions reflect the prioritized strategies identified in the prior section, while mid-term and long-term actions include additional tools discussed in the section on available encroachment reduction strategies.

### CHRISTIAN COUNTY

#### ***Near-term Actions:***

- Adopt proposed exterior lighting controls in the form of building permit requirements in the expanded NVD Influence Area (APPENDIX G)
- Develop one or more of the recommended policy tools to control the subdivision of property and the resulting residential density of development in the designated Public Safety Buffer near CAAF
- Educate property owners about ACUB, PACE and other federal or state funded opportunities to donate or sell development rights on lands with agricultural and silvicultural value
- Participate in a multi-jurisdictional corridor management study of U.S. Highway 41A to shape land use form and commercial sites
- Consult with the Kentucky Airport Zoning Commission to evaluate the feasibility of delegating land use regulation in the vicinity of Fort Campbell
- Sign a Tier 1 MOU intended to expand current information sharing efforts within the JLUS AOC (APPENDIX E)
- Continue to participate regularly in the JLUS Partnership forums and continue consultation procedures with military planners
- Assist in community outreach about the JLUS, ACUB, and new lighting standards and disseminate compatibility information in the form of web postings, posters and handouts (APPENDIX G)
- Collaborate with local governments to continue monitoring and mapping subdivision and building permit activity in the JLUS Area of Concern
- Coordinate with local utilities and the State Department of Transportation to sign MOUs that address issues related to public infrastructure improvements and outdoor lighting applications (APPENDIX E)

#### ***Mid-Term Actions:***

- Update the County Comprehensive Plan to include a Military Influence Planning District Element (APPENDIX F)
- Consider development of a rural conservation based subdivision ordinance that would permit property owners to cluster homes away from the operational impact areas of the installation and set aside noise and safety affected areas for permanent open space protection
- Explore full real state disclosure for properties within the JLUS Area of Concern to include a special emphasis on land in the noise zones associated with large arms firing near Lafayette and air operations at CAAF (APPENDIX C)

- Participate in regional sustainability partnerships with Fort Campbell
- Consider establishing preservation plans/programs to protect key open space including prime farmland containing high noise areas adjacent to the installation

**Long-Term Actions:**

- Explore county zoning as a means to prevent encroachment and promote more efficient, quality growth outcomes, including creation of a Fort Campbell Activity Zone District (APPENDIX H)

## CITY OF HOPKINSVILLE

**Near-term Actions:**

- Extend existing outdoor lighting regulations into the expanded NVD Influence Area
- Participate in a multi-jurisdictional corridor management study of U.S. Highway 41A to shape land use form and commercial sites
- Coordinate annexation, infrastructure, and transportation policies to minimize the public expenditure of funds on projects that may induce incompatible development in the Public Safety Buffer Area around CAAF
- Sign a Tier 1 MOU intended to expand current information sharing efforts within the JLUS AOC (APPENDIX E)
- Continue to participate regularly in the JLUS Partnership forums and continue consultation procedures with military planners
- Assist in community outreach about the JLUS, ACUB, and new lighting standards and disseminate compatibility information in the form of web postings, posters and handouts (APPENDIX G)
- Collaborate with local governments to continue monitoring and mapping subdivision and building permit activity in the JLUS Area of Concern
- Coordinate with local utilities and the State Department of Transportation to sign MOUs that address issues related to public infrastructure improvements and outdoor lighting applications (APPENDIX E)

**Mid-Term Actions:**

- Update the Comprehensive Plan to include a Military Influence Planning District Element (APPENDIX F)
- Explore full real state disclosure for properties within the JLUS Area of Concern (APPENDIX C)
- Designate Urban Service Area and Planned Growth Area boundaries contiguous to existing public infrastructure to control the extent of growth on the urban fringe
- Participate in regional sustainability partnerships with Fort Campbell

## CITY OF OAK GROVE

### ***Near-term Actions:***

- Continue enforcement of the current lighting ordinance
- Participate in a multi-jurisdictional corridor management study of U.S. Highway 41A to shape land use form and commercial sites
- Coordinate annexation, infrastructure, and transportation policies to minimize the public expenditure of funds on projects that may induce incompatible development in the Public Safety Buffer Area around CAAF
- Sign a Tier 1 MOU intended to expand current information sharing efforts within the JLUS AOC (APPENDIX E)
- Continue to participate regularly in the JLUS Partnership forums and continue consultation procedures with military planners
- Assist in community outreach about the JLUS, ACUB, and new lighting standards and disseminate compatibility information in the form of web postings, posters and handouts (APPENDIX G)
- Collaborate with local governments to continue monitoring and mapping subdivision and building permit activity in the JLUS Area of Concern
- Coordinate with local utilities and the State Department of Transportation to sign MOUs that address issues related to public infrastructure improvements and outdoor lighting applications (APPENDIX E)
- Consider requiring indoor noise attenuation for new residential construction in the 60 dB + noise contours around CAAF

### ***Mid-Term Actions:***

- Update the Comprehensive Plan to include a Military Influence Planning District Element (APPENDIX F)
- Explore full real state disclosure for properties within the JLUS Area of Concern (APPENDIX C)
- Participate in regional sustainability partnerships with Fort Campbell
- Revisit the existing lighting ordinance to incorporate the more robust prescriptive measures in the proposed Tier 2 ordinance, including measures to control lighting intensity and light trespass (APPENDIX G)

## TRIGG COUNTY

### ***Near-term Actions:***

- Identify a point of contact to participate regularly in the JLUS Partnership and to interact with Fort Campbell military planners
- Adopt proposed exterior lighting controls in the form of building permit requirements in the expanded NVD Influence Area (APPENDIX G)
- Develop a public safety-based provision in subdivision regulations to control residential lotting and infrastructure and the resulting density of development in the JLUS Area of Concern (residential density should not exceed one dwelling units per acre)
- Educate property owners about ACUB, PACE and other federal or state funded opportunities to donate or sell development rights on lands with agricultural and silvicultural value
- Execute the Tier 2 MOU intended to establish formal information sharing efforts within the JLUS AOC (APPENDIX E)
- Develop regular consultation procedures with military planners regarding major residential subdivisions and commercial or industrial uses in the JLUS Area of Concern
- Assist in community outreach about the JLUS, ACUB, and new lighting standards and disseminate compatibility information in the form of web postings, posters and handouts (APPENDIX G)
- Coordinate with local utilities and the State Department of Transportation to sign MOUs that address issues related to public infrastructure improvements and outdoor lighting applications (APPENDIX E)

### ***Mid-Term Actions:***

- Develop a County Comprehensive Plan that includes a Military Influence Planning District Element (APPENDIX F)
- Consider development of a rural conservation based subdivision ordinance that would permit property owners to cluster homes away from the operational impact areas of the installation and set noise and safety affected areas aside for permanent protection
- Explore full real state disclosure for properties within the JLUS Area of Concern (APPENDIX C)
- Participate in regional sustainability partnerships with Fort Campbell
- Consider establishing preservation plans/programs to protect key open space including prime farmland containing high noise areas adjacent to the installation

### ***Long-Term Actions:***

- Explore county zoning as a means to prevent encroachment and promote more efficient, quality growth outcomes, including creation of a Fort Campbell Activity Zone District (APPENDIX H)

## CITY OF CLARKSVILLE

### ***Near-term Actions:***

- Adopt proposed exterior lighting controls in the form of zoning requirements in the expanded NVD Influence Area (APPENDIX G)
- Participate in a multi-jurisdictional corridor management study of U.S. Highway 79 to shape land use form and commercial sites
- Continue to coordinate annexation, infrastructure, and transportation policies to minimize the public expenditure of funds on projects that may induce incompatible development in the Public Safety Buffer Area around SAH
- Use quality growth tools, such as mixed use activity centers and traditional neighborhood planning to limit development pressures outside of Planned Growth Areas and thus protect the existing rural character of land in the western portion of the county along U.S. Highway 79
- Sign a Tier 1 MOU intended to expand current information sharing efforts within the JLUS AOC (APPENDIX E)
- Continue to participate regularly in the JLUS Partnership forums and continue consultation procedures with military planners
- Assist in community outreach about the JLUS, ACUB, and new lighting standards and disseminate compatibility information in the form of web postings, posters and handouts (APPENDIX G)
- Collaborate with local governments to continue monitoring and mapping subdivision and building permit activity in the JLUS Area of Concern
- Coordinate with local utilities and the State Department of Transportation to sign MOUs that address issues related to public infrastructure improvements and outdoor lighting applications (APPENDIX E)

### ***Mid-Term Actions:***

- Revisit the existing lighting ordinance to incorporate the more robust prescriptive measures in the proposed Tier 2 ordinance, including measures to control lighting intensity and light trespass (APPENDIX G)
- Update the Comprehensive Plan to include a Military Influence Planning District Element (APPENDIX F)
- Expand existing real state disclosure requirements to all properties within the JLUS Area of Concern (APPENDIX C)
- Advocate for increased state involvement in promoting land use compatibility around Tennessee's military installations
- Participate in regional sustainability partnerships with Fort Campbell

### ***Long-Term Actions:***

- Explore establishing a Transfer of Development Rights program to shift future development into Planned Growth Areas

## MONTGOMERY COUNTY

### ***Near-term Actions:***

- Extend existing outdoor lighting regulations into the expanded NVD Influence Area
- Participate in a multi-jurisdictional corridor management study of U.S. Highway 79 to shape land use form and commercial sites
- Continue to coordinate annexation, infrastructure, and transportation policies to minimize the public expenditure of funds on projects that may induce incompatible development in the Public Safety Buffer Area around SAH
- Use quality growth tools, such as mixed use activity centers and traditional neighborhood planning to limit development pressures outside of Planned Growth Areas and thus protect the existing rural character of land in the western portion of the county along U.S. Highway 79
- Sign a Tier 1 MOU intended to expand current information sharing efforts within the JLUS AOC (APPENDIX E)
- Continue to participate regularly in the JLUS Partnership forums and continue consultation procedures with military planners
- Assist in community outreach about the JLUS, ACUB, and new lighting standards and disseminate compatibility information in the form of web postings, posters and handouts (APPENDIX G)
- Collaborate with local governments to continue monitoring and mapping subdivision and building permit activity in the JLUS Area of Concern
- Coordinate with local utilities and the State Department of Transportation to sign MOUs that address issues related to public infrastructure improvements and outdoor lighting applications (APPENDIX E)

### ***Mid-Term Actions:***

- Revisit the existing lighting ordinance to incorporate the more robust prescriptive measures in the proposed Tier 2 ordinance, including measures to control lighting intensity and light trespass (APPENDIX G)
- Update the Comprehensive Plan to include a Military Influence Planning District Element (APPENDIX F)
- Expand existing real state disclosure requirements to all properties within the JLUS Area of Concern (APPENDIX C)
- Advocate for increased state involvement in promoting land use compatibility around Tennessee's military installations
- Participate in regional sustainability partnerships with Fort Campbell
- Consider establishing preservation plans/programs to protect key open space including prime farmland containing high noise areas adjacent to the installation

## STEWART COUNTY

### ***Near-term Actions:***

- Identify a point of contact to participate regularly in the JLUS Partnership and to interact with Fort Campbell military planners
- Adopt proposed exterior lighting controls in the form of building permit requirements in the expanded NVD Influence Area (APPENDIX G)
- Execute the Tier 2 MOU intended to establish formal information sharing efforts within the JLUS AOC (APPENDIX E)
- Develop regular consultation procedures with military planners regarding major residential subdivisions and commercial or industrial uses in the JLUS Area of Concern
- Assist in community outreach about the JLUS, ACUB, and new lighting standards and disseminate compatibility information in the form of web postings, posters and handouts (APPENDIX G)
- Participate in a multi-jurisdictional corridor management study of U.S. Highway 79 to shape land use form and commercial sites
- Coordinate with local utilities and the State Department of Transportation to sign MOUs that address issues related to public infrastructure improvements and outdoor lighting applications (APPENDIX E)

### ***Mid-Term Actions:***

- Develop a County Comprehensive Plan that includes a Military Influence Planning District Element (APPENDIX F)
- Explore full real state disclosure for properties within the JLUS Area of Concern (APPENDIX C)
- Advocate for increased state involvement in promoting land use compatibility around Tennessee's military installations
- Participate in regional sustainability partnerships with Fort Campbell

### ***Long-Term Actions:***

- Explore county zoning as a means to prevent encroachment and promote more efficient, quality growth outcomes, including creation of a Fort Campbell Activity Zone District (APPENDIX H)
- Explore subdivision regulations as a means to control residential lotting and infrastructure and the resulting density of development in the JLUS Area of Concern (residential density should not exceed one dwelling units per acre)
- Consider development of a rural conservation based subdivision ordinance that would permit property owners to cluster homes away from the operational impact areas of the installation and set aside noise and safety affected areas for permanent open space protection

## FORT CAMPBELL

### ***Near-term Actions:***

- Develop an on-post pilot program to demonstrate recommended exterior lighting applications (APPENDIX G )
- Spearhead community outreach about the JLUS, ACUB, and new lighting standards and disseminate compatibility information in the form of web postings, posters and handouts
- Continue efforts to pursue conservation easements from willing sellers near critical airfields and training areas
- Maintain and improve communication through methods such as publishing planned training schedules (training schedules change day-to-day) and operational guidelines for night training on the post web site
- Support ongoing role for a highly visible Fort Campbell liaison to address noise and other issues in the community
- Continue briefings to the JLUS Partnership
- Facilitate signing of new MOUs with regional partners
- Collaborate with local governments to continue monitoring and mapping subdivision and building permit activity in the JLUS Area of Concern
- Coordinate with local utilities and State Departments of Transportation to sign MOUs that address issues related to public infrastructure improvements and outdoor lighting applications (APPENDIX E)
- Pursue conservation opportunities within the Public Safety Buffer Area utilizing the Army Compatible Use Buffer (ACUB) Program
- Improve/enhance existing on-post procedures for the public to obtain information and report military-related concerns

### ***Mid-Term Actions:***

- Establish an advisory role in regional planning bodies such as the MPOs and Area Development Districts for areas such as transportation and capital improvements planning
- Participate in multi-jurisdictional corridor management studies of U.S. Highway 41A and U.S. Highway 79 to shape land use form and commercial sites
- Advocate for increased state involvement in promoting land use compatibility around Tennessee's military installations
- Initiate regional sustainability partnerships with local communities