

# Fort Knox

## Compatible Use Plan

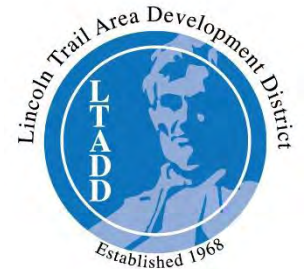
Study Report – January 2022

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*Prepared by*

Lincoln Trail Area Development District



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*This study was prepared under contract with the Lincoln Trail Area Development District, with financial support from the Office of Local Defense Community Cooperation, Department of Defense. The content reflects the views of the Lincoln Trail Area Development District and the primary partners involved in the creation of this study and does not necessarily reflect the views of the Office of Local Defense Community Cooperation.*

# Acknowledgements

*The Fort Knox Compatible Use Plan was produced with a regional focus that involved a diverse team of partners. These individuals represented the varied interests of citizens, governments, business, education, private and public organizations, and the military. These representatives were allocated amongst our two committees: the Executive and the Technical Advisory. Under that structure, they provided guidance and review for the duration of this study. This section recognizes their efforts on behalf of their respective organizations and the communities they serve.*

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*Special Acknowledgement of Gerry Lynn, Judge/Executive - Meade County who died in office 6 September 2020.*

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*In addition, we would like to recognize the many other unnamed residents and both public and private community leaders and staffs who assisted with the creation and review of this plan, attended meetings, and responded to our surveys and inquiries. The final product is better because of them.*



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# Executive Summary

*The last Joint Land Use Study was completed in June 2008, just as some of the effects of the 2005 Base Realignment and Closure Process were beginning to occur. Longtime residents only knew the Armor School, which was originally established in 1940. In 2011 it relocated to Fort Benning, and new missions came to Fort Knox. Funding dollars became available for roads, water systems, and schools. Many in the community thought the new 880,000 square foot office complex would mean the end of noise, training, and transient populations; heralding in an era of office workers living in the local area. This was not, however, the whole story. The Fort Knox Garrison continues its mission to deliver "...base support to enable training, force projection, and Soldier and Family readiness." The new Digital Air Ground Integration Range, summer training of over 10,000 cadets, and the 2020 reactivation of V Corps means the Army continues to play a huge role in the geographic, social, and economic impact of the region. The region, in turn, continues to effect Fort Knox. Thus, the need to revisit the relationships through the new Compatible Use Program.*

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## STUDY PURPOSE/NEED

The basic purpose of a Compatible Use Study is to identify methods that will allow cooperative relationships between Fort Knox and its surrounding communities to the benefit and consensus of all parties.

Identifying issues and concerns, highlighting success stories and solutions are all part of a pro-active approach to resolving conflicts, providing tools, and continuing the positive accomplishments that are integral to everyone. The focus to bring together as many community leaders and representatives as possible to the table to gather data, feedback, stories, and creativity was a primary mission.

Laying out this information, tying together the needs of Fort Knox, and then presenting a coherent framework to enable more success stories going forward was the goal.

This study is presented in five sections:

### **I Region and Community Profiles**

### **II Fort Knox Military Reservation Profile**

### **III Compatibility Issues**

### **IV Compatibility Mitigation Tools**

### **V Implementation Strategy**

## Section

### I Region and Community Profiles

This section provides the framework of the region or more specifically as we will refer to it the “study area.” It is a compilation of the geography, governmental structure, planning focus, infrastructure, and socio-economic data that was gathered and evaluated during the study. The initial meetings with community representatives and the public at large began in September 2019.

### II Fort Knox Military Reservation Profile

Following a similar path with the previous section, the focus this time being the installation itself. Data obtained from Fort Knox, and publicly available sources were compiled into a snapshot that provides elements of its operations, land use, its personnel, residents, and the economic impact it has on the study area.

### III Compatibility Issues

The concerns of both Fort Knox and the communities around are evaluated in the section. It provided details on encroachment of many types, issues that can create problems on both sides of the fence, and a look at the infrastructure and workforce needs that can impact all concerned.

### IV Compatibility Mitigation Tools

Presented here are some tools that may help prevent or resolve any issues. Combining resources from Federal, State, and Local participants, it presents options to address several different areas of

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concern. It includes backgrounds of programs, templates of ordinances, concepts, and strategies to assist communities to work independently or in partnerships to help promote compatible use.

### V Implementation Strategy

Finally, a summary of recommendations is laid out to be considered by the various entities. They are then charged to undertake specific actions that all revolve around the goal of promoting compatible use. This strives toward the overall objective of Fort Knox being able to support not only its current mission, but also future ones that will occur. The 2005 BRAC has, if nothing else, illustrated that nothing is constant, and the challenge of change must be and can be addressed in a manner that promotes positive outcomes for all.

## RESULTS & RECOMMENDATIONS

The current state of Fort Knox is functional and thriving. The efforts of all the parties involved in the study process were enthusiastic and committed to working together to maintain this. The actions proposed are in many cases continuations of some successful programs just applied to new geographies in the area. Thus, the people involved can continue to work with their neighbors to learn from each other what works and how to implement those recommendations. Some strategies are new to the region. It will take persistence to apply those and will involve many different groups from local planners, elected officers of the study area communities, business leaders, state agencies and state officials to work together to implement those policies. Not every party will agree to every action, but the willingness to reach a

consensus to promote the greater good and maintain the continued presence of Fort Knox has been evident throughout the process.

The number of regulations that have been created at federal and state levels create new levels of bureaucracy to deal with. Governments are confronted with the need to meet these requirements with limited staffs and funding sources. The initial cost of infrastructure is great, the long-term maintenance expense can be even greater. Highways must be repaired, water and wastewater systems must be replaced, growth of a community must be affordable in the long term. Including this into the planning process is unavoidable and must be considered.

In the past the Joint Land Use Study looked strictly at land uses. Such things and zoning and development density were the greatest concern. We have expanded this out somewhat to encompass a more holistic view. Consideration of how workforce and economic factors play a role in the stability of Fort Knox and the regions. Technology has created new issues of encroachment such as lasers and drones. Frequency bandwidth has surged with the growth of cellular equipment and remote-control devices. These also must be factored into this broader approach to compatible use.

The region is very dynamic and has consistently grown over the years. This has been due in large part due to two factors, the existence of Fort Knox and the region's central geographic location not only in Kentucky but in the United States as a whole. It is now, however, on the threshold of an era of even more rapid growth. The announcement of Ford Motor Company's 5,000 employee battery plant, to be located in Hardin County is an economic boom but all the afore mentioned planning elements become even more critical. The facility will be only

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25 miles south of Fort Knox's main gate via US31W. This will place additional stress on the area's already strained housing stock.

The return back to the key of all this continues to be communication and planning. Understanding your neighbor's needs, meeting, discussing and being involved in the multitude of situations or scenarios that can occur is demanding. Support of local officials to look at the big picture is crucial. Planning for things that may be years down the road can be difficult but must be done. All this must also happen with the awareness that flexibility is required as plans, in many cases, will have to adapt to these new and ever-changing situations.

It is hoped that the development process of this plan that was embraced by the parties involved, and the resulting content can assist in guiding the region forward for the betterment of all concerned.

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# Introduction

*The Fort Knox Compatible Use Plan (CUP) study identifies areas of current and potential land use conflicts between the Fort Knox Military Reservation and local units of government. This study aims to promote compatible civilian development to support the long-term sustainability and missions of Fort Knox, as well as to preserve and protect the public health, safety, and general welfare of those living near an active military installation.*

## Why a Compatible Use Plan

As communities surrounding military bases expand, prosper, and advance economically; it is important to ensure the continued mission sustainability of nearby military installations. To provide an outlet for constructive and ongoing dialogue between local governments and their neighboring installations, the U.S. Department of Defense identified the need for a Compatible Use Plan (CUP). Formerly known as a Joint Land Use Study (JLUS), the CUP is administered through the Office of Local Defense Community Cooperation (OLDCC). Known as the Office of Economic Adjustment prior to 2021, the OLDCC “...assists states and local governments to maximize support of the military mission.”<sup>1</sup> Military Installation Sustainability and in turn CUP is one such program they provide toward achieving that goal.

## What is a Compatible Use Plan

To facilitate this dialogue, the CUP brings together local, state, and federal leaders, citizens, property owners, various interested parties,

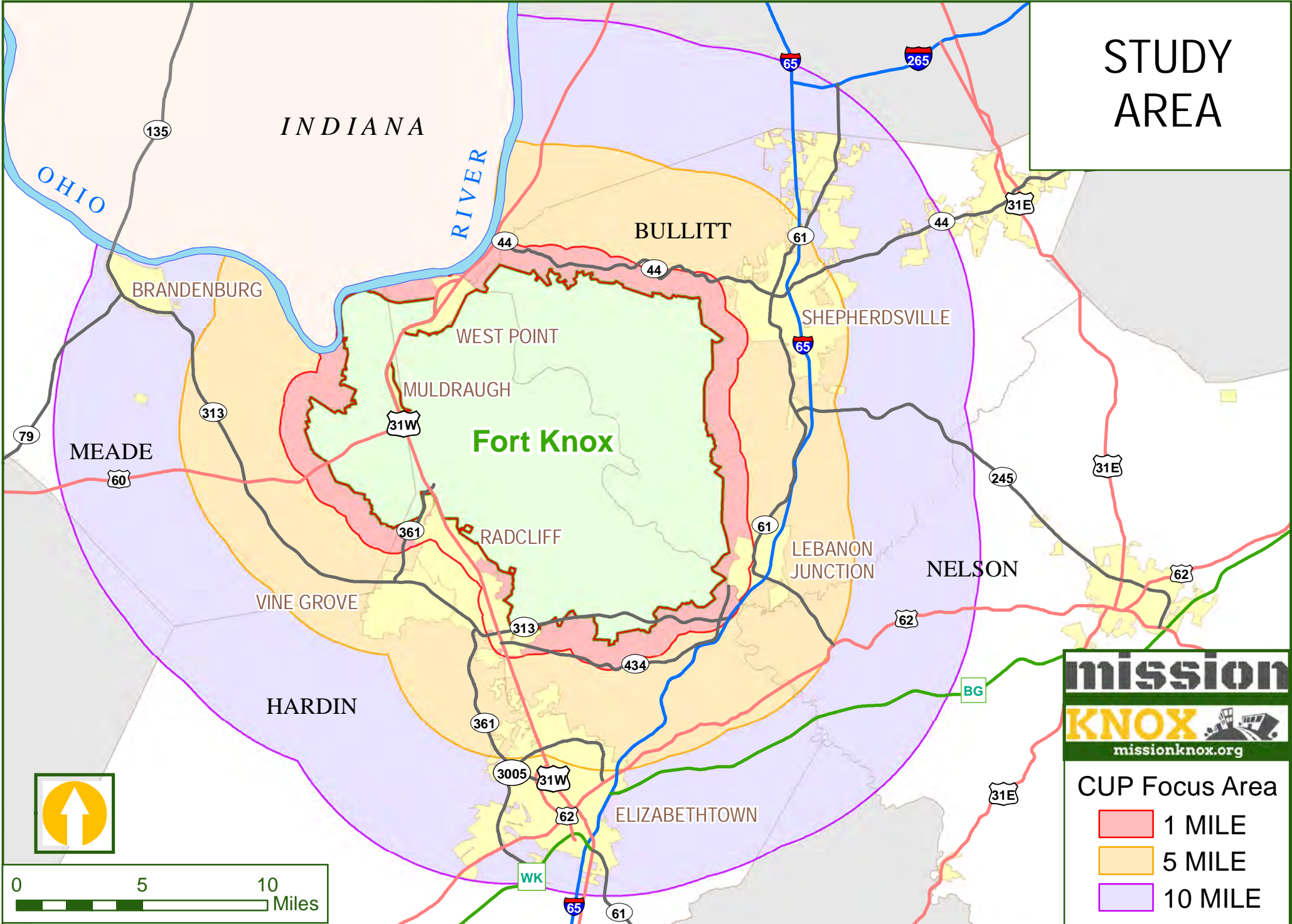
and military officials to provide a forum to identify issues and the best methods to ensure continued community viability. Concurrently it enhances the ability that military training efforts and other mission critical tasks can be effectively conducted. By mitigating incompatible civilian development and identifying strategies to reduce the operational impacts on adjacent lands, including environmental impacts of military operations, success can be achieved by all.

The Lincoln Trail Area Development District (LTADD), a regional planning organization, served as the study sponsor and provided the technical support. LTADD received local input from across the region and active participation from Fort Knox. The study partners are listed in the “Study Area” section following.

## Study Area

The primary study area includes the Fort Knox installation and neighboring counties and cities that are directly impacted, or may be directly impacted, by Fort Knox operations. To focus in on the many specific issues that are primarily driven by geographic proximity the study area was further refined by concentric rings of one, five, and ten miles. This did not preclude exclusion of any other issues that were revealed during the information collection and analysis phase of the study. This focus area is illustrated on Map 1.





MAP 1 - STUDY AREA

## Study Process

LTADD Staff in conjunction with input from OLDCC created a plan for managing the study. This included items such as compiling lists of potential committee members, creation of a public participation plan, plans for data gathering and analysis, creation of a website and social media presence, and a timeline for conducting the elements of the study. The original timeline of the study can be seen in Figure 2.

The broad based, regional participation required was done through two committees, the Technical Advisory Committee (TAC) and the Executive Committee (EC).

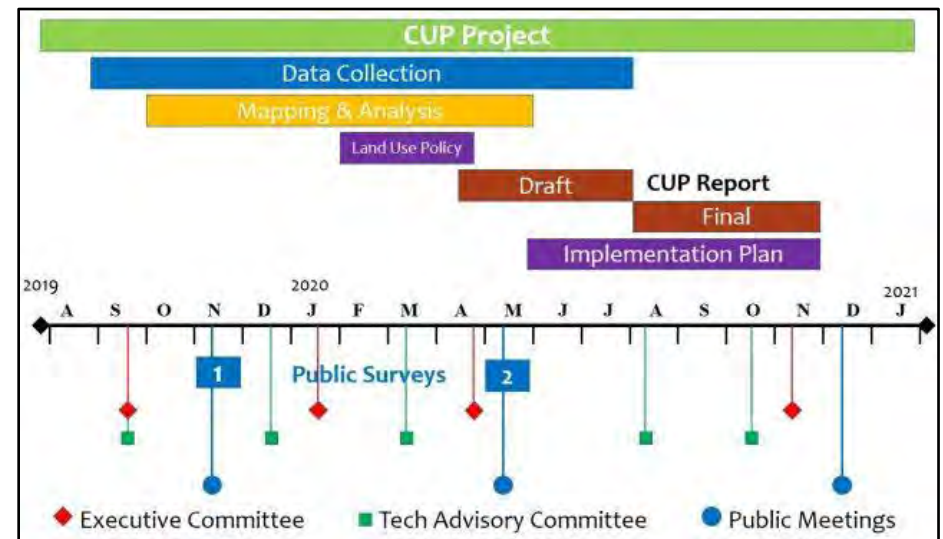


**Figure 1** CUP Executive Committee Meeting 9 Jan. 2020.

The TAC was comprised of a variety of individuals to include: city and county planners, infrastructure planners, school and business leaders, community organization leaders, and staff from Fort Knox Garrison

Command. The TAC was tasked with guiding the technical direction and assisting in data requests necessary for the study.

The EC was made up of area Mayors, County Judge-Executives, military organization leadership, and state and regional agency executives. The EC was formed for the purpose of guiding the overall direction of the process and ultimately, to endorse the final CUP report. A list of all stakeholder organizations can be seen in the Acknowledgements.



**Figure 2** CUP Timeline (Original Sept. 2019)

### Public Outreach and Involvement

The CUP study process promoted public involvement which was solicited and encouraged. This public involvement process included public meetings, the establishment of a social media page (Facebook-Mission Knox), the establishment of a website ([www.missionknox.org](http://www.missionknox.org)),



and involved the use of public surveys to invite comment and feedback on the study as it progressed.

Initial public meetings were held in geographically dispersed locations throughout the study area. These public meetings were held in the Fall of 2019. Additional public meetings were scheduled to be held in the Spring of 2020, but due to the Covid-19 pandemic, these public meetings were not allowed to be conducted per guidance from public health officials.



**Figure 3 Survey Postcard Notice**

The public was solicited to take part in an initial survey related to the CUP study process in conjunction with the first round of meetings. Specific focus regarded sentiment towards their individual existing relationship with Fort Knox. The survey contained questions relating to noise, vibration, economic impact, and communications between Fort Knox and the public. In addition, some demographic questions helped establish the background and geography of the survey participants.

This survey was made available in hard

copy at all public meetings and in a digital format through our online presence. The survey and meetings were promoted thru local and social media and the Mission Knox website. The website also served as a repository for all information relating to the CUP study process, including past and future events, meeting minutes, as well as news updates and an overview of the CUP study. A similar survey was conducted once the draft plan was released. This survey requested

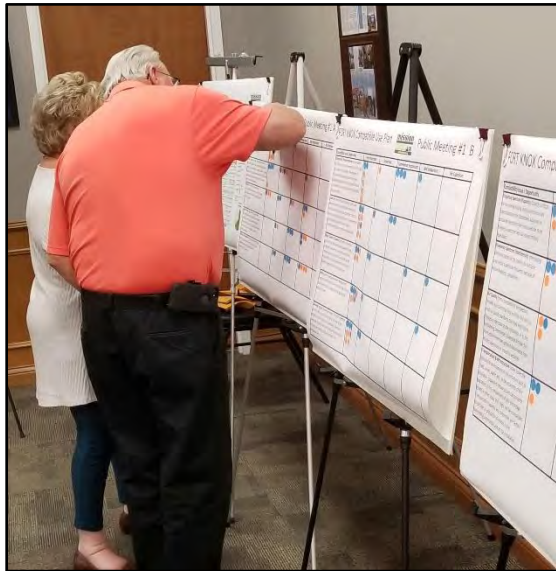
input regarding the various elements of the draft plan with particular focus on the completeness of the compatibility issues as presented and the potential mitigation elements to be included in the implementation plan that resulted.



**Figure 4 Public Meeting at Brandenburg.**

An attempt to conduct a second round of public meetings in October 2021 was also stymied by Covid restrictions. An outreach to media outlets to promote a response to the draft plan and the 2nd survey was done during this period. While there were articles and op-eds generated by local media, both print and radio, the number of responses to this survey was disappointing.

The initial public meeting was held November 7, 2019 at the Colvin Community Center in Radcliff, KY, the second public meeting November 13, 2019 at Shepherdsville City Hall in Shepherdsville, KY, and the third public meeting November 25, 2019 at the Meade County Courthouse in Brandenburg, KY. The public meetings were attended by a minimum of



**Figure 5 "Sticker Exercise" Shepherdsville Public Meeting.**

four LTADD staff members and members of the public. were advertised on social media and in local newspapers.

The public meetings were conducted via the use of a presentation from LTADD staff along with a public involvement activity that allowed members of the public to participate in a visual "sticker exercise" to prioritize which compatibility issues were most important to them.

Several displays which illustrated the CUP study area and potential concerns were available for review during the meeting. The LTADD staff were made available after the presentation to assist in answering questions related to the study. Some members of the Fort Knox Garrison Command also in attendance at the meetings also generously made themselves available to respond to inquiries from other members of the public. Brochures with additional information about both CUP and Fort Knox were available for distribution to attendees. These "Fast Facts" created by LTADD staff were also made available on the website.

## INTRODUCTION

These handouts, and example seen in Figure 6, are included in Appendix A. The results of the meetings and surveys are also included in Appendix A under "Survey Reports".



**Figure 6 Fast Facts #1, side A.**



## Committee Formation and Activity

The two committees formed to assist in the study are also considered to be part of the “public”. While they also have a vested interest in their communities and the viability of Fort Knox, they bear the additional burden of implementing policies to achieve that goal. As previously described, they represented a wide array of decision makers and others involved in the day-to-day conduct of business in the region. Based on the list of prospective members for each committee, invitations were distributed to a joint “Kick-off” meeting of both committees.

This meeting was held on September 20, 2019, at the Colvin Community Center in Radcliff, KY (located approximately five miles from Fort Knox Army Garrison Headquarters). The invited guests included the proposed TAC and EC membership for an introduction to the CUP study process. This meeting was also attended by Fort Knox Commanding General, MG John R. Evans, Jr. who delivered an informative introduction regarding Fort Knox and its short-term and long-term future. LTADD, the project sponsor, presented an overview of the study process, goals, timelines, geography, and other details. A follow-on question and answer session was conducted to provide as much information as possible to audience and begin to gain initial feedback from the members regarding their needs and concerns. The Joint Committee meeting was considered to be very successful overall. In total 46 individuals representing entities from across the study area were in attendance.



**Figure 7 Launch Meeting, Radcliff.**

This initial meeting was followed up with separate meetings of the two committees. These were conducted after the November public meetings to provide feedback on their outcomes. The TAC met on December 5, 2019, with 19 members in attendance. The meeting was led by LTADD staff who provided status on data acquisition, reports on the public meetings and survey results, and then conducted an input session from the TAC members to gain their priorities, concerns, goals, and needs going forward. In closing, LTADD staff presented a summary of the next steps in the process. The EC met January 9, 2020, with a similar agenda and platform to the TAC. In addition, the outtakes to the TAC meeting were also discussed. This was followed by a roundtable discussion between the 12 attendees and the LTADD staff which provided opportunities to gather more public and official involvement. Highlighted were requests to present to fiscal courts, city council meetings, chambers of commerce and other similar bodies the insights and outcomes of the study going forward.

## Covid-19 Issues

The issue of the Covid-19 pandemic during the original timeline presented many new and unforeseen issues to deal with. LTADD, like many other agencies, closed its offices to the public. As of March 20<sup>th</sup>, 2020, approximately 90% of the LTADD staff began teleworking at that time. As a follow up to OMB Memorandum M-20-18; LTADD staff participated in the OLDCC (OEA) Covid-19 webinar conducted on April 9<sup>th</sup> regarding policies and procedures going forward with grant programs.

Subsequently the original timeline was adjusted numerous times in response to this ongoing and unpredictable issue. The April 28th Community Information Exchange (CIE) sponsored by The Ft. Knox Public Affairs Office was canceled March 30th due to the Covid-19 pandemic.

In lieu of a physical meeting with the Technical Advisory Committee scheduled for mid-March, a questionnaire was sent out requesting input. Of interest were potential public survey questions, current encroachment issues, noise issues addressed in local planning and zoning policies, other zoning or legal restrictions on development that emphasize or address compatible use issues.

The Executive Committee meeting, scheduled for April 30th was canceled due to the COVID-19 pandemic. In addition, the three Public Meetings, one each in Bullitt, Hardin, and Meade Counties, and a corresponding survey previously scheduled for the May timeframe were also canceled as of April 14th.

These setbacks created some suspension of ongoing activities of staff due to the need to respond to other Covid related needs in our

communities and adapting to the new work environments that resulted from office closures and shutdowns.

The pandemic severely hampered our abilities to conduct traditional “face-to-face” citizen participation working sessions; and negatively impacted LTADD’s ability to follow the original goals and outcomes projected during this period. However, beginning in July, LTADD once again adjusted its efforts and restructured various tasks. This due to the continued limitations placed on public interaction resulting from the Covid-19 pandemic and the necessity to continue to work toward the overall goal of completing the Fort Knox CUP Study and Implementation Plan.

The staff continued to gather and process data necessary to the creation of the study. A draft of the study was begun using the available information and further inquiries were made regarding additional data of public agencies and in particular their land use, transportation, permitting, and similar planning components.

In October 2020 LTADD was contacted by OLDCC and advised to request an extension which was subsequently approved on November 3, 2020. The extension pushed forward all due dates one calendar year. The overall framework of events and flow did however remain intact, which enabled this study to be completed. A final timeline for the study is presented in Figure 8. This reflects the actual meeting dates of the committees and public activities.

## Finalizing the Plan

Research and compilation for the study continued. Communications with individuals and small groups to obtain data and refine issues and concerns was expanded during this time period. This included ongoing

contact with the public and the committees through our social media and through the local media outlets in addition to direct contact with members or other data sources. In addition to these contacts, we had in-person briefings for the new Deputy Garrison Commander in December 2020 and the new Garrison Commander in August 2021 regarding the CUP and our efforts. We also continued to brief our own board members at our monthly meetings regarding the overall status of the study. In March 2021, LTADD staff participated in Fort Knox's Real Property Vision Workshop and provided discussion and feedback to the group based on our findings to date. That activity was done in support of the installations new master plan. Also during this time frame, we interfaced with Garrison personnel and various community members, leaders, and their staffs to address some of the types of issues that have now become part of this study. Examples such as access to the post, transportation issues, land use and zoning conflicts, and noise concerns were addressed. Upon completion of the draft plan, it was made available to our committees and the public at large through our website and media releases. The committees met again in September 2021 via Zoom™ to be briefed on status and to provide discussion and feedback on the plan. As mentioned earlier, a second outreach to the public through media and a second survey was conducted in October 2021.

The two committees were brought back together in November and December to again be brought up to date regarding the final plan and the status of the process. This also involved updates on our recent briefing to the Kentucky General Assembly's Interim Joint Committee on Veterans, Military Affairs, and Public Protection. The subject was real estate disclosures in areas of military installations, which is one of the implementation strategies we address in the study. Subsequently,

a bill was introduced in the Kentucky House during the 2022 General Session to provide this requirement in statute.

Note: The Covid delay also affected the compilation and dissemination of the 2020 US Census. We were able to take some advantage of that situation and did incorporate the new data were available into our research and the resulting results.

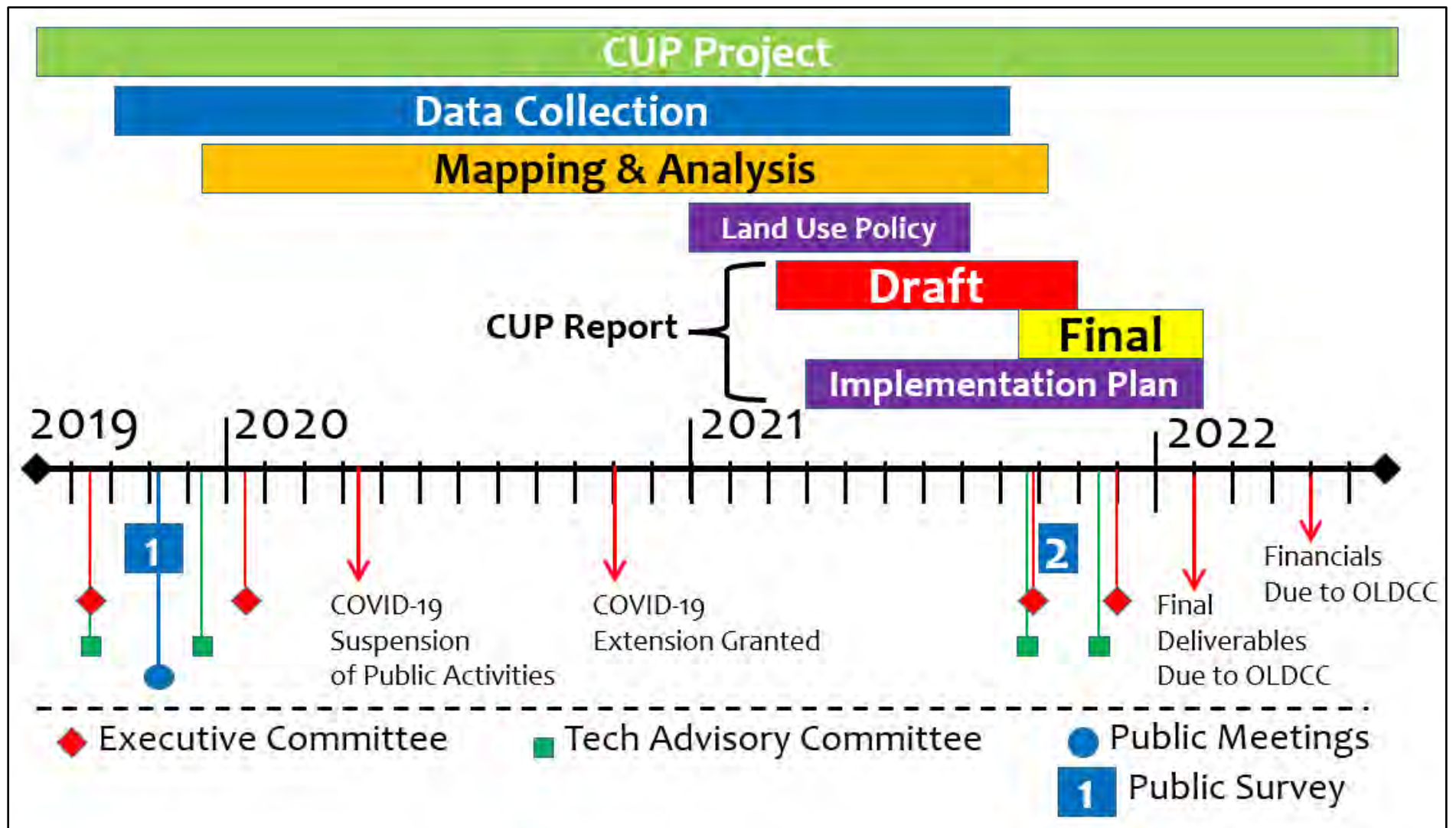


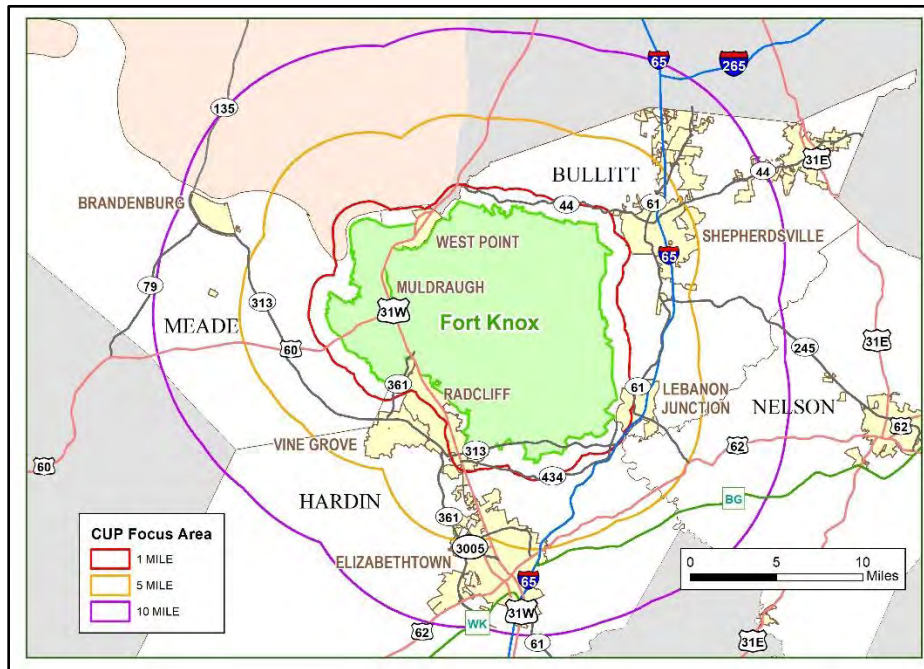
Figure 8 CUP Timeline (Final Nov. 2021)



# I Region and Community Profiles

The study area, as originally defined, encompassed parts of both Indiana and Kentucky. The focus of this study, however, are the portions of Bullitt, Hardin, Meade, and Nelson Counties that lie within the study area. While other counties do fall within the ten-mile study buffer, Breckinridge, LaRue, and Jefferson (Louisville Metro) in Kentucky and Harrison County Indiana; it was decided during the initial study planning phase to concentrate on the aforementioned counties that share a more extensive relationship with Fort Knox. Their physical location, integrated transportation, communication, utility networks and local governance reflect that they both absorb and contribute the most impact in relation to Fort Knox's presence.

**Map 2 Study Area**



The entirety of Fort Knox lies within Bullitt, Hardin, and Meade Counties. Nelson County, while not conterminous, does lie along some aerial approaches to the main ranges of the installation. It also shares directly in the potential development corridors that potentially could affect the military's missions. There are 15 incorporated cities in Bullitt, Hardin, and Meade Counties within the study area. They have additional planning units and governing bodies that contribute to any policies that can play a role in any compatible use planning.

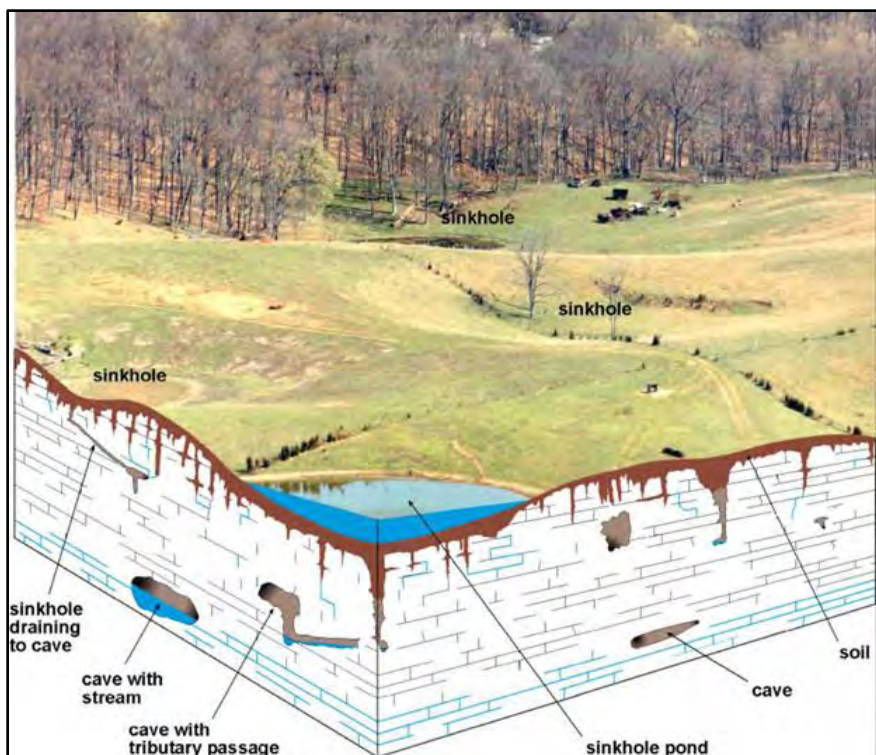
## Geography & Environment

The study area lies along the southern boundary of the Ohio River in central Kentucky. It is unique in that for its compact size it straddles three of the six physiographic regions of Kentucky. Meade and the majority of Hardin County lie within the Pennyroyal (Mississippi Plateau) region with its predominate feature being the karst topography. See Map 3 Physiographic Regions.









**Figure 9 Karst Landform System, Kentucky Geologic Survey.**

This karst area creates many issues with construction and various types of land use in general and must be accounted for in any development. The north-eastern strip of Hardin, the southwest area of Bullitt, and the eastern half of Nelson Counties lie within the Knobs region. Extending south from the Ohio River this area is known for its steep sloped hills that rise from the river plains. A primary concern is landslides and subsidence. Thus, these areas of steep slopes are prohibitive of most development although the river valleys have allowed formation a transportation corridor that has seen much residential development supplanting agriculture over the years. The western portions of Bullitt and Nelson Counties lie in the Outer Bluegrass region. This area

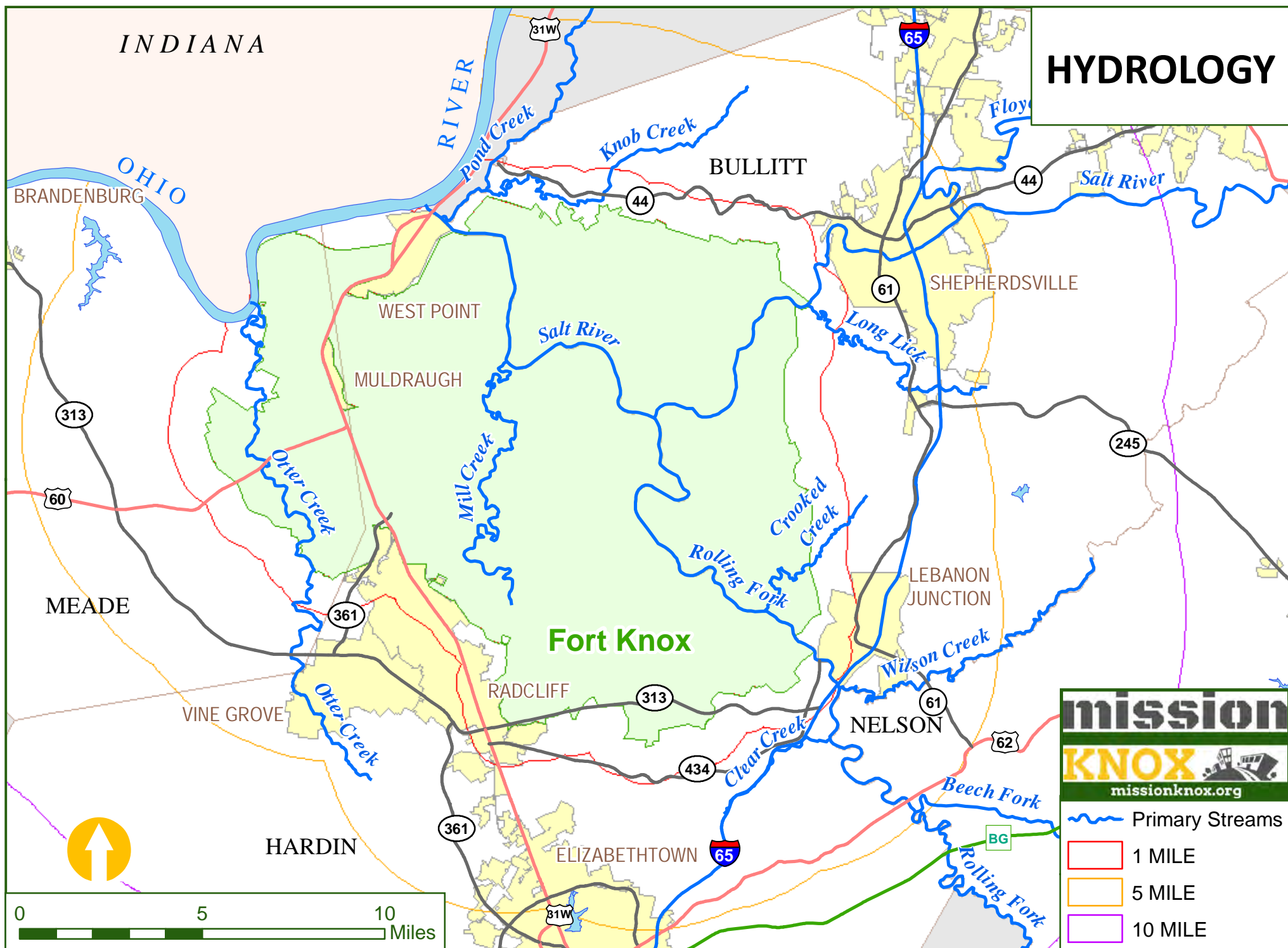
contains flat to rolling areas of land prone to development but primarily falls outside of the study area.

The study area is bisected by numerous streams that lie in the Ohio Valley. Predominate is the Salt River, Rolling Fork, Otter Creek, Wilson Creek and Beech Fork. See Map 4. These valleys create regular problems with flooding. The result is that flooding is the most common disaster in the state and certainly within the study area. Over development in areas that are now understood as alluvial flood plains present ongoing issues. The need to restrict further development in the flood plains are necessary for protection of both human investment and prevention of environmental degradation.



**Figure 10 Ohio River Flood, West Point, KY. Photo Credit: WDRB Media 2018.**

The varied landforms also provide unique habitats for both flora and fauna. Protected species, wetlands, forests, and streams all need to be considered in planning for and implementing development. This applies both on and off post. These issues are highlighted and explained in detail in Section III – Compatibility Issues.



MAP 4 - HYDROLOGY

## Government

County governments provide the foundation of local policy making and implementation in Kentucky. With a long history of local control over land use affairs the County serves as the focus of issues with regards to any planning of land use, infrastructure, or other adaptation of the environment to its people. In part, due to their historic nature and timeframe of establishment, Kentucky has 120 Counties. This is the third greatest number in the United States. This can present issues with multiple policies within small geographic areas. County government is based on a representative “fiscal court” that has magistrates allocated based upon equal population districts. Each county may have between three and eight based upon Kentucky’s statutes. To elect the body each magistrate represents their respective district. While an alternative “commissioner” form of government is available whereby the representatives reside within their district but are elected by voters county-wide; most choose to retain the historic magisterial method. The fiscal court is led by a “Judge / Executive” who is elected by a county-wide vote. The title of “Judge” is a carryover from days when the fiscal courts did have some limited judicial powers and functions. All the counties within the study area retain the magisterial form of government.<sup>1</sup>

Kentucky statutes allow for three forms of city governance, mayor-council, commission, or city manager.<sup>2</sup> Within the CUP study focus area, the cities of interest are all of the mayor-council form.

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<sup>1</sup> Only 13 Counties have adopted a commissioner form of government vs. 105 with magisterial. However, 24% of Kentuckians live in a County with this form of government per 2020 Census. Hardin County adopted this form in 2004 but reversed the decision in 2008. See Kentucky’s Dept. for Local Government

Within the scope of this plan and its focus on land use issues finds cities may maintain a separate governance over some affairs although they are still subservient to the county, they are a part of in other respects. County ordinances are applied county-wide including within cities unless state law provides otherwise, or a city has more stringent standards.<sup>3</sup> Cities and Counties can work together to create joint boards to manage various entities. These may include parks and recreation facilities, land use and zoning, building codes, or floodplain management. They may also create so called “special districts” that have oversight of their respective policies such as air boards, transit authorities, housing authorities, industrial development authorities, agricultural districts, community improvement districts, sanitation districts, water districts, area planning commissions, or watershed conservancy districts. Interlocal agreements may also be implemented between counties and cities involving roads.<sup>4</sup>

**Table 1 Units of Government**

STUDY AREA UNITS OF GOVERNMENT			
Bullitt County	Judge/Executive	Fiscal Court	4 Magistrates
Lebanon Junction	Mayor	Council	6 Members
Shepherdsville	Mayor	Council	6 Members
Hardin County	Judge/Executive	Fiscal Court	8 Magistrates
Elizabethtown	Mayor	Council	6 Members
Radcliff	Mayor	Council	6 Members
Vine Grove	Mayor	Council	6 Members
West Point	Mayor	Council	6 Members
Meade County	Judge/Executive	Fiscal Court	6 Magistrates
Brandenburg	Mayor	Council	6 Members
Muldraugh	Mayor	Council	6 Members
Nelson County	Judge/Executive	Fiscal Court	5 Magistrates

[[https://kydlgweb.ky.gov/Counties/16\\_CountyList.cfm](https://kydlgweb.ky.gov/Counties/16_CountyList.cfm)]. Note this excludes Louisville/Jefferson County Metro and Lexington-Fayette Urban County governments which are each a special Council form of government. Their inclusion puts 43% of Kentuckians in a non-magisterial form of government.



## Counties and Cities

The region's cities and counties together comprise a mix of small urban and rural jurisdictions that overall is vibrant and growing. A brief synopsis of each is presented as follows:

### **Bullitt County**

Bullitt County was founded in 1796, and named after Alexander Scott Bullitt, Kentucky's first Lieutenant Governor. Even prior to its' official founding, Bullitt's Lick, a historic salt lick within the county, drew many settlers to the area. The extraction and processing salt works built here created what is considered to be Kentucky's first industry.<sup>5</sup> Today, Bullitt County is home to a thriving alcohol tourism industry, including the Bullitt County Wine & Whiskey Trail. This Trail features six locations within nine miles of each other, including the Jim Beam American Outpost and four local wineries.<sup>6</sup> The growth of transportation and logistics has dominated recently. The proximity to the UPS World Hub and I-65 have given rise to numerous warehouse and distribution centers such as Amazon which is currently the largest employer in the county.

### **Lebanon Junction**

Lebanon Junction grew up around the L & N Railroad, with a terminal built on the site in 1892. The town was incorporated in 1895. After this, the town prospered, and was Bullitt County's largest city until the 1970 Census. It still has the railroad (CSX) and now I-65 keeping it on major north-south transportation routes. It lies within two miles of Fort Knox's largest weapons range, Yano.



**Figure 11 Bullitt County Courthouse = Source: The Bullitt County History Museum.**

### **Shepherdsville**

Founded in 1793, Shepherdsville is located on the Salt River. It serves as the County Seat. Historically, it benefited from the salt trade and from the presence of a mineral water spa. Shepherdsville, like the county around it, has industrialized to an extent in more modern times.<sup>7</sup> It has experienced tremendous growth almost tripling in population since 1990. Just south of Louisville and with three exits off I-65; it is predicted to keep growing at a rapid pace.

## Hardin County

Hardin County was founded in 1793 and is a transportation hub in the center of the state. Hardin is the most populous county in the study area by a significant amount and contains the two largest cities in Elizabethtown and Radcliff. In addition to major highways and railroads, Hardin County is also home to a regional healthcare system, an advanced manufacturing sector, and a thriving agricultural sector.<sup>8</sup>



*Figure 12 Hardin County Government Building - Source: LTADD.*

## Elizabethtown

Elizabethtown, the seat of Hardin County, was founded in 1797; and named for the wife of Colonel Andrew Hynes. During the day, the average population doubles with an influx of workers and other visitors. The city is located on Interstate 65, and has a regional airport, Addington Field and is 45 minutes from Louisville International Airport.

## Radcliff

The City of Radcliff is a changing community with a diverse population. Located in northern Hardin County adjacent to the Fort Knox Army Installation, it serves as the gateway city to Fort Knox. Given Radcliff's size and proximity to Fort Knox, mitigation and compatibility efforts here are crucial. The newest city in the study area, it was incorporated in 1956, it came into existence due to Fort Knox. Continued development increases the vital role it plays in Fort Knox's future existence.

## Vine Grove

Growing up along the Illinois Central Railroad, Vine Grove maintains its small-town convenience. The advent of the railroad allowed businesses to locate themselves to take advantage of the passenger and shipping traffic that the railroad provided. Vine Grove was incorporated in 1897. Subsequent to the 2005 BRAC, Vine Grove has had a housing boom. A 57% population increase between 2000 and 2020 has created challenges and opportunities for the community.

## West Point

West Point is a northern Hardin County town on the Ohio River at the mouth of the Salt River. Founded in 1796, it has had a military presence dating back to the Civil War. West Point was the home of Fort Knox's predecessor, Camp Young which was first established in 1903.<sup>9</sup> Laying up against Fort Knox's northern boundary and astride US 31W, West Point plays a continued role in Fort Knox's future.

## Meade County

Formed in 1824, Meade County is located on the Ohio River. It has the most river frontage of any county in the state. Long an area of agriculture, it has grown more economically diverse over the years. First beginning in the 1950's with the construction of the Olin-Matheson Chemical Plant and now with the building of Nucor Steel along the Ohio River. Today, Meade County is heavily tied to Fort Knox through its location, transportation network, retirees, and workforce.



**Figure 13 Meade County Courthouse - Source: LTADD.**

## Brandenburg

Brandenburg, the county seat, has long been tied to the Ohio River. It was located on the river as the site for a ferry landing. Today a river front park serves to host community events. A bridge across the Ohio River still serves to connect the area to I-64. The new KY 313 extension provides an improved, alternate route to go north and west from Fort Knox bypassing Louisville.

## Muldraugh

Muldraugh was named after Muldraugh Hill, a dominant ridge a predominant geomorphic feature dividing the Knobs from the Pennyroyal regions. At the top of the hill coming up from the Ohio River along the Louisville and Nashville Turnpike it was long a stopping point for traffic. While the Muldraugh Post Office was established in 1874, it wasn't incorporated until 1952. Muldraugh is distinctive being an enclave of Fort Knox, and as such, ensuring compatibility between Muldraugh and Fort Knox is vital.



## **Nelson County**

Founded in 1785, Nelson County sits astride both the Knobs and Blue Grass regions. Known internationally for the bourbon industry, it has grown in population rapidly; increasing 25% between 2000 and 2020 per the U.S. Census. It is not as directly influenced as the other counties by Fort Knox but its location, workforce, and transportation links play a definite role.



**Figure 14 Nelson County Courthouse - Source: Nelson County Government.**

### *Growth & Change*

Regionally, all four counties are continuing to grow in overall population. The following portions of the study will look at population, residential, and transportation growth and their respective issues. This growth has and will continue to impact the compatibility between the communities within these counties and Fort Knox. As these counties continue to grow, the potential the growth near the installation increases. Ensuring that all parties have clear planning and open

communication is vital to making sure that expansion is directed in such a fashion as to enable Fort Knox to continue to perform its vital mission. This must be balanced with the evolution the surrounding area will experience with the societal and economic changes that accompany that progression.

Just as with national changes, the area continues to become more urban with denser population clusters. The larger cities have experienced the greatest population growth. Slow growth, to decline in many cases, are reflective of the smaller cities populations. The continued generation of subdivisions consume what was once open land and the expansion of infrastructure both supports and then escalates this pattern. This must be understood and accounted for apropos future development in the study area.

## Local Planning Agencies

It is important to understand the existing planning environment in the study area. Some implementation strategies developed need to be carried out by the correct, most equipped agency or group. In some cases, they may need to be carried out by multiple organizations. Thus, it's critical to understand the relationships between the various organizations of the region. Zoning is an area with high potential for changes to be made to improve compatibility. One of the most effective ways to prevent non-compatible uses in areas close to the post would be to zone those areas in such a way that new construction is automatically either disallowed or restricted in design or type.

Planning agencies in Kentucky are set up as a "Planning Commission" under Kentucky Revised Statute (KRS) Chapter 100. They may be established as an individual city, county, joint city county, or as groups of counties and cities in a regional format.<sup>10</sup> The study area is covered by ten separate commissions as illustrated in Table 2. They can regulate a number of components of land use that may include: building permits, cell tower siting, subdivision regulations, boards of adjustment, zoning regulations, et al.

In Kentucky, the state sets the building codes. The Department of Housing, Buildings, and Construction is the responsible agency. In 2019, they adopted the 2018 *Kentucky Building Code*, and *Kentucky Residential Code*, 2<sup>nd</sup> Editions. The Codes are based on the 2015 versions of *International Building Code*, and the *International Residential Code for One- and Two- Family Dwellings* respectively. There are also Kentucky specific amendments to those to those codes.<sup>11</sup> The Kentucky Residential Code regulates one and two family

residential structures and townhomes, while the Kentucky Building Code regulates all other building types.

The Kentucky Building Code is a "mini/maxi" code. This means that it is statewide, mandatory, and uniform. No local government is allowed to adopt or enforce any other building code applying to commercial construction.<sup>12</sup> The Kentucky Residential Code is also a "mini/maxi" code, and as such, local governments are not allowed to adopt or enforce any other building code that would apply to one or two family dwellings or townhomes.<sup>13</sup> In Kentucky, responsibilities for inspections are split between the Department of Housing, Buildings, and Construction and local governments. Sections 104.15 and 104.16 of the 2018 Kentucky Building Code lay out this split of responsibilities.<sup>14</sup>

**Table 2 Planning Agencies**

STUDY AREA PLANNING AGENCIES	
Bullitt County	County Joint Planning Commission
Lebanon Junction	
Shepherdsville	
Hardin County	Planning & Development Commission
Elizabethtown	Planning Commission
Radcliff	Planning Commission
Vine Grove	Planning & Zoning Commission
West Point	Planning & Zoning Commission
Meade County	Planning Commission
Brandenburg	Planning & Zoning Commission
Muldraugh	Planning & Zoning Commission
Nelson County	City-County Joint Planning Commission

## Regional Planning Agencies

In addition to the county and city specific planning agencies, there are other bodies that cover the study area and guide planning efforts on a more regional basis. These are touched on briefly in this section.

### Kentuckiana Regional Planning and Development Agency

The Kentuckiana Regional Planning and Development Agency (KIPDA) is a regional agency that works with the Federal, State, and Local governments on a variety of issues across the policy spectrum. It serves six Kentucky counties: Bullitt, in the study area, Henry, Jefferson, Oldham, Shelby, and Spencer, and also Clark and Floyd Counties in Indiana.

KIPDA provides several planning services for their region. Included are regional planning, review and technical services, and transportation related services. KIPDA also coordinates services for those 60 years of age and older as part of the Area Agency of Aging and Independent Living program. KIPDA also does regional reviews for almost all applications for federal/and or state funds that are made by Kentucky governments or organizations in their service area.<sup>15</sup>

### Lincoln Trail Area Development District

The Lincoln Trail Area Development District (LTADD) is, like KIPDA, another of the 15 Area Development Districts statewide. The LTADD region consists of eight counties: Breckinridge, Grayson, Hardin, LaRue, Marion, Meade, Nelson, and Washington.

The organization and management goal of LTADD is to assist local units of government in provision of optimal services to citizens by enhancing

and strengthening their public management and administration capabilities. This vision is encompassed in the statewide ADD's mission statement, *"To bring those local, civic and governmental leaders together to accomplish those objectives that could not be achieved by the governments acting separately."* LTADD has various councils, committees, and departments to meet the needs of the region. The primary ADD planning functions are carried out through groups such as the Radcliff-Elizabethtown Metropolitan Planning Organization, the Regional Transportation & Highway Safety Committee, Water Management Council, and the Regional Planning Council.<sup>16</sup>

### Transportation Planning Organizations

In the study area, there are three regional transportation planning organizations. Bullitt County is covered by the Louisville Urban Area Metropolitan Planning Organization (MPO), under the umbrella of KIPDA. The Radcliff-Elizabethtown Metropolitan Planning Organization (REMPO), LTADD serving as the host organization, is responsible for Hardin and Meade Counties. Finally, the Regional Transportation and Highway Safety Committee manages the transportation of Nelson County. This Committee is also resident at LTADD.

**Table 3 Transportation Planning**

STUDY AREA REGIONAL TRANSPORTATION PLANNING ORGANIZATION		
	Organization Name	Residing Agency
Bullitt County	Louisville Urban Area MPO	Kentuckinan Regional Planning & Development Agency
Hardin County	Radcliff-Elizabethtown MPO	Lincoln Trail Area Development Agency
Meade County		
Nelson County	Regional Transportation Committee	Lincoln Trail Area Development Agency

The MPO's were established via the Federal Surface Transportation Assistance Act of 1973. Requiring the formation of a MPO for urbanized areas of a population exceeding 50,000, *"MPOs were created in order to ensure that existing and future expenditures for transportation projects and programs are based on a comprehensive, cooperative, and continuing (3-C) planning process. Federal funding for transportation projects and programs are channeled through this planning process."*<sup>17</sup>

The Regional Transportation and Highway Safety Committee is set up at the ADD's through a partnership with the Kentucky Transportation Cabinet (KYTC) to assist rural counties in transportation planning. In particular, inclusion in the statewide transportation planning process. This process helps the local governments prioritize projects and coordinate a more regional approach to expensive transportation infrastructure.

#### Knox Regional Development Alliance

The Knox Regional Development Alliance (KRDA) is a public private partnership that is focused on promoting and protecting Fort Knox in

order to increase its economic impact. The Alliance focus areas include the retention of existing missions, addition of new missions, developing more public-public and public-private partnerships, facilitating and advocating for more support for soldiers and their families, and generally expanding defense contractor business in the region.<sup>18</sup>

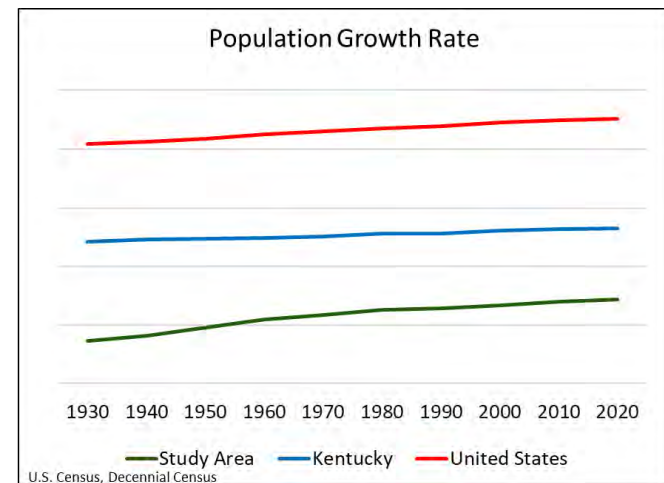
## Population and Housing

The issue of residential need versus the impact of its geographic location will be required to be addressed by policy makers on a continuing basis. The need for affordable housing for residents in the study area is reflected across the United States as policies regarding environment, density, transportation, and community preferences all play a role in the policy decisions of local governments. Balancing needed residential development against those residents being affected by various mission requirements such as noise, overflights, ambient light restrictions, dust, or other ramifications must be factored into any development plans or policies.

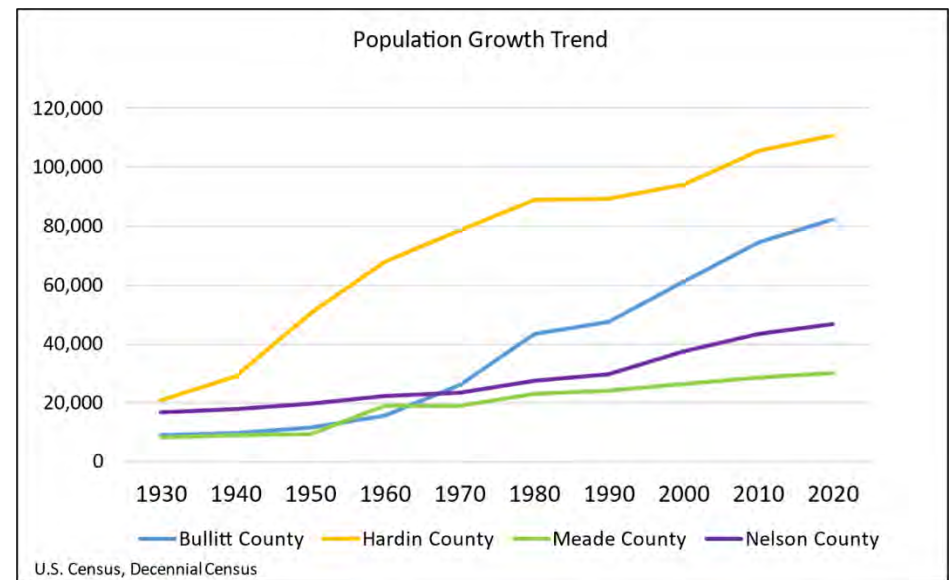
The study area has revealed steady growth over the years, the result of many factors. Historically a transportation hub located on main north/south routes, it has also benefited from the existence of Fort Knox and proximity to the large metropolitan area of Louisville. Later years provided the addition of the east/west connector parkways, and the upsurge of rail traffic due the advent of containerized cargo and the expansion of the Panama Canal. The four-county study area has experienced a compound annual growth rate of 1.8% in population since 1930. This exceeds the national (1.1%) and state (0.6%) growth rates for the same period. See Table 4. The region more than doubled its population in the first 30 years reviewed and again in the next 40 years.

The population growth of the individual governing bodies in the study area are provided in Table . Overall, the populations of the individual jurisdictions have grown enormously. Bullitt County is 9.3 times larger, Hardin – 5.3 times, Meade -3.7 and Nelson – 2.8 times larger over the

**Chart 1 Study Area Population Growth Rates – US Census (Table 4)**



**Chart 2 County Population Growth Trend – US Census (Table 5)**



timeframe reviewed. See Chart 2. Of note is the growth of denser, urban areas. The cities, in particular the larger ones, have grown in



**Table 4 Population Growth**

STUDY AREA POPULATION										
	1930	1940	1950	1960	1970	1980	1990	2000	2010	2020
Study Area	54,374	65,450	90,604	124,621	146,784	182,701	190,687	219,236	251,901	269,660
Kentucky	2,614,589	2,845,627	2,944,806	3,038,156	3,218,706	3,660,777	3,685,296	4,041,769	4,339,367	4,505,836
United States	123,202,624	132,164,569	151,325,798	179,323,175	203,211,926	226,545,805	248,709,873	281,421,906	308,745,538	331,449,281

U.S. Census, Decennial Census

**Table 5 Study Area Population Growth**

STUDY AREA POPULATION											
		1930	1940	1950	1960	1970	1980	1990	2000	2010	2020
Bullitt County		8,868	9,511	11,349	15,726	26,090	43,346	47,567	61,236	74,319	82,217
	Lebanon Junction	1,267	1,141	1,243	1,527	1,571	1,581	1,741	1,801	1,813	1,746
	Shepherdsville	633	762	943	1,525	2,769	4,454	4,805	8,334	11,222	14,201
Hardin County		20,913	29,108	50,312	67,789	78,421	88,917	89,240	94,174	105,543	110,702
	Elizabethtown	2,590	3,667	5,807	9,641	11,748	15,380	18,167	22,542	28,531	31,394
	Radcliff*	n/a			3,384	8,426	14,656	19,772	21,961	21,688	23,042
	Vine Grove	523	822	1,252	2,435	2,987	3,648	3,586	4,169	4,520	6,559
	West Point	697	992	1,669	1,957	1,741	1,339	1,216	1,100	797	952
Meade County		8,042	8,827	9,422	18,938	18,796	22,854	24,170	26,349	28,602	30,003
	Brandenburg	484	561	755	1,542	1,637	1,831	1,857	2,049	2,643	2,894
	Muldraugh**	n/a			1,743	1,773	1,752	1,376	1,298	947	1,040
Nelson County		16,551	18,004	19,521	22,168	23,477	27,584	29,710	37,477	43,437	46,738
STUDY AREA TOTALS		54,374	65,450	90,604	124,621	146,784	182,701	190,687	219,236	251,901	269,660

U.S. Census, Decennial Census.

\* Incorporated 1956

\*\* Incorporated 1952

area and population as a percentage of their counties. Shepherdsville has grown 22 times in size from 7% in 1930 of Bullitt County to over 17% of its current population. In Hardin County, Elizabethtown from 12% to over 28% of the county's population, and Radcliff from not existing until 1956 to being almost 21% of the total population in 2020. The question then arises; where do all these people live? They are obviously not evenly distributed throughout the region and the result finds most within the study area. This plays a large roll in understanding the issues that may or do present compatible use conflicts.

Going back to our focus area buffers of one and five miles, Table 6 shows the populations in each for the 30-year period from 1990 to 2020. The growth rate in the one-mile buffer was just over 14% however, in the five mile it increased by 60%. See Chart 3. For some perspective this means that the area within five miles of Fort Knox's perimeter added almost 33,000 people during this period.

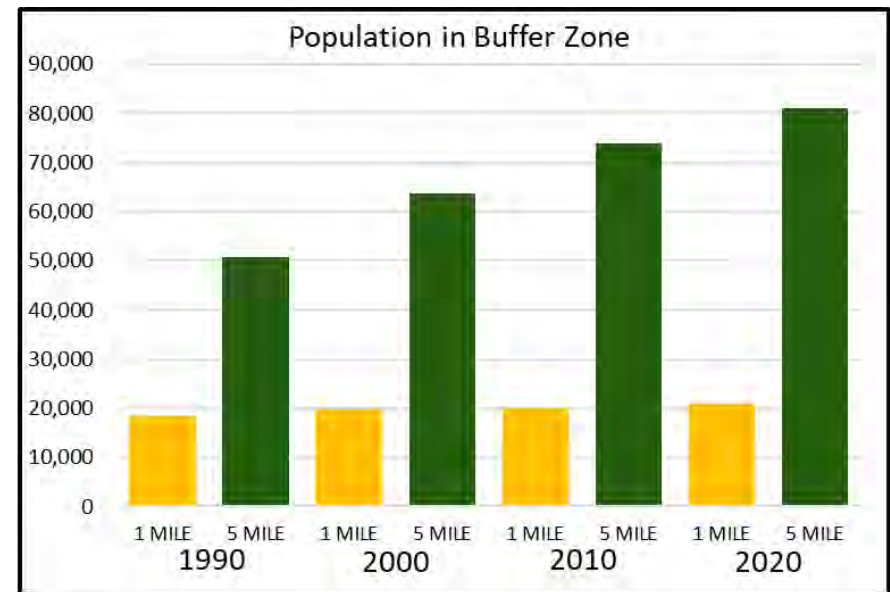
To attempt to focus in on areas with the most growth, a comparison was done between the 1990 and 2020 Census. Due to the change of block boundaries between census a direct comparison is not possible (Appendix B – Data Sources and Issues, Census Block Data.). To determine the change, each block population was divided by its area to obtain the population density. The layer for each Census year was then converted to a rasterized dataset with a set pixel size based on this density value. This allowed calculations to be performed on the datasets to determine the deltas which are presented in Map 5. The results illustrate areas of increased population density, thus growth during the timeframe.

**Table 6 Decennial Populations by Buffer Zone**

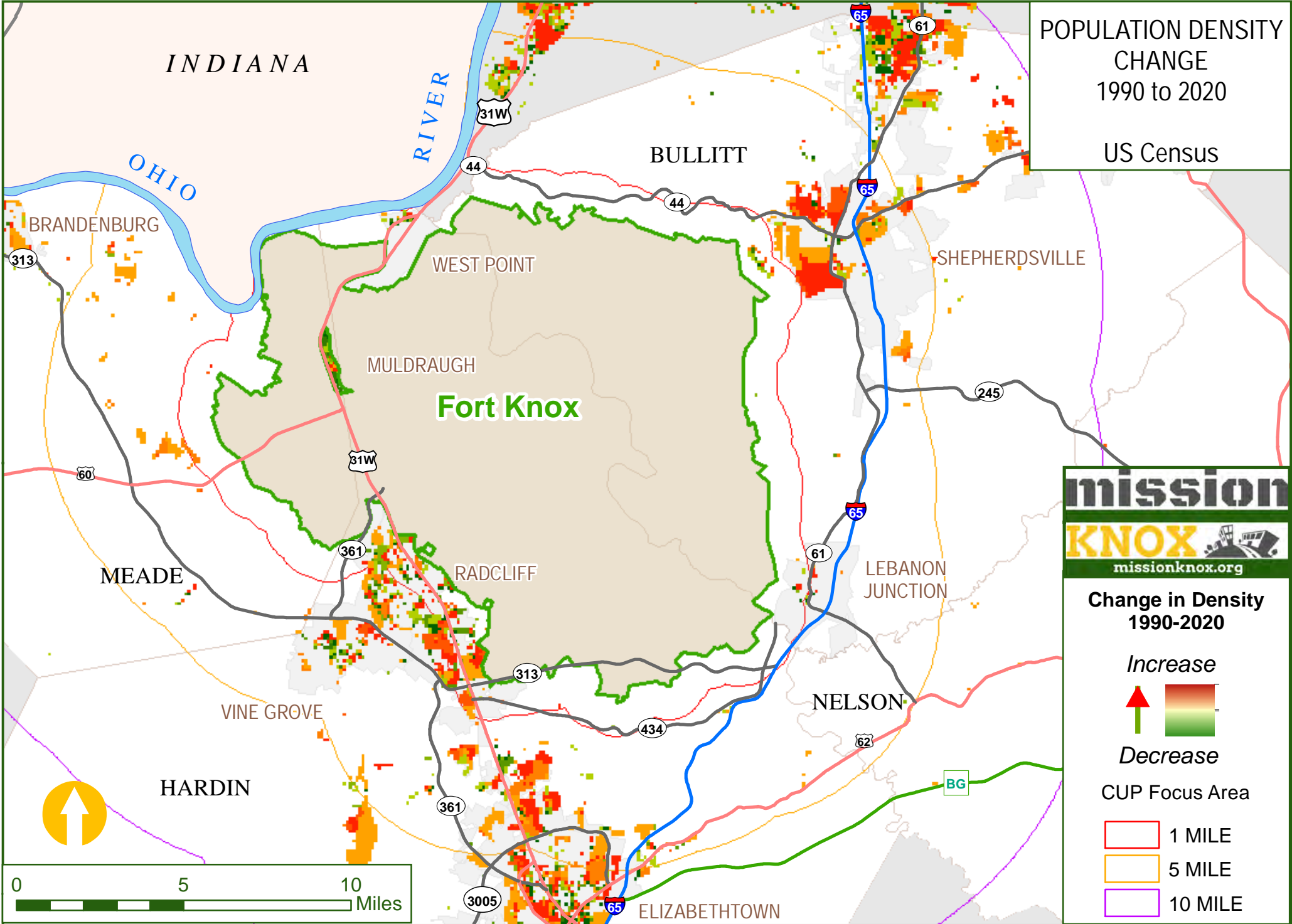
DECENNIAL POPULATIONS BY BUFFER ZONE								
(city totals are included in county totals)	1990		2000		2010		2020	
	1 MILE	5 MILE	1 MILE	5 MILE	1 MILE	5 MILE	1 MILE	5 MILE
Bullitt County	2,715	12,868	2,864	17,124	2,536	21,653	2,760	23,773
Lebanon Junction	868	873	798	999	791	1,022	694	1,052
Shepherdsville		4,805		8,294		11,128		13,761
Hardin County	13,405	25,254	14,374	30,671	15,126	34,527	15,124	39,133
Elizabethtown		2,570		5,280		7,090		8,631
Radcliff	10,455	9,317	11,590	10,400	11,845	9,840	12,315	10,727
Vine Grove		3,586		4,168		4,520		6,542
West Point	1,216		1,099		921		952	
Meade County	2,027	5,341	2,595	8,258	2,323	10,536	2,846	11,205
Brandenburg								
Muldraugh	1,306		1,214		947		1,040	
Nelson County		570		581		477		482
Jefferson County	113	6,648	0	7,066	0	6,575	72	6,428
<b>Total Study Area</b>	<b>18,260</b>	<b>50,681</b>	<b>19,833</b>	<b>63,700</b>	<b>19,985</b>	<b>73,768</b>	<b>20,802</b>	<b>81,021</b>

Source: U.S. Census, Decennial Census. Selection method block polygon centroid withing buffer zone.

**Chart 3 Population in Buffer Zone**



Source: U.S. Census, Decennial Census.  
Selection method block polygon centroid withing buffer zone.



MAP 5 - POPULATION DENSITY CHANGE, 1990-2020



## Parcels

An additional way to understand the growth within the study area is a review of the number of parcels in each buffer zone. An increase in parcel count, which reflects the subdividing of existing parcels can primarily be presumed to result in increased residential usage. Again, because the boundaries are not concurrent, the centroid selection method is used. Table 7 shows increases in the one-mile buffer for both Hardin (11%) and Meade (36%). Note the decrease in Bullitt's number which is unusual. That would indicate an aggregation of parcels between 2007 and 2019. In a visual comparison of the two datasets there is some evidence of that. Several instances of property owners perhaps acquiring adjacent parcels to increase their overall lot size are noted. Other cases appear to be ongoing cleanup of the dataset over time.<sup>2</sup>

More growth, however, is evident in looking out to the five-mile buffer. New subdivisions have been created in Bullitt, Hardin, and Meade Counties over the time frame. Looking along the installation boundary itself, we see an increase of parcels that are contiguous. Table 8 reveals increases in parcels in this area "up against the fence." The Radcliff increase is in the Southern Heights subdivision adjacent to the Fort Knox boundary.

<sup>2</sup> A brief background on the parcel data used in this study. This data is controlled by the individual County Property Valuation Administrators (PVA) in Kentucky. Most of the datasets were originally created in the early 2000's by digitizing existing hardcopy parcel aerial image maps by prison labor directed by the Kentucky Revenue Cabinet. The original data is thus based on sketches of property lines and typically not actual

**Table 7 Parcel Counts**

PARCEL COUNTS						
	2005*/2007**		2019		% CHANGE	
	1 Mile	5 Mile	1 Mile	5 Mile	1 Mile	5 Mile
Bullitt County*	1,616	10,668	1,575	11,708	-3%	10%
Hardin County**	5,239	19,045	5,793	22,702	11%	19%
Meade County*	948	7,139	1,290	7,309	36%	2%
Nelson County**	na	306	na	325	na	6%

Sources: County PVA Offices. Based on centroid selection method.

File dates: Bullitt, Apr. 26, 2007 & Dec. 2, 2019

Hardin, Feb. 25, 2005 & Oct. 23, 2019

Meade, Oct 31, 2007 & Oct. 23, 2019

Nelson, Jul.19, 2005 & Mar. 11, 2019

**Table 8 Contiguous Parcel Counts**

CONTIGUOUS PARCEL COUNTS			
	2005*/2007**	2019	% CHANGE
Bullitt County*	119	111	-6.7%
Hardin County**	285	323	13.3%
Radcliff	132	158	19.7%
West Point	20	20	0.0%
Meade County*	159	165	3.8%
Muldraugh	90	89	-1.1%
Nelson County**	na	na	na

Sources: County PVA Offices. Parcels within 100ft of reservation boundary. County total includes respective city.

meets and bounds calls. For our study purposes this suffices but overall quality would be a concern for any ownership determination. Over time it is presumed that the quality of the data will improve. Thus, the Bullitt County "aggregation" may be partially attributed to a refinement of the data over the twelve year difference in the datasets.

## Housing Units

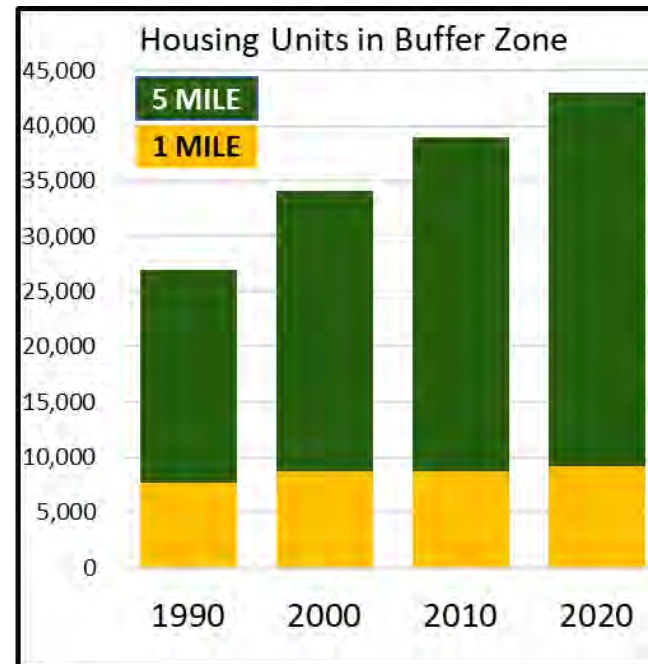
Continuing to look at where growth is occurring, the use of housing unit and building permit data was collected and evaluated. The U.S. Census collects data on housing at the block level for the Decennial Census and some information with the American Community Survey (ACS) in the interim years. Table 9 Housing Units by Buffer Zone, provides a look at the number of housing units in each buffer zone. Note the county numbers include their respective cities. In addition, the one-mile numbers are exclusive of the five-mile values i.e. the five-mile represents an area four miles deep between five miles out and the one-mile line out from the installation boundary. An overview of the growth trend is portrayed in Chart 4 Housing Units in Buffer Zone.

In the 30 years between 1990 and 2020, data reveals tremendous growth. In the one-mile buffer, Meade County lead the way with 26% increase in housing units. Bullitt County with 25% and Hardin County a 17% increase in this interval. The City of Radcliff with a 21% increase had 958 additional housing units or 99% of Hardin County's total. With a net loss of housing units in West Point, In Hardin County only 134 were added outside of Radcliff's corporate limits in the one-mile buffer.

The five-mile buffer review reveals even greater growth. Meade and Bullitt Counties both with over 100% increase during this period. Hardin County at 72%, led in volume with 11,137 new housing units in the five-mile buffer. This includes additional housing of 2,871 in Elizabethtown, an almost 290% increase. Vine Grove had 1,389 and Radcliff 998 units in this buffer. The City of Shepherdsville, with over 200% growth rate, saw the addition of 3,712 units in the time frame.

A review of the overall study area for this period of 30 years indicates an 18% increase in the one-mile buffer and 76% gain for the five-mile. Raw numbers put this at 1,420 new housing units within one mile of the Fort Knox perimeter and an additional 14,609 going out to five miles.

**Chart 4 Housing Units in Buffer Zone**



Source: U.S. Census, Decennial Census. Selection method block polygon centroid withing buffer zone.

**Table 9 Housing Units by Buffer Zone**

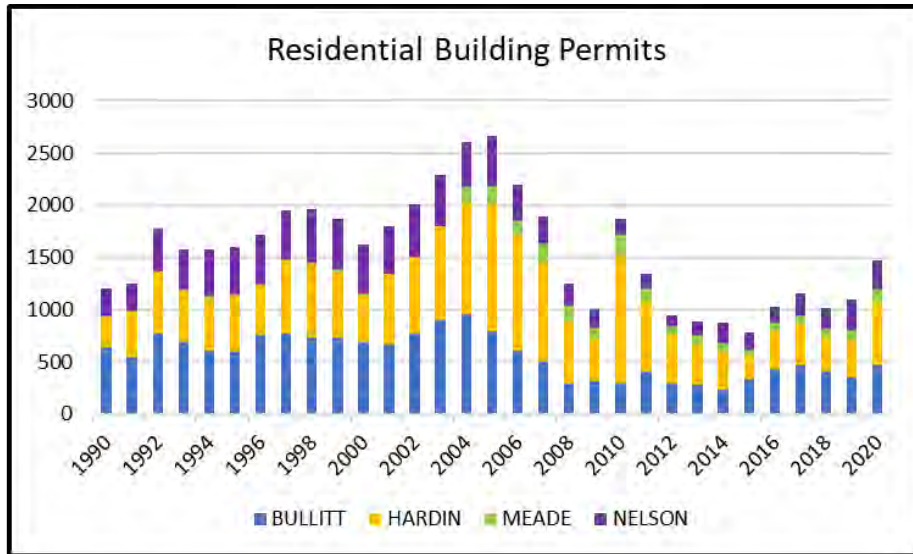
DECENNIAL HOUSING UNITS BY BUFFER ZONE								
(city totals are included in county totals)	1990		2000		2010		2020	
	1 MILE	5 MILE	1 MILE	5 MILE	1 MILE	5 MILE	1 MILE	5 MILE
Bullitt County	931	4,675	1,092	6,766	1,039	8,596	1,161	9,607
Lebanon Junction	331	354	332	420	342	442	313	469
Shepherdsville		1,803		3,388		4,440		5,515
Hardin County	5,737	9,787	6,432	12,502	6,620	14,497	6,709	16,874
Elizabethtown		993		2,194		3,104		3,864
Radcliff	4,507	3,744	5,171	4,333	5,170	4,320	5,465	4,742
Vine Grove		1,430		1,778		1,880		2,819
West Point	560		565		488		490	
Meade County	998	2,063	1,164	3,217	1,060	4,147	1,256	4,392
Brandenburg								
Muldraugh	713		604		539		551	
Nelson County		216		235		220		222
Jefferson County	77	2,443	0	2,727	0	2,798	37	2,698
<b>Total Study Area</b>	<b>7,743</b>	<b>19,184</b>	<b>8,688</b>	<b>25,447</b>	<b>8,719</b>	<b>30,258</b>	<b>9,163</b>	<b>33,793</b>

Source: U.S. Census, Decennial Census. Selection method block polygon centroid withing buffer zone.

## Building Permits

The growth of housing can be more accurately portrayed by quantifying residential building permits.

**Chart 5 Residential Building Permits - Census**



U.S. Census Bureau, New Private Housing Structures.

Hardin County saw 1,209 private houses permitted in 2010 after the Great Recession of 2007-2009. The recession resulted in an overall downturn in new construction and a depression of house prices throughout the country. A previous peak of 1,221 occurred in 2005 prior to the downturn. Meade County's high was also in 2010 at 216. Bullitt County's previous high was 2004 with 954 permits issued. Nelson County's high of 525 occurred back in 1998 and after the 489 permits issued in 2005 has seen an overall drop-off. The year 2005 total of 2,669 permits remains the high value for the study area.<sup>19</sup>

In order to focus on where these permits are actually being constructed, we use data provided from the various county and city permitting agencies (See Table 11 Residential Building Permits by Year.) There are several gaps in the data due to various reporting mechanisms. Some years are supported and validated with numerous published media accounts. See Appendix B – Data Sources and Issues for more information. While gaps in the data remain, it is possible to determine specific trends and areas of growth. Map 6 Residential Building Permits, illustrates the permits as they fall within the one and five-mile buffers of the focus area. Some of these are individual houses, others are clustered, typically part of larger, planned developments. The breakout of these permits in the buffer zones is provided in Table 10.

**Table 10 Residential Building Permits by Buffer Zone**

RESIDENTIAL BUILDING PERMITS IN BUFFER ZONES (2010-2019)			
	1 MILE BUFFER	2-5 MILE BUFFER	TOTAL
Bullitt County	62	285	347
Lebanon Junction	5	12	17
Shepherdsville	1	583	584
Hardin County	62	629	691
Elizabethtown	n/a	329	329
Radcliff*	50	22	72
Vine Grove	n/a	662	662
West Point	nda	n/a	nda
Meade County	93	399	492
Brandenburg	n/a	n/a	n/a
Muldraugh	4	n/a	4
Nelson County	n/a	3	3
<b>TOTAL</b>	<b>277</b>	<b>2924</b>	<b>3201</b>

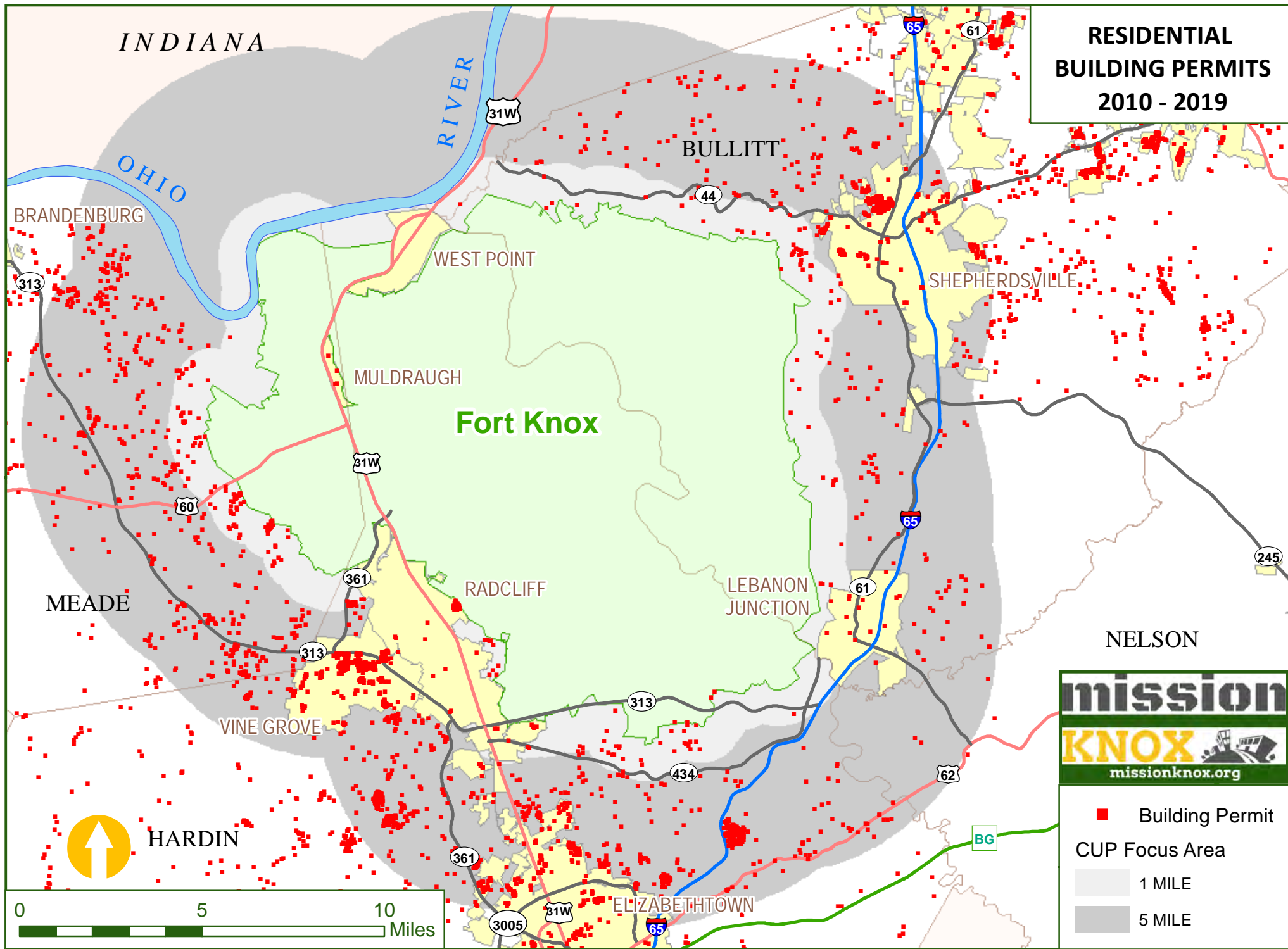
Primary Source: Respective City/County Permitting Agencies. See Appendix B, Data Sources and Issues. *nda* – no data available, \*Official data only available for 2017-2019.

**Table 11 Residential Building Permits by Year**

RESIDENTIAL BUILDING PERMITS BY YEAR (2010-2019)											
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Bullitt County	<i>nda</i>	288	235	276	294	249	365	461	462	408	365
Lebanon Junction	<i>nda</i>	3	2	1	0	1	0	0	0	6	4
Shepherdsville	<i>nda</i>	73	59	72	60	48	56	70	84	51	44
Hardin County*	169	327	152	159	160	126	138	161	194	188	198
Elizabethtown	<i>nda</i>	150	86	66	85	75	52	67	113	85	71
Radcliff**	69	420	179	<i>nda</i>	<i>nda</i>	<i>nda</i>	<i>nda</i>	11	28	21	23
Vine Grove	69	139	52	61	51	40	48	44	63	42	53
West Point	<i>nda</i>	<i>nda</i>	<i>nda</i>	<i>nda</i>	<i>nda</i>	<i>nda</i>	<i>nda</i>	<i>nda</i>	<i>nda</i>	<i>nda</i>	<i>nda</i>
Meade County	<i>nda</i>	93	106	89	100	93	88	99	97	97	129
Brandenburg	<i>nda</i>	<i>nda</i>	<i>nda</i>	<i>nda</i>	<i>nda</i>	<i>nda</i>	<i>nda</i>	<i>nda</i>	<i>nda</i>	<i>nda</i>	<i>nda</i>
Muldraugh	<i>nda</i>	2	0	0	1	1	0	0	0	0	0
Nelson County	148	144	120	114	164	178	149	153	194	191	276

Primary Source: *Respective City/County Permitting Agencies*. See Appendix B, Data Sources and Issues.

*nda* – no data available, \* For 2009 Single-Family only. \*\* Official data only available for 2017-2019. Years 2009-2011, 2016 from The News-Enterprise.



MAP 6 - RESIDENTIAL BUILDING PERMITS - 2010-2019



## Land Use

In looking at the current land use the focus will be on the one-mile buffer with some attention paid to areas of concern in the five-mile zone. See Map 7 Land Use - One Mile Buffer.

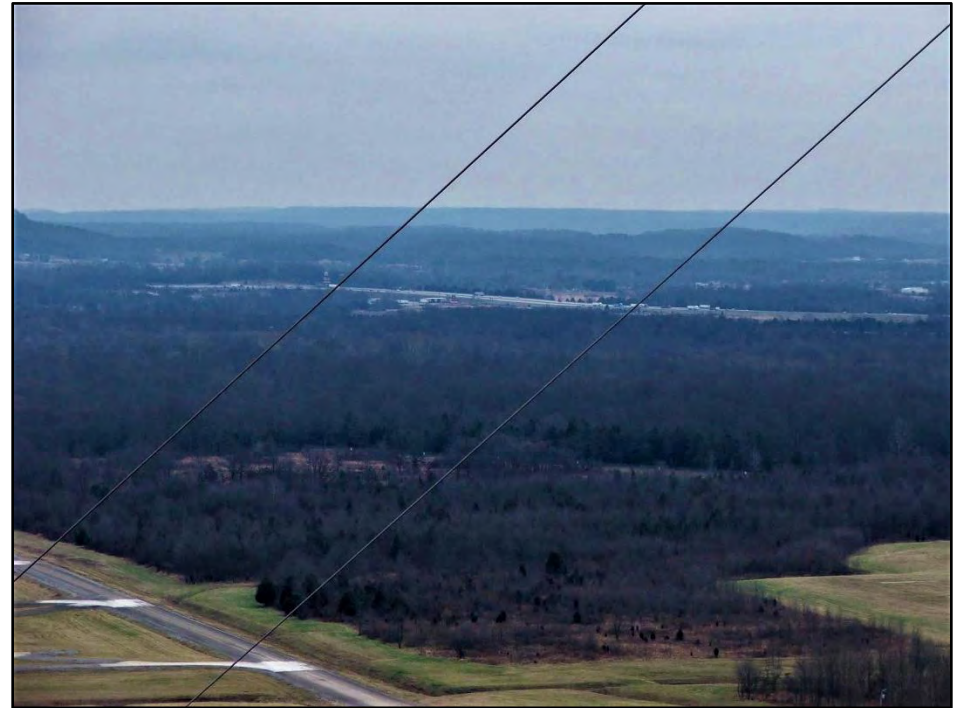
### Bullitt County

The **Bullitt County Joint Planning Commission** (BCJPC) administers zoning, subdivision, building permits among other functions for the county and its eight incorporated cities. Two of which, Shepherdsville and Lebanon Junction are within the study area. BCJPC shares the longest common boundary of any planning unit, over 20 miles. Physical encroachment and noise are primary concerns.

The one-mile buffer consists of steep knobs and flat valleys, many of which lay in the 100-year flood plain. There have been many efforts towards land conservation in this area which benefits the compatible use concept. Several hundred acres were preserved through the ACUB program. The comprehensive plan's future land use goals promote two large areas for conservation along the eastern boundary. Through the comprehensive plan, BCJPC recognizes the impact Fort Knox creates with regard to land use.<sup>20</sup>

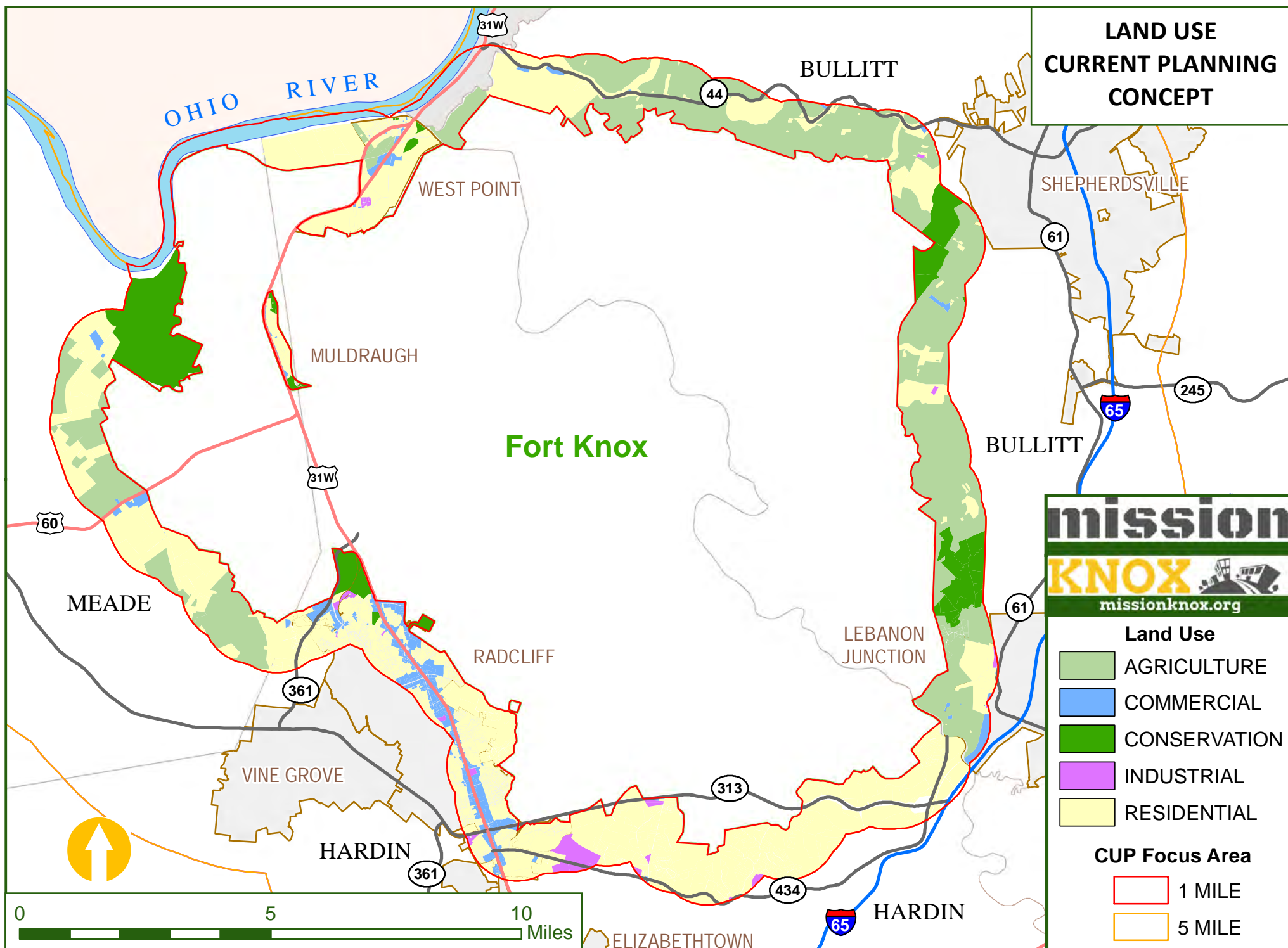
While currently most of the land in the buffer is zoned for Agriculture, there has been an increase of residential development over the years. Pressures for residential development are an ongoing issue. Location adjacent to I-65, a new interchange, Exit 114, and tracts of farmland available are just some elements that can contribute to non-compatible growth. In the future land use plan, there are four large areas of Low

Density and two Medium Density Residential areas. There were 71 residential building permits issued between 2010 and 2019 in the one-mile buffer.



*Figure 15 Yano Range tower looking east to Lebanon Junction & Exit 105, I-65. Source: Fort Knox, Directorate of Public Works, Environmental Management Division, c. 2007*

The proximity of the Yano range and its expansion will increase the noise factor. One training NOE flight path follows the reservation boundary along this perimeter. Almost the entire buffer falls under the 2018 Noise Study's Large Caliber zones and some areas in the Small Caliber zones. This is recognized in part by BCJPC as they reflected it in their current comprehensive plan noise contours from the 2008 JLUS.<sup>21</sup>



MAP 7 - LAND USE - CURRENT PLANNING CONCEPT



They express the concern that:

*“Exposure to noise within this area is severe and development within this area should be limited to activates such as industrial, manufacturing, transportation and resource production. Residential within the Noise II Zone should be prohibited.”<sup>22</sup>*



**Figure 16 A. Home in Bullitt County, Newton Farm Rd, adjacent to Yano Range.**  
**Source: Fort Knox Garrison Command, Directorate of Public Works, Environmental Management Division, c. 2007.**

It could be an issue however between “should be” and “will be”. Three residential building permits have been issued in areas covered by Small Arms, 87 dB “Zone II” and eight more in the CDNL 62-70 Large Caliber,

listed as “Zone II” on the 2008 JLUS maps. This is an area that will be further addressed in the implementation section.

Of particular concern are the areas adjacent to Yano Range, future home of the DAGIR facility. In some cases, homes are built in this area that are subject to additional increases in noise and vibration levels. See Figure 16 and Figure 17. This is discussed more in depth in Section II & III.



**Figure 17 B. Home in Bullitt County, Newton Farm Rd, adjacent to Yano Range.**  
**Source: Fort Knox Garrison Command, Directorate of Public Works, Environmental Management Division, c. 2007.**

This highlighted area, along Newton Farm Rd., Does have a connecting gate used on occasion by facilities management. It has numerous notice and warning signs demonstrating potential hazards in the area. This can be seen in Figure 18 images and Map 8.

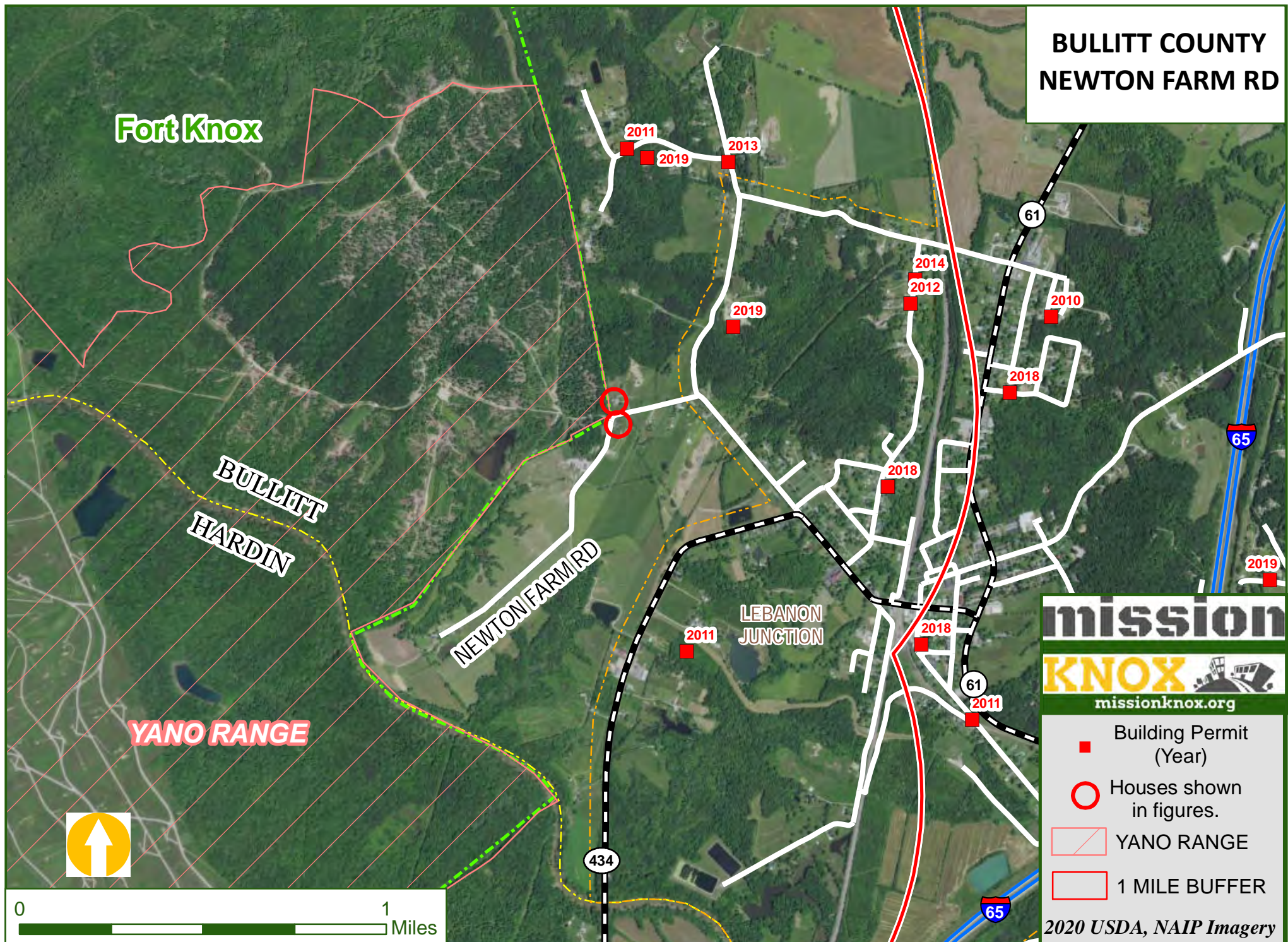




Figure 18 Fort Knox Gate, Newton Farm Rd., Source: LTADD c. 2007.



# BULLITT COUNTY NEWTON FARM RD



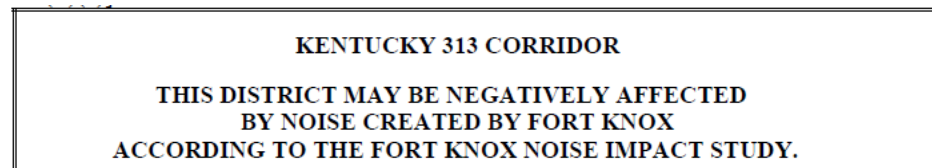
MAP 8 - BULLITT COUNTY - NEWTON FARM RD

## Hardin County

There are five separate planning agencies with jurisdiction within the five-mile zone and of those, three have coverage inside the one-mile buffer. This entails dealing with numerous policy makers with regards to any concerns in their relationships with Fort Knox.

**Hardin County Planning and Development Commission (HCPDC)** covers the greatest land area inside both the one- and five-mile perimeters. They break the county up into several planning areas of which two fall within the one mile.

One of the great success stories of compatible use in the region has been the creation of the KY 313 Corridor. See Map 9. Specifically designed to protect the land along the southern boundary of Fort Knox, the Corridor was established in 1995. Zoned R-3, Residential Estate, it has minimum lot sizes of 10 acres to assist in preventing dense residential development. Regulations in place require any plats created for development to have the following statement:



*Figure 11 Plat Requirement Notice, HCPDC Zoning Ordinance 11-3, KY 313 Corridor*

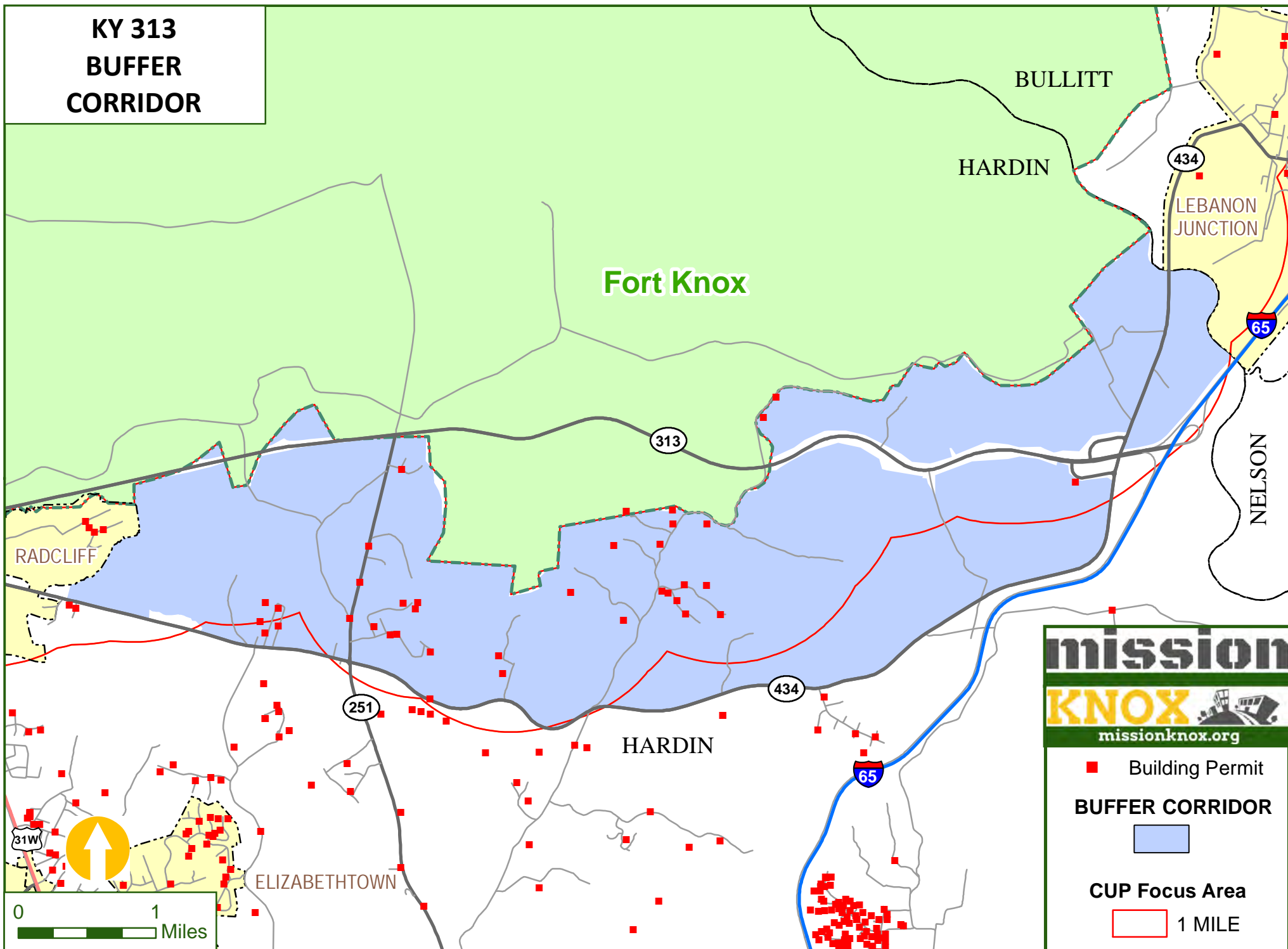
There have been 38 residences permitted since 2009. Containing over 12 sq miles, it currently has an average parcel size of 10.823 acres for the 771 parcels within.

By allowing it to be developed but still being considered compatible use, it has been supported by Fort Knox Garrison Command. Numerous letters of support and other communications over the years in have been helpful in support of comprehensive plan updates and legal challenges to this designation.

One threat to the Corridor is annexation by the City of Radcliff. This creates a different body of control thus rules for zoning and the potential for denser residential development. As an example, annexations in 2002 and 2003 allowed subdivisions of a lot size down to 2.5 acres to be created in the area east of South Boundary Road. The zoning Residential-Estate Zone (RU-E) classification was created in 2001.<sup>23</sup> Its currently only known application is the approximately 300 acres from these annexations known as Ashburn Hills Estates now adjacent to the Corridor. See Map 10. Its exact growth rate is unknown, however, four housing permits have been issued since 2017. The total permits issued since annexation is unknown due to incomplete permit data. A comparison of E911 address data between 2009 and 2020

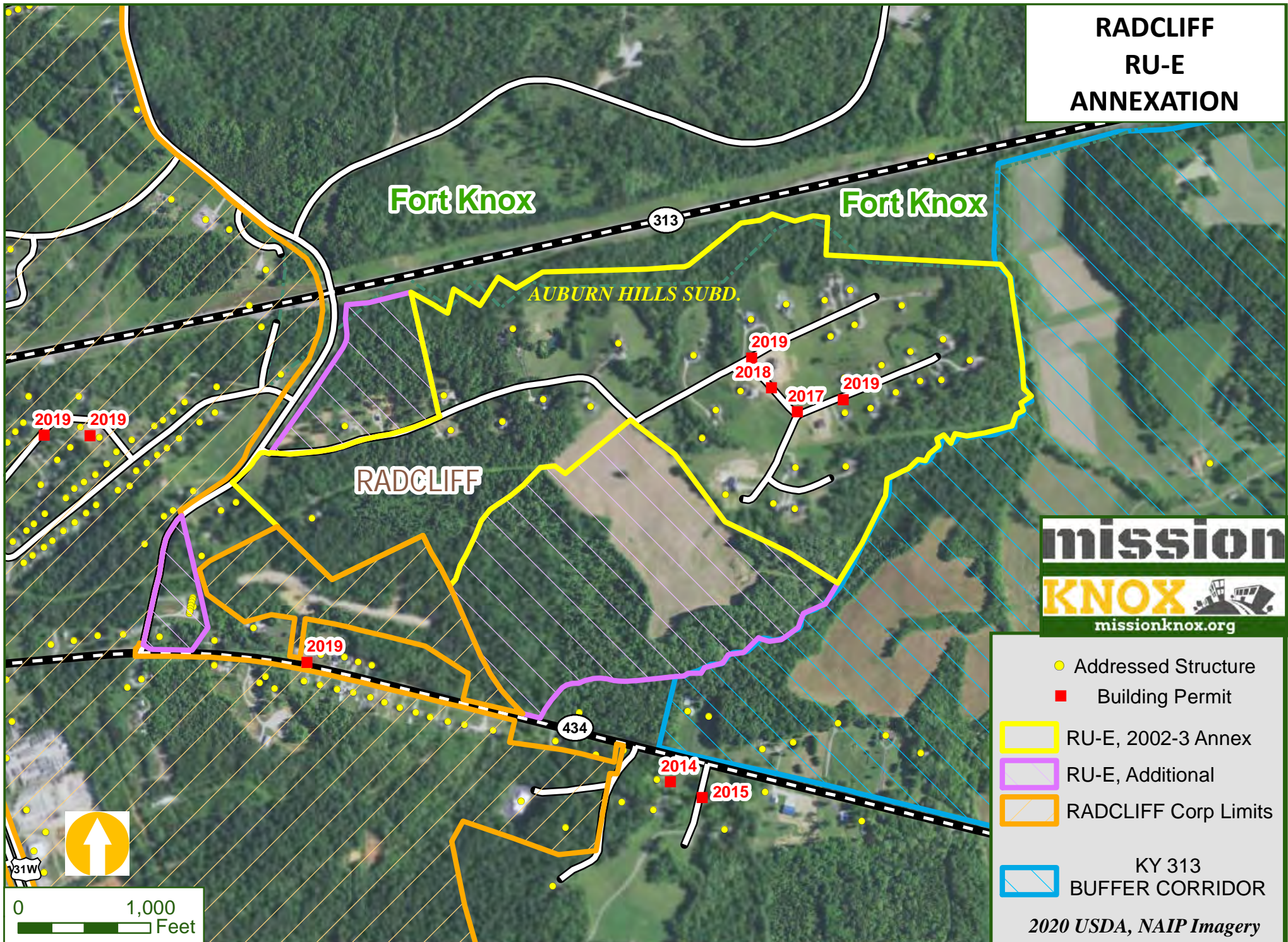


**KY 313  
BUFFER  
CORRIDOR**



**MAP 9 - KY 313 BUFFER CORRIDOR**

# RADCLIFF RU-E ANNEXATION



MAP 10 - RADCLIFF RU-E ANNEXATION



indicates 35 residential units built here since 2009. The 2019 Comprehensive Plan suggest that there is no growth of additional RU-E zones but additional annexations along KY 313 could bring this denser type of residential development.<sup>24</sup>



**Figure 12 RU-E Zone Home.** Source: Radcliff Comprehensive Plan 2019.

Additional concerns in the KY 313 Buffer are existing and potential residences in the Cartwright Estates area at the south end of Yano Range. See Map 11. This area lies entirely in the 100-year floodplain along the Rolling Fork. There is an access gate for facilities management at the end of Stewart Road into the range area. The area has been flooded several times (See Figure 24) and is at great risk to noise exposure as described in Section II.



**Figure 19 Stewart Road Access Gate.** Source: LTADD c.2007.



**Figure 20 Stewart Road Gate Signage.** Source: LTADD c.2007





**Figure 21 Residence on Cartwright Est. Rd. Source: LTADD c. 2007.**



**Figure 22 Elevated Residence on Cartwright Est. Rd. Source: LTADD c. 2007.**



**Figure 23 Utilities raised out of Floodplain. Source: LTADD c. 2007.**

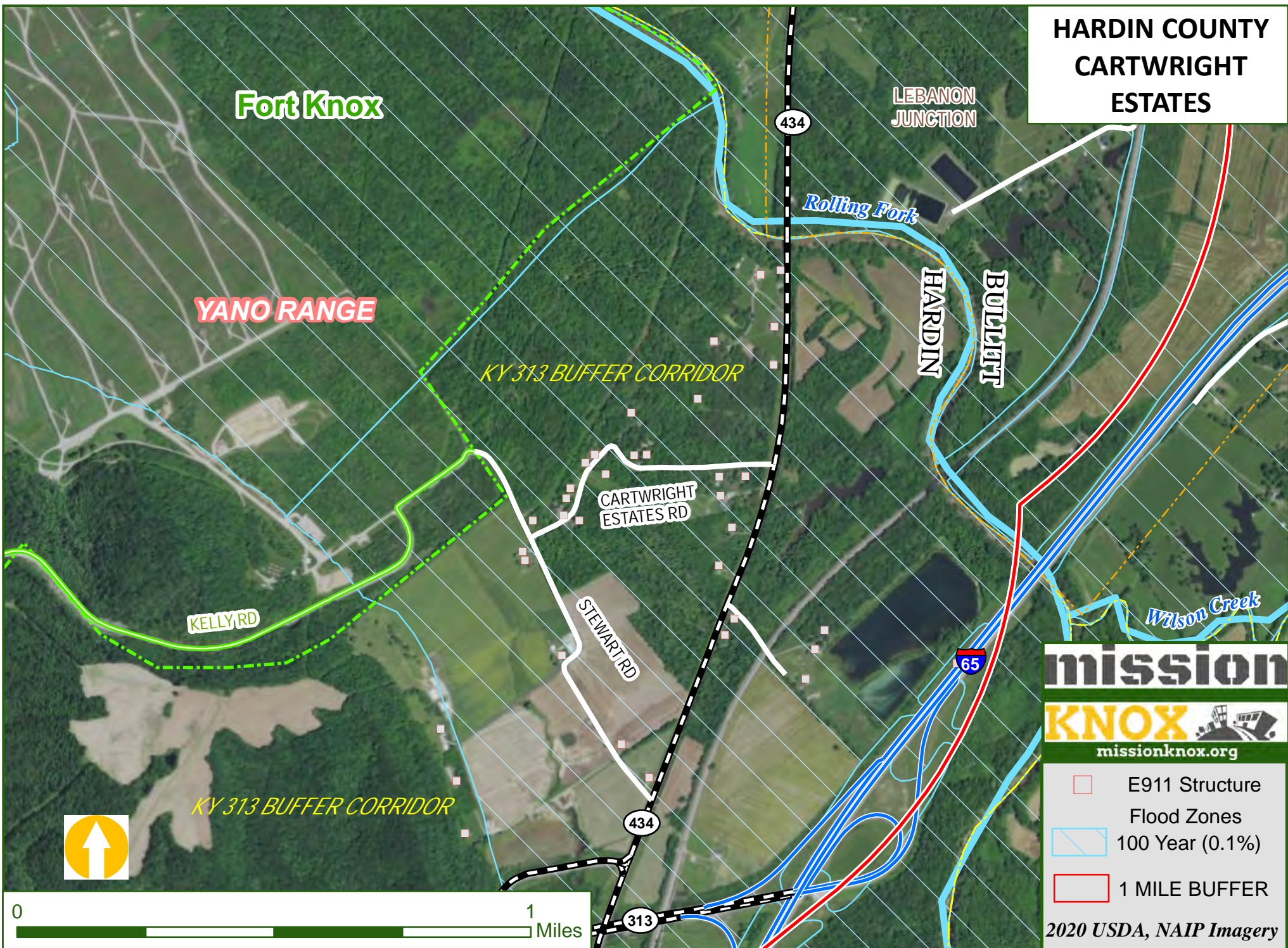
These residences are along Cartwright Estates Rd. The flood plain requires additional measures be taken such as raising structures and utilities.

The sign on the post in Figure 24 shows the levels of flooding for 1978, 1989, and 1997. This photo location is approximately ½ mile from the river gauge. The official high crest was 69 ft on February 17, 1989. This placed the bridge road surface on KY 434 where the gauge is located 3.5 ft underwater.<sup>25</sup>



**Figure 24 Flood Elevations. Source: LTADD c. 2007.**





# HARDIN COUNTY CARTWRIGHT ESTATES

MAP 11 - HARDIN COUNTY - CARTWRIGHT ESTATES

Hardin County has two additional areas that lay contiguous to the installation boundary thus within the one-mile buffer. Both are designated as part of the North Urban Area. This area in its entirety represents the primary growth area that remains in HCPDC jurisdiction in and around the primary cities of Elizabethtown, Radcliff, and Vine Grove. Of concern for this study, are these two sections that are between the post boundaries and Radcliff and Vine Grove. Primarily zoned R-1, Urban Residential Zone, they have thus far not been annexed.

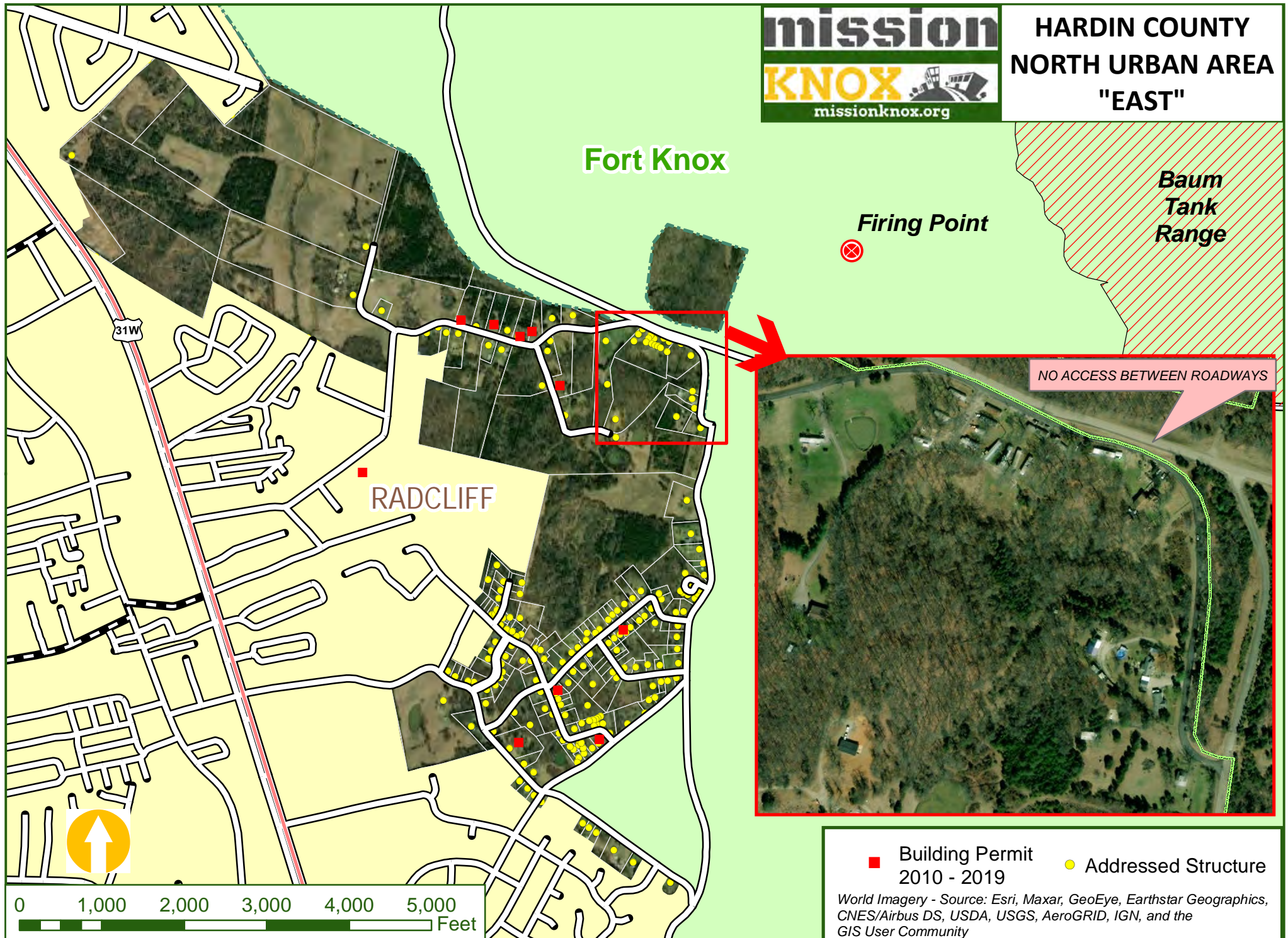
The eastern area adjoins Fort Knox on the east and Radcliff on the south. See Map 12. It has approximately 178 parcels of which 10 are undeveloped and in excess of 20 acres each. There are currently 196 addressed structures which include several clusters of mobile homes. This is an increase of almost 40 structures since 2009 per E911 data. Nine building permits were issued since 2009 of which 7 were mobile homes per HCPDC. The northern end lies at the current terminus of Lincoln Boulevard and the southern end of the area is accessed by South Boundary Road.

The western area is contained by the boundary with Meade County and the Cities of Radcliff and Vine Grove. See Map 13. It is split across the one- and five-mile buffer. Within the one mile there are 104 parcels of which 6 are greater than 20 acres, with one being over 90 acres. There are currently 89 residential addresses up from 75 in 2009 per E911 data. There were 17 residential building permits issued since 2009 per HCPDC. This area straddles the new KY 361 / Bullion Boulevard with direct access to the Chaffee Gate entrance to Fort Knox.

Both these areas have potential for dense residential development and should be considered at risk for that outcome.

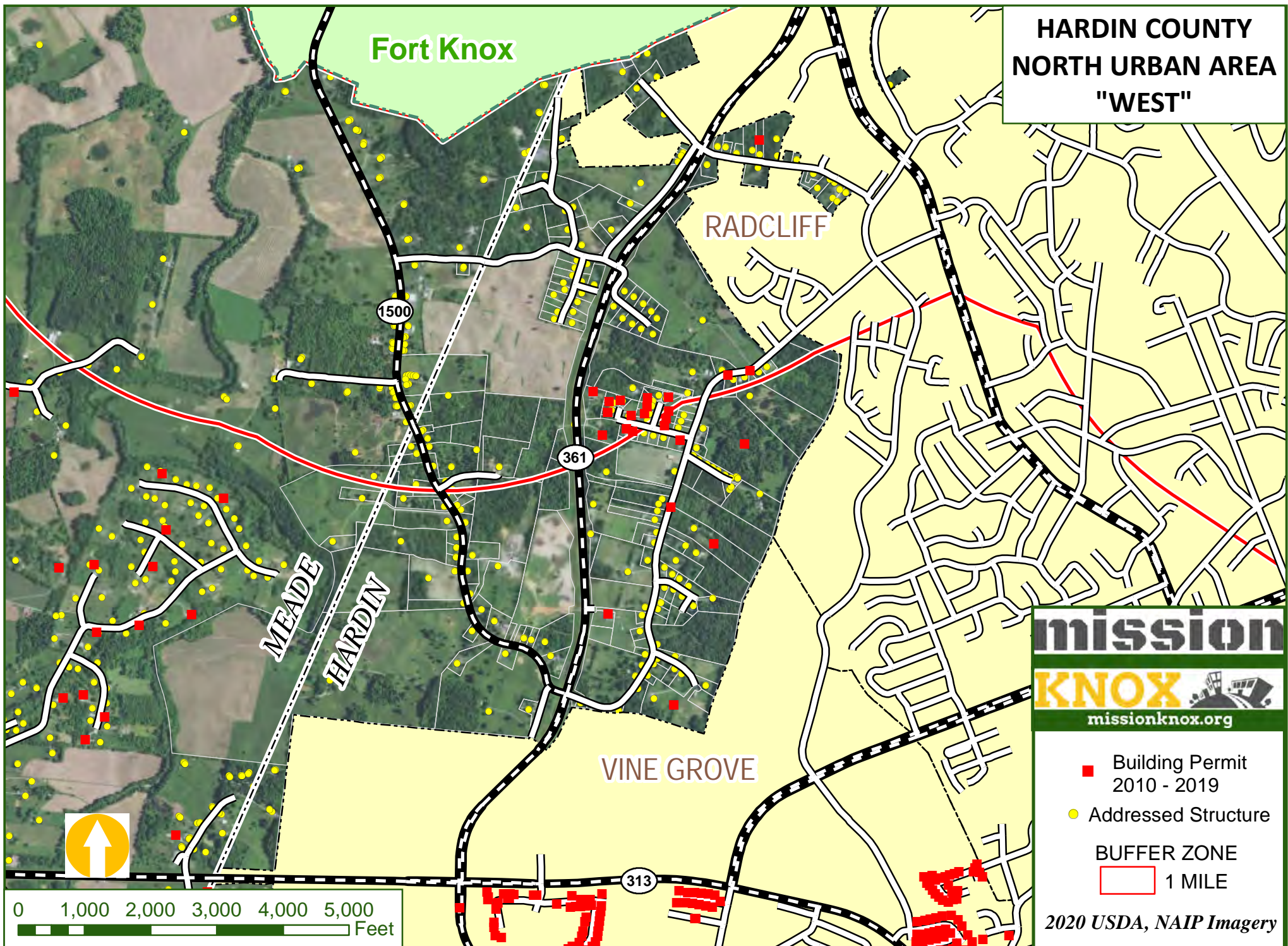
To the west of the City of West Point there is a portion of unincorporated land that falls under HCPDC purview. See Map 15 West Point Zoning. There are 20 residential addresses on 34 parcels all zoned R-2, Rural Residential. The entire area lies within the Ohio River's 100-year flood plain and it is mainly used for agriculture. It is bordered by Fort Knox along the south and lies entirely within the one-mile buffer.





**MAP 12 - HARDIN COUNTY, NORTH URBAN AREA, EAST**







**Radcliff Planning Commission (RPC)** has jurisdiction over the incorporated City of Radcliff. A majority of the city lies within the one-mile buffer and most of the remainder within two miles with a small section extending down US 31W to approximately three miles from the post boundary.

Radcliff has 17 separate zoning classifications. Ten of these directly involve residential and one other, a Planned Unit Development (PUD) relates to mix uses including residential.

New, dense residential development continues to occur adjacent to the post boundary. The Southern Heights Subdivision serves as an example. See Map 14. Available data records 31 single-family houses permitted between 2017-2019. Many of these lots share a common boundary with Fort Knox. Since 2012, 70 houses have been added to this subdivision per E911 data.

Feedback from the Commission also expressed concern for the Auburn Hills subdivision referenced previously. See Map 10. They recommend noise level reduction features in construction in this area of up to 30 dB be incorporated. In general, concerns for noise and the understanding of the various noise contour locations from Fort Knox's studies were expressed.<sup>26</sup> These are dealt with in more detail in Section III – Compatibility Issues.

**West Point Planning & Zoning Commission (WPPZC)** provides land use policy oversight for the City of West Point along the northern boundary of Fort Knox. The city has 10 zoning categories of which 5 are residential. The entirety of the city falls within the one-mile buffer and 70% lays within the 100-year flood plain. The greatest part of the city is

comprised of undeveloped Single-Family, Low Density (R-1) zoning adjacent to the Fort Knox boundary. Most of this area is heavily wooded and split between the flood plain or steeply sloped areas. No new residential construction permits were reported for the time frame requested. See Map 15.

Of note are some goals from the current Comprehensive Plan:  
Land Use Objectives

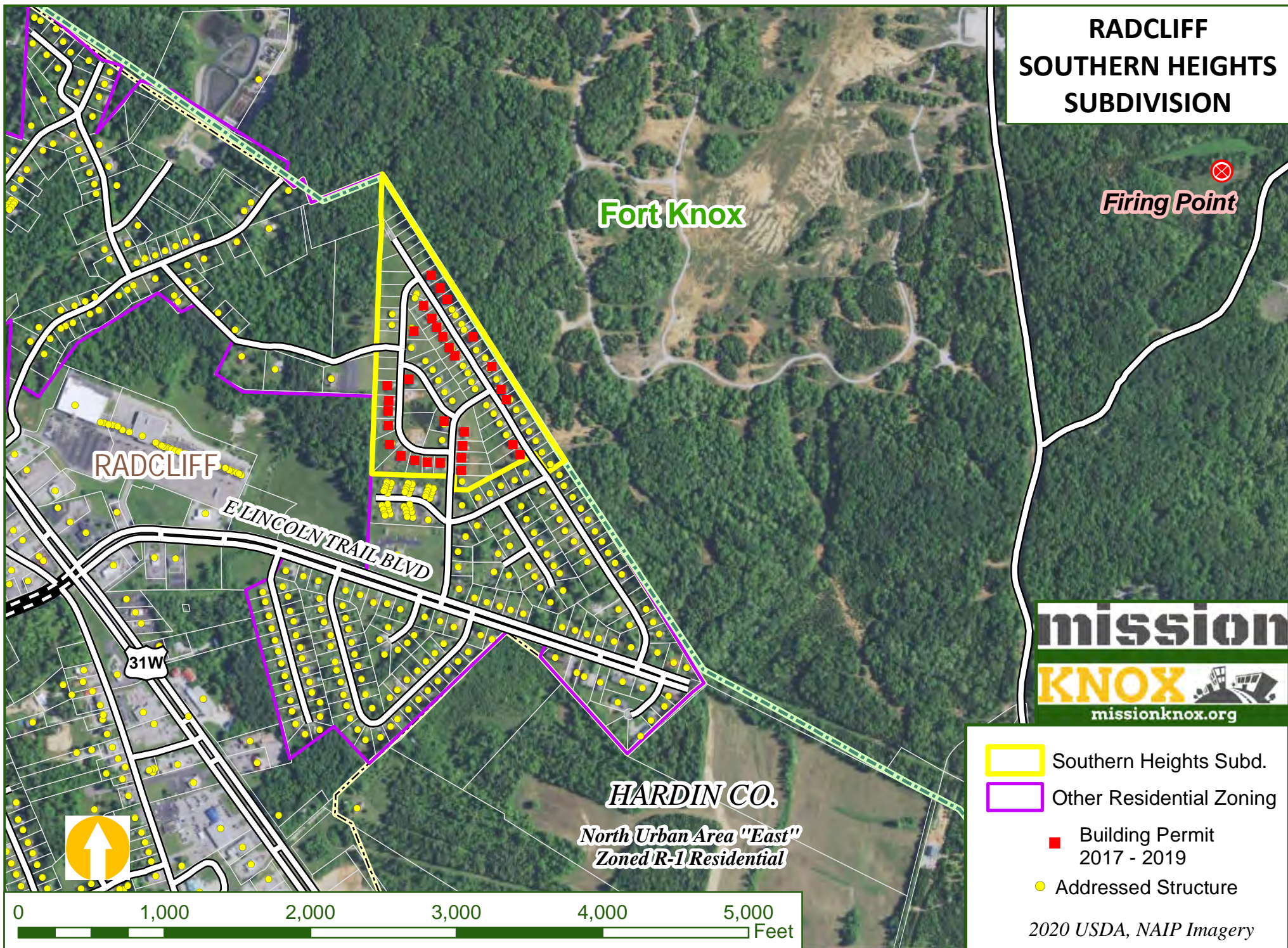
*5. Encourage creative development in areas designated as flood prone, where preventative measures are taken. Discourage development in areas in excess of fifteen (15) percent slope or other sensitive areas such as sinkholes or areas with unsuitable soil types.<sup>27</sup>*

In general, this would preclude growth in the existing R-1 areas on the south of US 31W. Considerations could be made for infill development and improvement of existing housing stock. This provided for in their "Housing" goals. However, a concern is Objective 1:

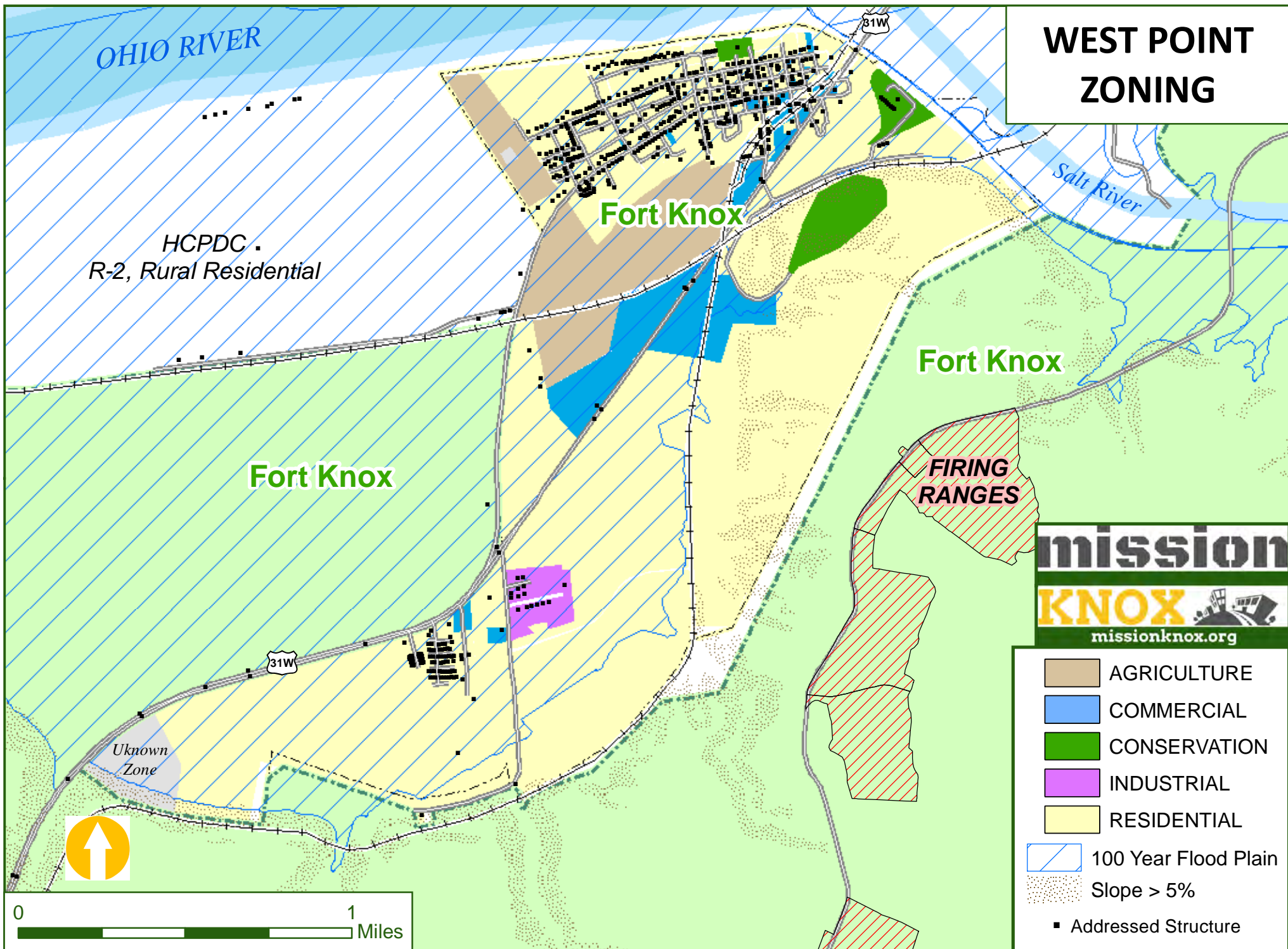
*Promote obtaining land out of the flood plain to develop an area of high quality housing to raise the average quality.<sup>28</sup>*

Because they are landlocked by Fort Knox and the existing flood plains it could be considered an unattainable objective.









MAP 15 - WEST POINT ZONING

## Meade

**Meade County Planning Commission (MCPC)** serves the unincorporated areas of Meade County. The focus here is the western boundary of Fort Knox. Meade County maintains 11 zoning classifications, 4 of those residential.

A primary concern is residential development along the US 60 corridor and its feeder routes. Large tracts of agricultural lands are being subdivided and converted to residential. E911 data reveals 829 residential addresses in the one-mile buffer in 2019. Since 2010 there have been 93 residential permits issued inside this buffer. A comparison of PVA parcel data shows several new subdivisions platted in this area between 2007 and 2019. Map 16 shows the KY 1882 Corridor to highlight this concern.

In their 2013 comprehensive plan, consideration is expressed for the need to notify, through subdivision plats, the existence and issues of living adjacent to Fort Knox. Research has not yet shown this to have been implemented.<sup>29</sup> The same section on future land use encourages dense residential development in this area.

*Residential growth closer to Fort Knox and Brandenburg should be more compact and urban in nature while other areas of residential growth should be more rural.<sup>30</sup>*

Also noted in the Future Land Use Plan the following:

*In order to foster a relationship for the future that embraces both the developmental goals of Fort Knox and citizens of*

*Meade County this plan will encourage county-wide notice of the proximity of any residential properties to an active military installation as well as active agricultural or industrial operations. This may be implemented in various manners including the county's subdivision regulations. The purpose of such a notice serves to advise prospective residents of Meade County that they are located near an active military installation, industrial activity, or agricultural operation. Additionally, the notice would advise on the potential impacts and implications of such proximity and that such activity could include certain levels of noise, vibration, smoke, dust, mechanical and/or agricultural odors and other physical collateral effects associated with these types of activities.<sup>31</sup>*

Concerns could be raised that “compact” i.e. denser residential development closer to Fort Knox could create compatibility issues. The plan’s “Scenario 3 – Ft. Knox Expansion” as laid out, has elements that could be considered non-compatible with the overall sustainability of Fort Knox. The concern for management of this scenario is raised.

*The majority of residential, commercial, and recreational development is focused between US 60, KY 313 and Hardin County. Development is currently occurring in this area due to the expansion at Fort Knox.<sup>32</sup>*

The need to implement policies prior to this occurring should be of primary focus.

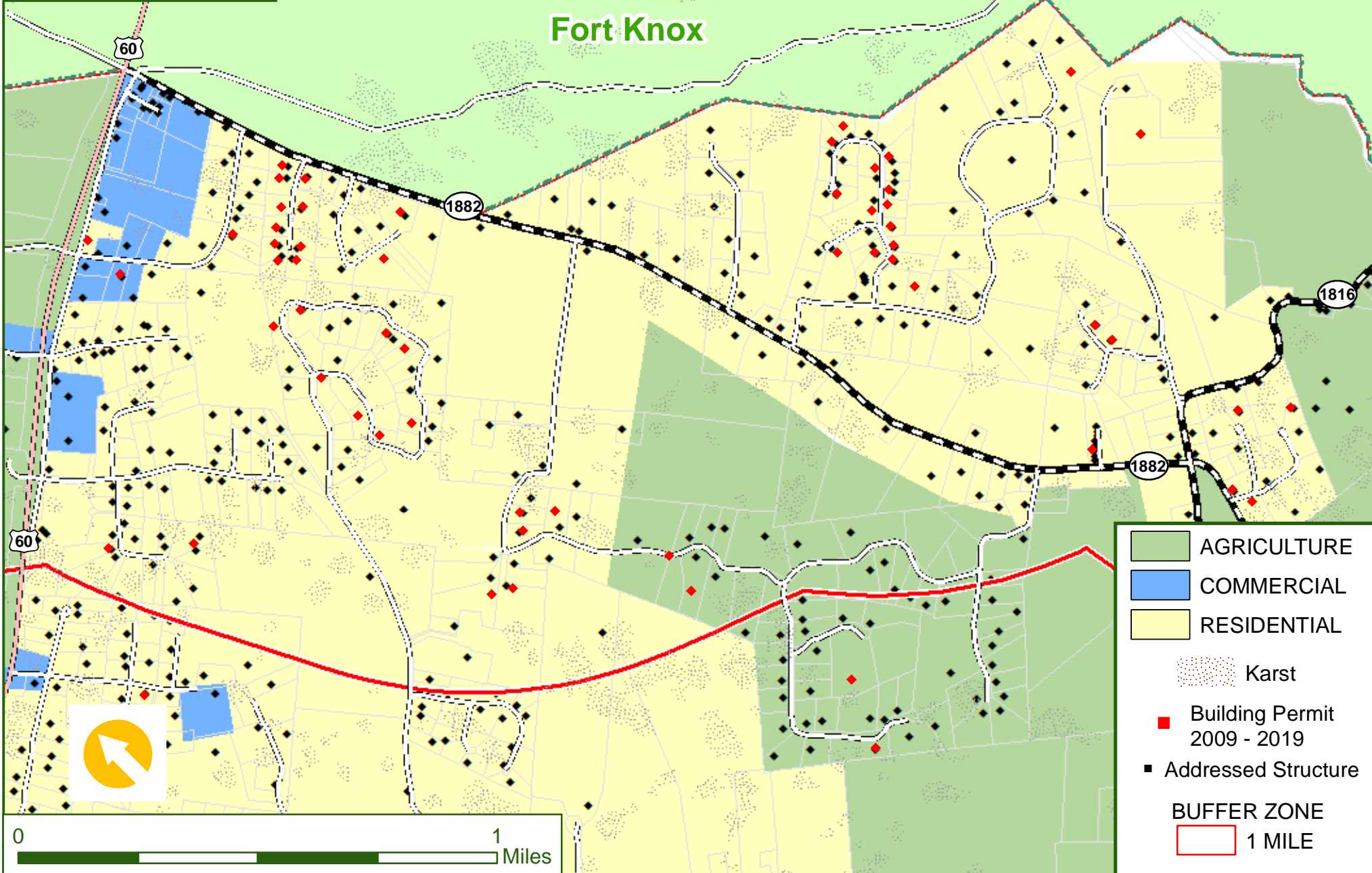
A large section of this area (over 2,200 acres) is protected by Otter Creek Park, managed by the Kentucky Department of Fish and Wildlife

Resources. However, concern of future subdivision of the many large agricultural tracts that remain along the Post boundary is of concern. The predominate karst landforms of this area should also be of concern due the potential instability of the soils in this area.

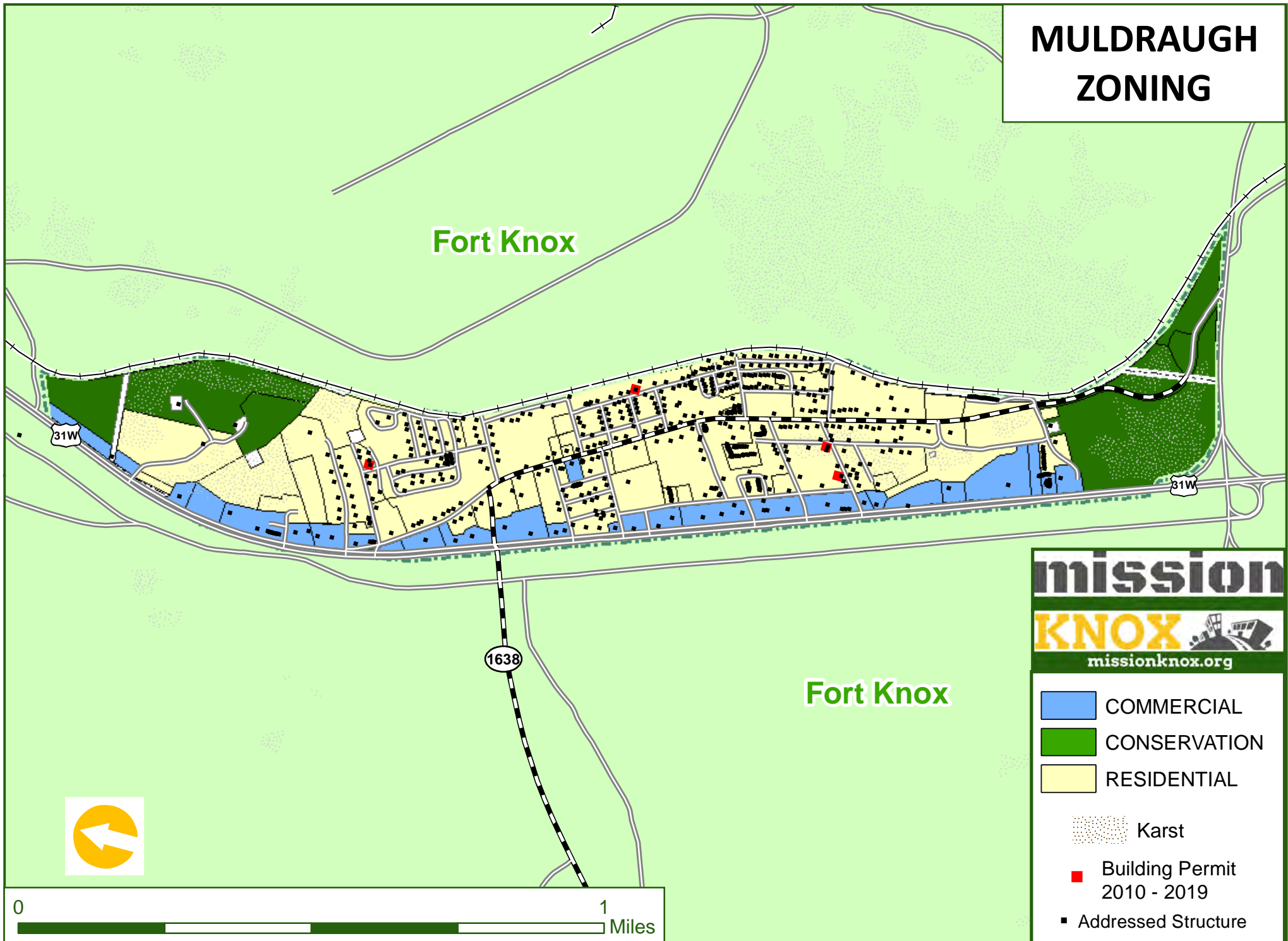
**Muldraugh Planning & Zoning Commission** (MPZC) oversees the city policies for their unique situation. As an island in the Fort Knox reservation, they have no ability for growth through land acquisition. Infill is the only measure to increase or improve housing stock. Four of their 10 zoning classifications are residential. The vast majority of the land area is zoned residential. Since 2010, there have been only 4 residential building permits issued. Typical of the region there are large areas of sinkholes in the city that consume land area that is undevelopable for structures. See Map 17.



**MEADE COUNTY  
 KY 1882  
 CORRIDOR**



# MULDRAUGH ZONING



MAP 17 - MULDRAUGH ZONING

## Nelson

The Nelson County **Joint City-County Planning Commission** (JCCPC) was established in 1970 to serve all of the county and its four incorporated cities. No part of Nelson County lies within the one-mile buffer. They maintain 19 zoning districts of which 8 are residential plus an additional 2 special districts for manufactured housing.

The concern from a compatible use standpoint is potentially noise and light pollution concerns. The Large Caliber LUPZ and Fort Knox Airway route cross over the western end of Nelson County in the five-mile buffer zone.

The area is almost entirely zoned Agricultural (A-1) and is also classified as a “Naturally Sensitive Area”. Large sections are also in the 100-year flood plain of the Rolling Fork and its tributaries. The area also has steep slopes common with the Knobs region and various protected wetlands and wildlife management areas.

Currently the future land use plan “...*emphasizes limited growth and development within the Rural and Naturally Sensitive Areas to protect the integrity and character of these unique areas. Management and protection of these areas are vital to preserving the rural character and unique resources...*”<sup>33</sup> The current densities for residential use are one dwelling per 5 acres. Since 2009 only 3 residential building permits have been issued within the five-mile buffer zone.



## Transportation

### Existing Highway Network

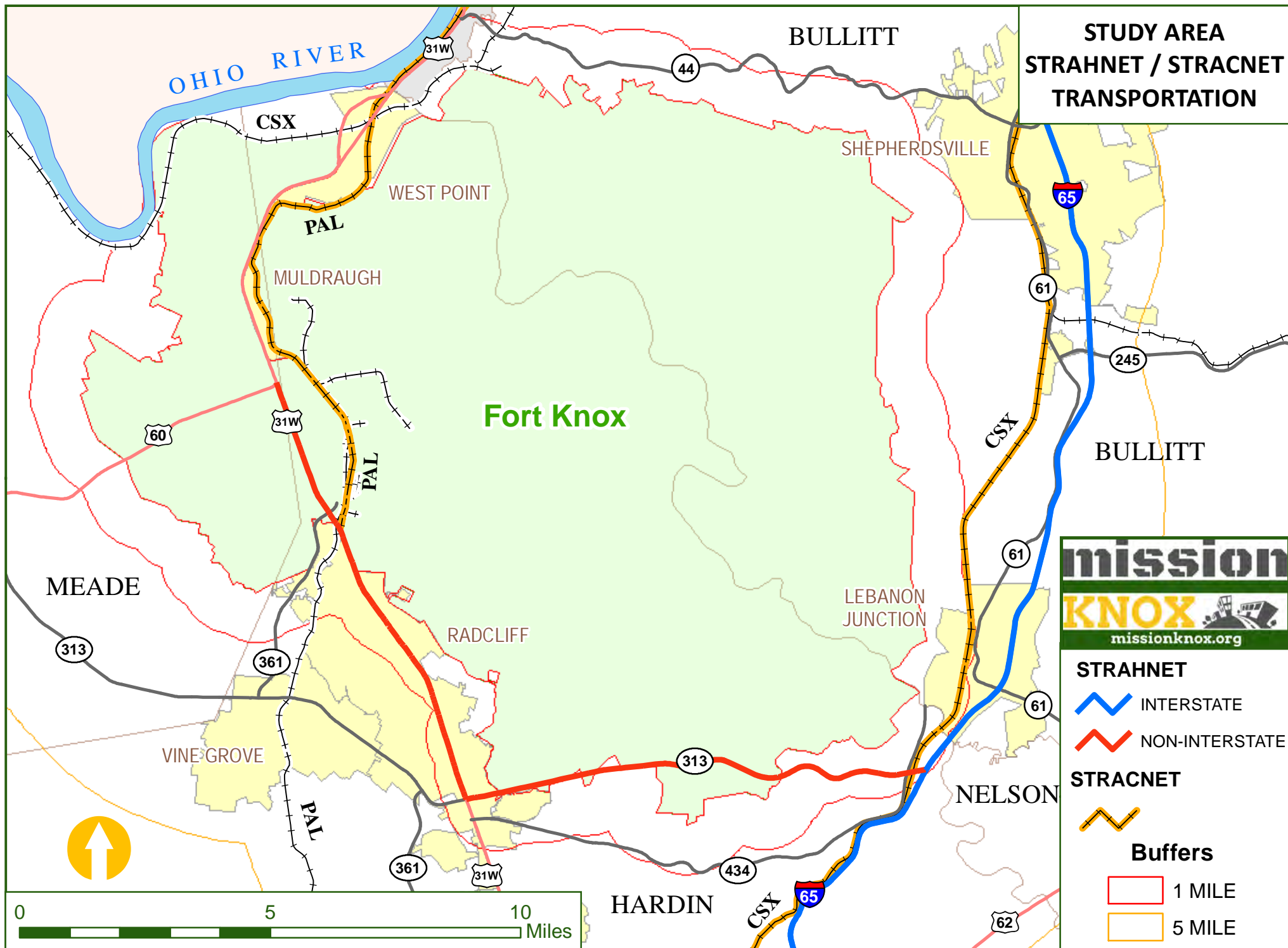
The study area is serviced by a strong system of roadways including several Strategic Highway Network (STRAHNET) roadways. I-65 is an integral part of STRAHNET and runs north-south just to the east of Fort Knox. KY 313 connects with I-65 and extends along the southern boundary of the reservation intersecting US 31W to complete the STRAHNET connection. US 31W provides access to the main gates onto the reservation at Wilson Road, Bullion Boulevard, and Brandenburg Station Road. US 31W runs north-south through the western side of Fort Knox bisecting the cantonment area. KY 313 continues west and north around Fort Knox to Brandenburg. There it crosses the Ohio River terminating into IN 135. See Map 18.

In addition to the STRAHNET network, Fort Knox is served by several other roadways. The most significant of these roadways are US 60, which runs east-west through the western side of post. KY 44, which runs east-west along the northern boundary of Fort Knox, is a more rural connector between US 31W and I-65. The Kentucky Transportation Cabinet (KYTC) has recently designated two corridors in the study area as “Regionally Impactful Corridors”. The first, KY 245, which begins in Nelson County at US 150 in Bardstown and follows northwest to interchange with I-65 in Bullitt County. KY 3005, also known as Ring Road, provides a bypass around Elizabethtown in Hardin County, currently beginning at the Western Kentucky Parkway and ending near I-65 on US 62.<sup>34</sup>

### Rail Network

There are two private rail operators in the study area. The Paducah and Louisville Railway (PAL), which is a Class II railroad and short line partner of the other - CSX Transportation. PAL provides mainline service via spurs at Cecilia, Elizabethtown, Vine Grove, Fort Knox, and into yards in Louisville. CSX has tracks to the north and east of Fort Knox. Running out of Louisville through the Ohio Valley to connections in Henderson, Kentucky, it provides service to industries along the Ohio River in Meade County. Going south from Louisville, their primary line between the gulf ports and Chicago, passes just to the east of Fort Knox through Bullitt and Hardin Counties.

DoD has designated the Strategic Rail Corridor Network (STRACNET), a network of rail corridors that are considered important to national defense. STRACNET main lines include the PAL line providing access to Fort Knox. The CSX main line to the east of Fort Knox is also part of this network.<sup>35</sup> See Map 18.



MAP 18 - STRAHNET / STRACNET TRANSPORTATION

## Air Facilities

Addington Field, located in Elizabethtown, has a lighted, paved runway that is 100' by 6001' long. It averages 50 operations a day; 30% is general transient aviation, 40% local general aviation, 10% air taxi service, and 20% military aviation. The airport has also recently installed a precision runway approach aid known as an Instrument Landing System (ILS).<sup>3637</sup>

Louisville International Airport aka Standiford Field provides commercial passenger and freight flight service. It is home to UPS Worldport, and numerous passenger and cargo airlines.<sup>38</sup> It also serves as home of the 123<sup>rd</sup> Airlift Wing of the Kentucky National Air Guard.<sup>39</sup>

## Fort Knox Access Gates

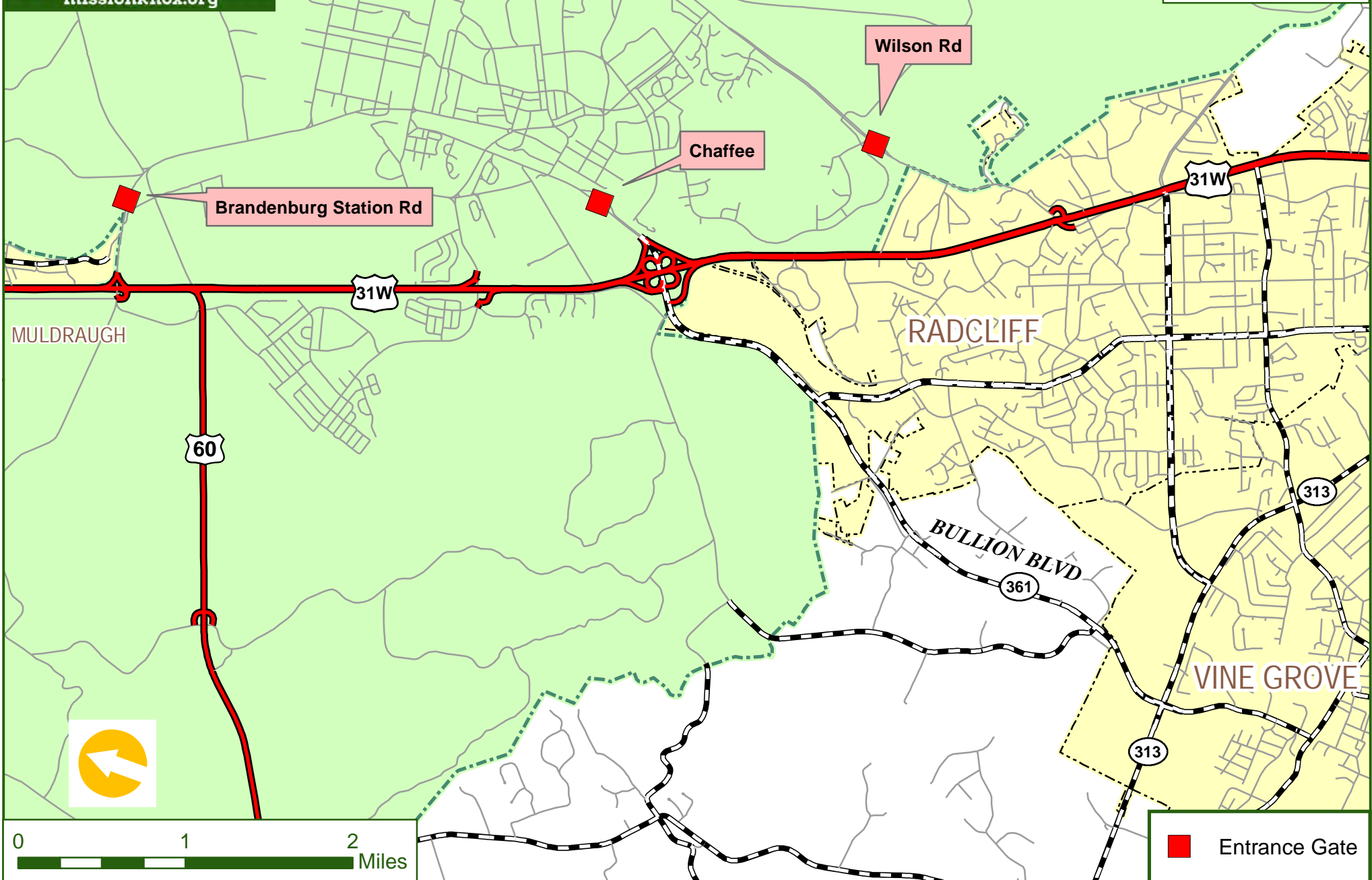
Fort Knox has three primary gates that provide ingress and egress movements for the post. See Map 19. They are referred to as Brandenburg Station Road Gate, Chaffee Gate at Bullion Boulevard, and Wilson Road Gate. A fourth gate, the Chaffee Avenue Gate, once provided full access for the post prior to the gate at Bullion Boulevard being reconstructed. It now only serves as an exit from the post. One other gate was recently reopened in 2021, the Patton Museum Gate, but it does not provide access to the post, only to the museum facilities. Checkpoints are established at each entry gate for security purposes. These checkpoints cause delays, as identification is required before entry onto the post is permitted. Peak hour traffic volumes at the gates vary significantly, as daily activities and events on the Fort Knox post fluctuate. The following discussion describes the existing characteristics for each gate approach.

The northern-most gate, at Brandenburg Station Road, is accessed from US 31W via the Brandenburg Station Road interchange. The roadway leading to this gate is a two-lane road that crosses over a railroad bridge. At the gate, the roadway widens to four lanes, allowing for two commercial vehicle checkpoints and two regular vehicle checkpoint lanes. All commercial traffic must enter the Fort Knox post through this gate.

The second gate, Chaffee Gate at Bullion Boulevard, has been recently reconstructed and is accessed from the US 31W interchange at Bullion Boulevard. This gate facility has the largest capacity of all the gates, with two inbound and outbound lanes from US 31W to its entrance. At approximately 600 feet from the gate, the two inbound lanes widen to four checkpoint lanes.

The Wilson Road Gate is the southern-most entrance point into Fort Knox, located at the boundary with Radcliff. Traffic entering and exiting this gate utilizes North Wilson Road. The approach to this gate has one inbound and one outbound lane. Four checkpoint lanes exist at this gate. It is important to note that not all checkpoint lanes are open at all times of the day. From field observation, it was observed that only during times of peak congestion at the gates are all the checkpoint lanes open. For peak period analysis throughout this study, however, it was assumed that all checkpoint lanes for all gates would be open.





## Transportation Change & Growth

Base Realignment and Closure (BRAC) in 2005, created dramatic changes for Fort Knox and the study region, perhaps the most notable being the relocation of the armor school. However, with this loss, Fort Knox has since gained the presence of the Human Resources Command (HRC), which serves the entire United States Army. This addition brought a significant influx of civilian jobs in addition to those military training facilities that remained on post. These changes highlighted the ongoing need for an efficient transportation system to serve the installation. Map 20 illustrates the projects described in this section.

To meet these challenges and enhance the future missions of Fort Knox, the Commonwealth of Kentucky, local governments, and other stakeholders worked together to address many BRAC related transportation issues. At that time, KY 313 terminated at Knox Avenue in Vine Grove. It has since been extended to the City of Brandenburg. This extension provides much easier access to Meade County residents that work on Fort Knox.

Another major improvement that was constructed post BRAC was KY 361 (Patriot Parkway) which runs from a Single Point Urban Interchange at the US 31W Bypass in Elizabethtown to KY 313 in Radcliff. This new route serves as an alternative to US 31W between Elizabethtown and Radcliff. A further connection of the KY 361 route was the extension of Bullion Boulevard from US 31W near Fort Knox's Bullion Boulevard main gate to KY 313, just to the north of Vine Grove. As was desired by the BRAC Task Force, this series of new construction segments created a direct travel link between Fort Knox's main gate and the installation's largest municipal neighbor of Elizabethtown. These new routes have

provided safer and more efficient access to Fort Knox from surrounding environs.

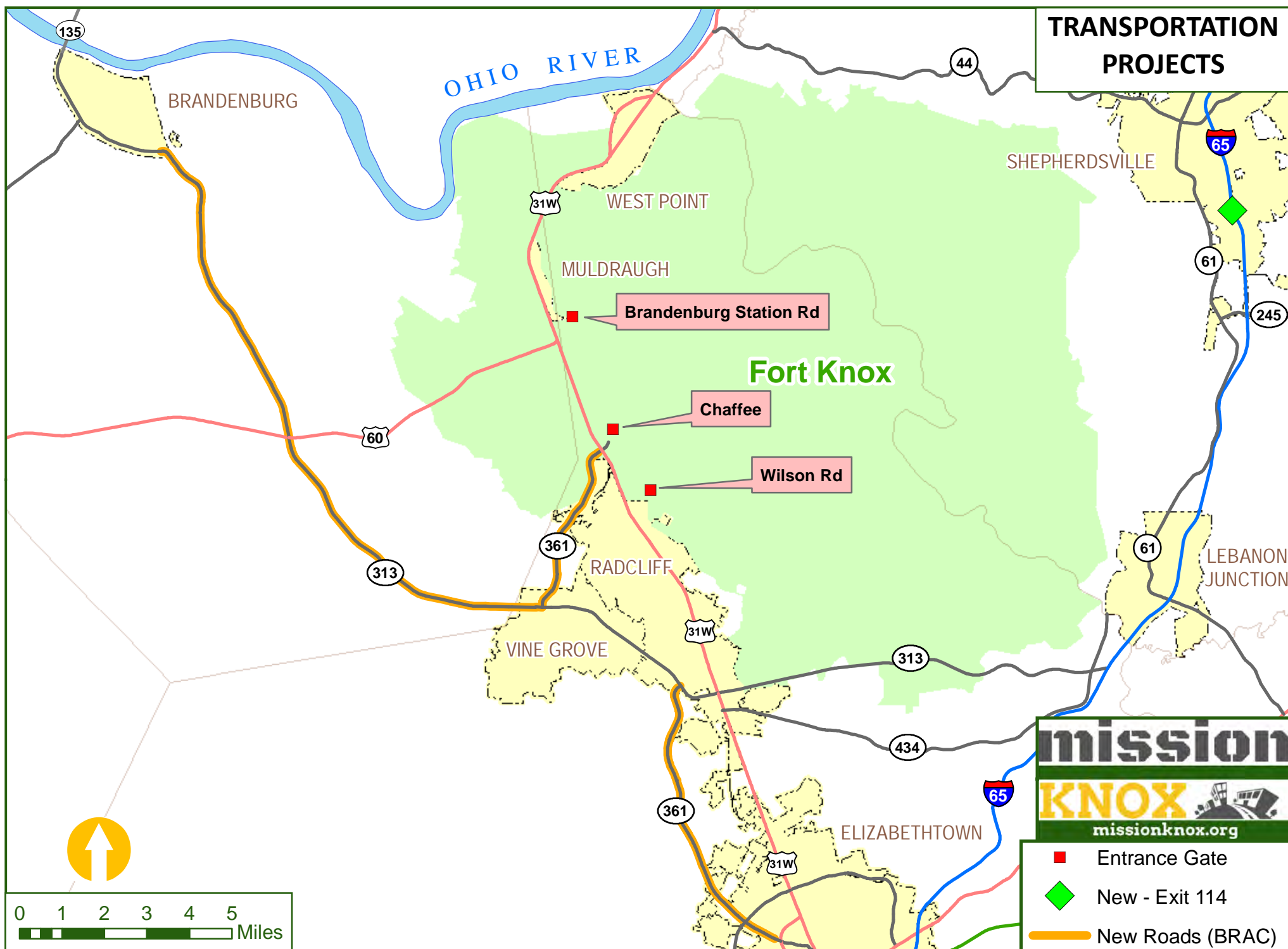
There were several other minor improvements as part of the BRAC transportation planning process. These included operational improvements to US 31W as well as improvements to North Wilson Road in Radcliff, which leads to Wilson Gate at Fort Knox. An access management study in 2012, as well as a series of Reduced Conflict U-Turns (RCUTS), in 2020, have helped to improve traffic flow and safety along US 31W.

In 2021, a 31W accessibility and connectivity study recommended several upgrades that would impact travel to and from Fort Knox. Directional median U-turns at 14 intersections on 31W between Elizabethtown and Fort Knox and a new ramp from 31W to North Wilson Road, which leads directly to Wilson Gate at Fort Knox. These roadway improvements are intended to improve safety and reduce travel times along the US 31W corridor.

Recently, a new interchange was constructed on I-65 in Bullitt County known as Exit 114. Along with the new interchange, a new east-west crossroad (KY 3538) was constructed that connects with KY 61 west of I-65. The new interchange was constructed to serve the growing commercial development in the area.

## Existing and Future Traffic Flow

AADT (Annual Average Daily Traffic) traffic counts are often a useful way of illustrating growth in traffic volumes in one location over a



## MAP 20 - TRANSPORTATION PROJECTS

FORT KNOX COMPATIBLE USE PLAN - STUDY



specific timeframe. However, with the Covid-19 pandemic, *“travel on all roads and streets changed by -25.5% (-72.9 billion vehicle miles) for May 2020 as compared with May 2019.”* Additionally, data shows that travel continued to remain low and had not returned to 2019 levels through January of 2021.<sup>40</sup> Since KYTC only collects some station data triennially, this also added to the difficulty of showing accurate traffic volume changes in the study area that were not affected by pandemic-influenced data. Due to this drastic and unanticipated change in traffic volumes beginning with the pandemic in 2020 and continuing into 2021, it is difficult to predict the near future volumes. Map 21 helps visualize the following information.

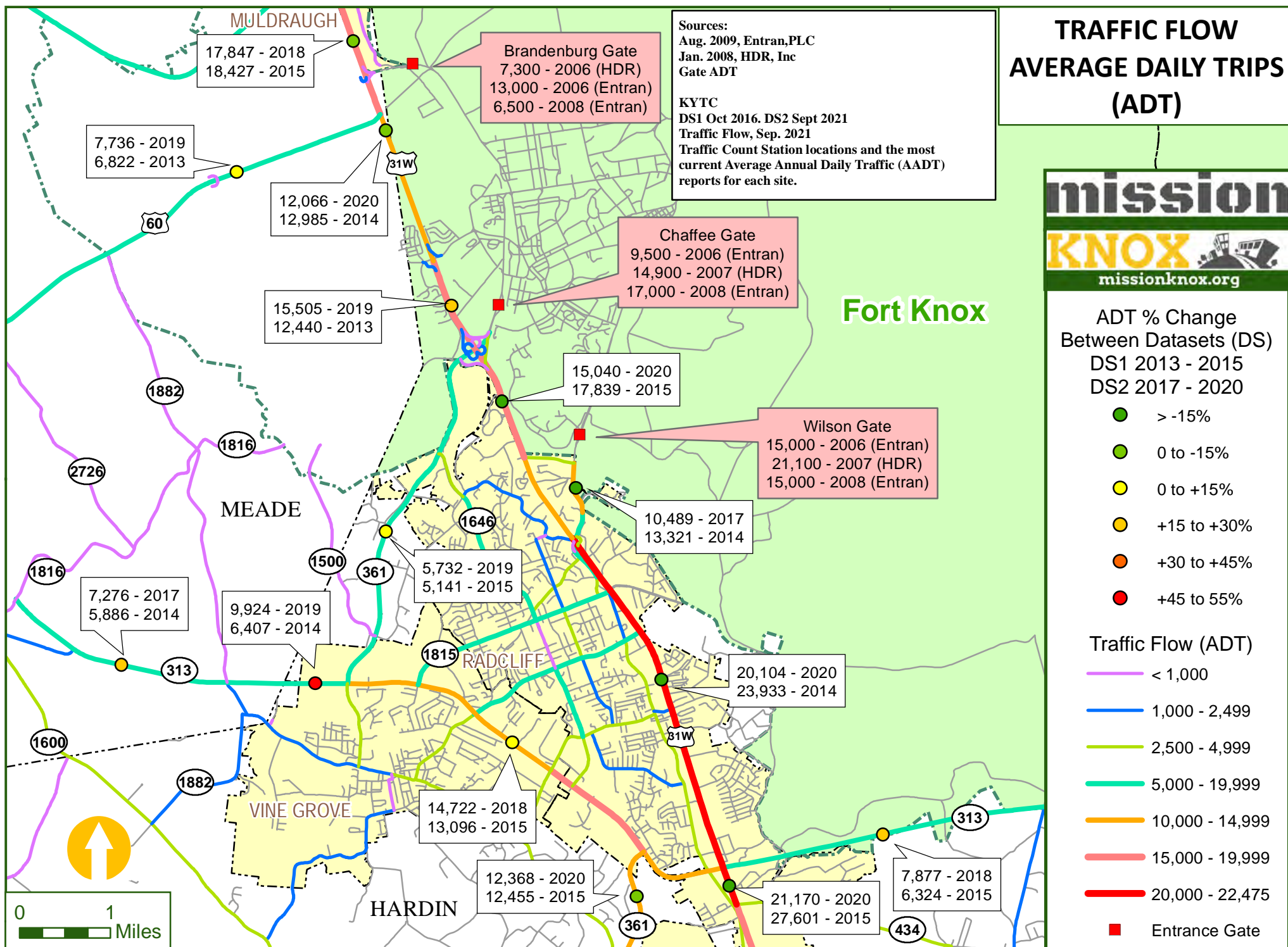
KY 361 was opened from US 31W Bypass in Elizabethtown to KY 313 in 2014 providing additional access paralleling US 31W. This was part of the 2005 BRAC funding outcome. Continuing from KY 313 in Vine Grove to Chaffee Gate at Fort Knox, the northernmost segment of KY 361 provides this direct access bypassing congestion on US 31W through Radcliff. The southern section of this roadway was KY 1500 with a count of 3,035 ADT in 2011. The growth of over 2,700 trips shows increased usage along this new alignment. This is even more dramatic with consideration given that the remaining portion of KY 1500 has seen a decrease to just 140 ADT.

Drops in the ADT for US 31W from KY 313 up to KY 361 through Radcliff reveal drops in ADT. As mentioned previously the issue of Covid-19 is likely a contributing factor. Thus, it is difficult to determine the trend without additional data. The fact that KY 361 went from zero in 2013 to over 12,000 in 2015 between Elizabethtown and KY 313 obviously is a contributing factor.

In looking at ADT and congestion at Fort Knox’s gates we lacked current data to contribute greatly to any analysis. The data available is from two studies done in 2008 and 2009 and there are some conflicts with the numbers contained in each study. Nonetheless the data is presented on Map 21 to assist in conveying the traffic flow through the checkpoints with the available data.

The 2008 HDR study collected gate data in November 2007 via visual counts.<sup>41</sup> It was a study looking at the overall Fort Knox traffic situation and contained a proposed improvement plan for post roads. One project involved a South Boundary Road upgrade with access to the Wilson Road gate connecting to KY 313 just to the east of its intersection with US 31W. This was by far the largest proposed project at \$28 million in 2008.<sup>42</sup> Additional efforts towards this were done in 2011 but to date this proposal sits idle.

The 2009 Entran study’s data was from 2006 and 2008. The source of this data is not noted.<sup>43</sup> It is believed to be partially sourced from a previous study also done by Entran in July 2007. The recommendations from this 2009 study included projects since come to fruition including the KY 313 extension west from KY 1500 and the construction of KY 361 then known as E2RC.<sup>44</sup> It also noted the South Boundary Road project to provide additional access and presented three options, but no dollar figure was given.<sup>45</sup>

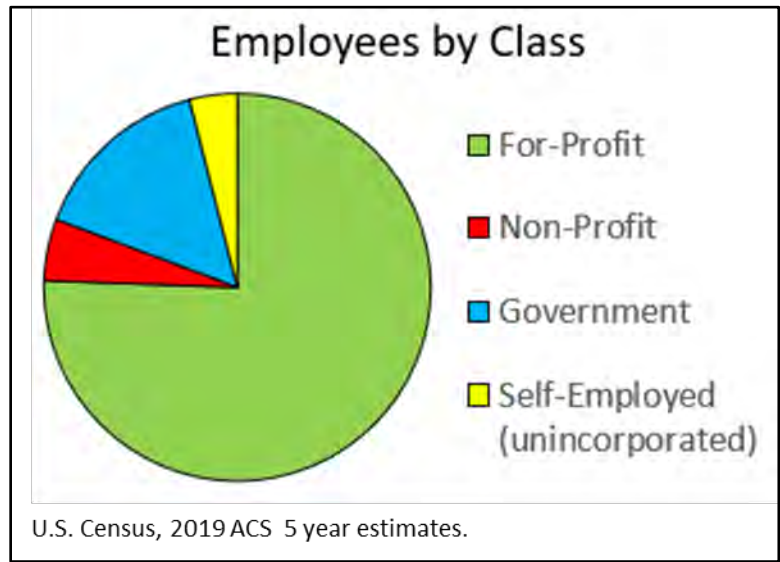


**MAP 21 - TRAFFIC FLOW**

# Economic & Labor Profile

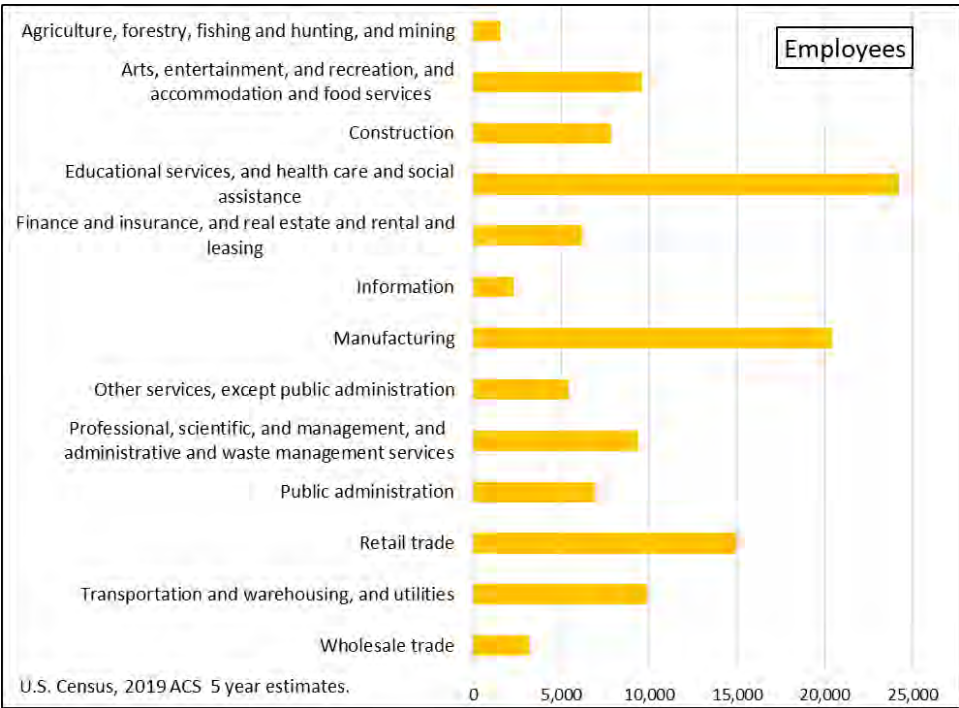
The study area has a diverse economy. The counties that comprise it have a total of 121,817 civilian workers earning over \$5.8 billion in aggregate over the 12 months measured.<sup>3</sup> The workers are employed across sectors, with 92,031 in private for-profits, 6,277 in non-profits, 18,650 in government and an additional 4,859 in unincorporated self-employment.

Chart 6 Study Area Employees by Classification



<sup>3</sup> In looking at the numbers it should be noted these are based on pre-Covid, 2019 U.S Census Bureau's American Community Survey numbers. It is expected over the long-

Chart 7 Study Area Employees by Civilian Sector



The civilian employees are balanced across many sectors with Education and Healthcare being predominant at 20% with manufacturing next at 17%.

In looking at incomes the study area tends to trend higher than Kentucky but lower compared to nationally. Median household incomes are all much higher than Kentucky but tend to trail nationally with Bullitt at 125% of the state and 101% of the U.S. All counties mean household incomes exceed the state but fall behind nationally.

term there will be an associated downturn in several categories due to the impacts of the pandemic.



Family per capita incomes follow a similar path. Only Meade, which is just 1% less than the state's, is lower. However, again nationally they all fall behind with Meade at 82% of the national income. Overall median earnings for workers exceed the state's earning level. Bullitt and Nelson being above the national median and Hardin and Meade falling just below. A large factor that comes into play is the cost of living.

The Bureau of Economic Analysis creates many datasets to track costs of products between geographics. In looking at Regional Price Parities (RPP) we can compare Kentucky's living costs to the United States as a whole and to other selected states described as follows.

*RPP "Allows comparisons of buying power across the 50 states and the District of Columbia, or from one metro area to another, for a given year. Price levels are expressed as a percentage of the overall national level."*<sup>46</sup>

The data shows that the study area compares very favorably to other parts of the county. See Table 12. The costs for all items and especially rents are much cheaper than nationally or for the other states chosen for comparison. In the Elizabethtown-Fort Knox Metropolitan Statistical Area (MSA) rents are 29% less than the national average.<sup>4</sup>

<sup>4</sup> The United States baseline value is essentially a factor of 100 but this can vary slightly because of how the data is aggregated.

**Table 12 Regional Price Parities**

REGIONAL PRICE PARITIES				
	All items	Goods	Services: Rents	Services: Other
United States	100	99.2	101.4	100
California	116.4	104.9	153.6	108.3
Georgia	93.2	96.8	82.6	96.7
Kentucky	87.4	94.8	67.7	90.6
Elizabethtown-Fort Knox, KY MSA *	86.5	92.7	71.9	90.1
Louisville/Jefferson County, KY-IN MSA**	89.6	96.6	74.9	90.5
Virginia	101.3	98.9	107.4	100.1

Bureau of Economic Analysis, Last updated: December 15, 2020-- new statistics for 2019.

\* - Hardin, Meade & LaRue Counties

\*\* - Jefferson, Bullitt, Henry, Oldham, Shelby, Spencer, and Trimble Counties in Kentucky, Clark, Floyd, Harrison, Scott, and Washington in Indiana.

The sectors of the study area economy cross a broad range as previously mentioned. The standby of agriculture still remains a factor but changes at least partially due to its geographic location, transportation network, and low energy costs that create many of these opportunities. Automotive parts and related industries, logistics, warehousing, and distribution, and distilled spirits are all demonstrating recent growth. Major investments continue to occur such as the \$1.7 billion NUCOR steel plant in Meade County, continued logistic growth in Bullitt County, several distilleries expanding production and warehousing, and the potential of the Glendale Megasite all portend future growth in the region that must be monitored for compatible use issues related to Fort Knox.

## II Fort Knox Military Reservation Profile

*This section of the plan lays out a history of Fort Knox and a picture of the installation today and in the future. It also describes the overall mission footprint, to include ground, air, and riverine operations. It will briefly examine the impacts that these various missions have on the surrounding communities and community impacts to the installation.*

### Overview

Fort Knox is located along the Ohio River in north-central Kentucky. Containing approximately 108,000 acres, it spreads south across portions of Hardin, Meade, and Bullitt Counties. It lies approximately 35 miles south of Louisville a major metro area which is ranked 29<sup>th</sup> by population in the US. There are multiple communities located around and contiguous to the post: West Point to the north, Shepherdsville to the northeast, Lebanon Junction to the southeast, Elizabethtown to the south, Radcliff and Vine Grove to the southwest, and Brandenburg to the northwest. Uniquely the City of Muldraugh is encompassed by the installation along a portion of US 31W near the northside of the cantonment area.

### Geography & Environment

The Fort Knox installation sits at a confluence of multiple physiographic regions that are characteristic of its many neighbors. This includes the knob region of high ridges and steep hillsides, the Muldraugh hills region of varying hillsides and narrow valleys, and the Pennyroyal region that consists of karst landscapes. Meanwhile intersecting the installation and leading to the Ohio river to the north are the Salt River,

the Rolling Fork River, Otter Creek, Cedar Creek, and Mill Creek and their vast flood plains.

The western portion of the installation can be considered good or excellent for construction or as foundation material as it consists of dolomite or limestone. Meanwhile the eastern portion of the installation's land is only considered fair foundation material as it consists of gravel, siltstone, and sand. Like the surrounding region, the natural landscape of Fort Knox is associated with the natural hazards flooding, sinkholes, and landslides that are a risk to property and life. The installation also shares similarities with the surrounding area and the rest of the state in the type of flora and fauna that are in the installation. This includes forested areas, grasslands, bats, deer, diverse fish life, and bald eagles.

## History

The area around and containing Fort Knox has a military history dating back to fortifications built during the Civil War. The area hosted maneuvers in 1903 for both the Regular Army and National Guard units. In 1917, with the United States entry into World War I, there was a need for new military installations to stage training areas. Camp Zachary Taylor was established in Louisville to mobilize and train



**Figure 25 138th Field Artillery Regiment training at Ft. Knox c. 1917, Photo Credit: KY National Guard.**

soldiers. In December of that year, a new artillery range was established in nearby West Point on the site of former military maneuver grounds. In the summer of 1918 Stithton, a small farming

community south of West Point, was chosen to become the site of a Field Artillery Brigade Firing Center Cantonment for six brigades, a total of 45,000 soldiers.<sup>47</sup>



**Figure 26 - Stithton PO c.1918, Photo Credit: U.S. Army.**

More land was acquired from Bullitt and Meade Counties, and many buildings in Stithton were repurposed by the Army. In August of 1918, MG William J. Snow announced the official name of the cantonment would be Camp Knox, honoring Revolutionary War general and first US Secretary of War, Henry Knox. In 1922 it was determined that Camp Knox would close as a permanent installation but continued to host training of National Guard and Reserve Units.<sup>48</sup> In the interim the land was designated Camp Henry Knox National Forest until 1928 when infantry was once again stationed there.<sup>49</sup> In 1932 it was renamed Fort Knox, and the mechanized cavalry were established and based there. The area also became the location of a new depository built in 1936 for the US Treasury Department.



With the outbreak of World War II, the Army created the Armored Force and Fort Knox became its' headquarters. The Armored Force was responsible for creating the doctrine guiding use of armored vehicles and the establishment of armored formations.



*Figure 27 M-3 tanks in action, Ft. Knox, 1942, Photo Credit: Library of Congress.*

To support this Force, there was a very large construction boom and more land was acquired bringing the total to over 106,000 acres. Other highlights over the years include the 1949 establishment of the Patton Museum. The US Army Recruiting Command Headquarters was relocated to Fort Knox in 1992.

The 2005 Base Realignment and Closing (BRAC) Commission ushered in an era of change to the Fort. The Armor Center and School relocated off the post, and new formations were assigned. New units included Human Resources Command, Cadet Command to join Recruiting Command in formation of the Human Resource Command Center of Excellence.<sup>50</sup>

## Demographics

Fort Knox continued to see a decrease in population to 7,742 persons in 2020. This from 10,124 in 2010, 12,377 in 2000, and a high of 21,565 in 1990. The 2019 ACS 5-year average reported 2,473 households with 2.96 persons per household. The median household income of \$59,323 is 15% greater than the state's average of \$50,589 per the 2019 ACS. The daytime population increased from 19,975 in 2000 to 23,142 in 2010.<sup>51</sup> In 2021 the number stands at 26,260.<sup>52</sup>

The DoD Education Activity (DODEA) schools serve approximately 1,550 students in grades PreK-12.<sup>53</sup> They have built three new school facilities starting in 2009 with an additional elementary school scheduled to be replaced with construction starting in 2021-22 school year and scheduled to open in the 2024-25 school year at a cost of \$58.9 million.<sup>54</sup>

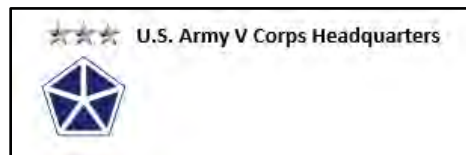
## Current Operations

Today, Fort Knox is home to 1st Theater Sustainment Command, First U.S. Army Division East and 84th Training Command, U.S. Army Reserve Aviation Command and 100th Division and many other units.<sup>55</sup> On an

average workday, there are approximately 25,200 people working on the base, including about 9,600 active-duty military personnel.<sup>56</sup>

The Post has sole responsibility for the entirety of soldier career management, from swearing in to departing service. Fort Knox is also home to all ROTC Summer Cadet Training, which brings approximately 10,000 cadets to the Fort each summer. In addition, the Fort Knox range complex features one of the highest utilization rates of any military installation in the United States. In one year, there are more than 10,000 range utilization days.<sup>57</sup>

The V Corps was reactivated in February 2020 with Fort Knox serving as the headquarters location.<sup>58</sup> In total, approximately 630 soldiers will be a part of V Corps, with about 200 of them based at the forward command post in Poznan, Poland on a rotational basis, and with the rest remaining at Fort Knox.<sup>59</sup>



**Figure 28 V Corps**



**Figure 29 Major Units and Organizations - Adapted from Maj. Gen. John R. Evans Jr. presentation, 20 Sept. 2019.**

Continued growth has been sustained with new housing, new educational facilities, and continued positive relationships with the surrounding communities.

## Future Operations

Fort Knox will soon be home to a Digital Air-Ground Integration Range, or DAGIR. It will be only the second of its kind. This range will allow training for tanks, dismounted live-fire exercises, artillery, and aircraft. It will also allow for simultaneous air and ground training. Current construction has it on track for completion in 2023. It involves expending approximately \$52 million to convert the existing Yano Range.<sup>60</sup>

Fort Knox is well equipped to provide high quality training to the wide variety of units and personnel that come to train there. The following describes the various training assets the Fort has available. In addition, the impacts associated with that training are briefly discussed.

## Training Areas and Issues

### Ground / Maneuver Operations

Fort Knox features training areas for infantry, armor, and artillery. It has over 62,000 acres of land that can support maneuvers. These areas are spread across the entire installation and have many different types of topography to provide necessary challenges. See Map 22.

Training areas also include “village”, and, “city”, riverine, and amphibious areas for specialized training.

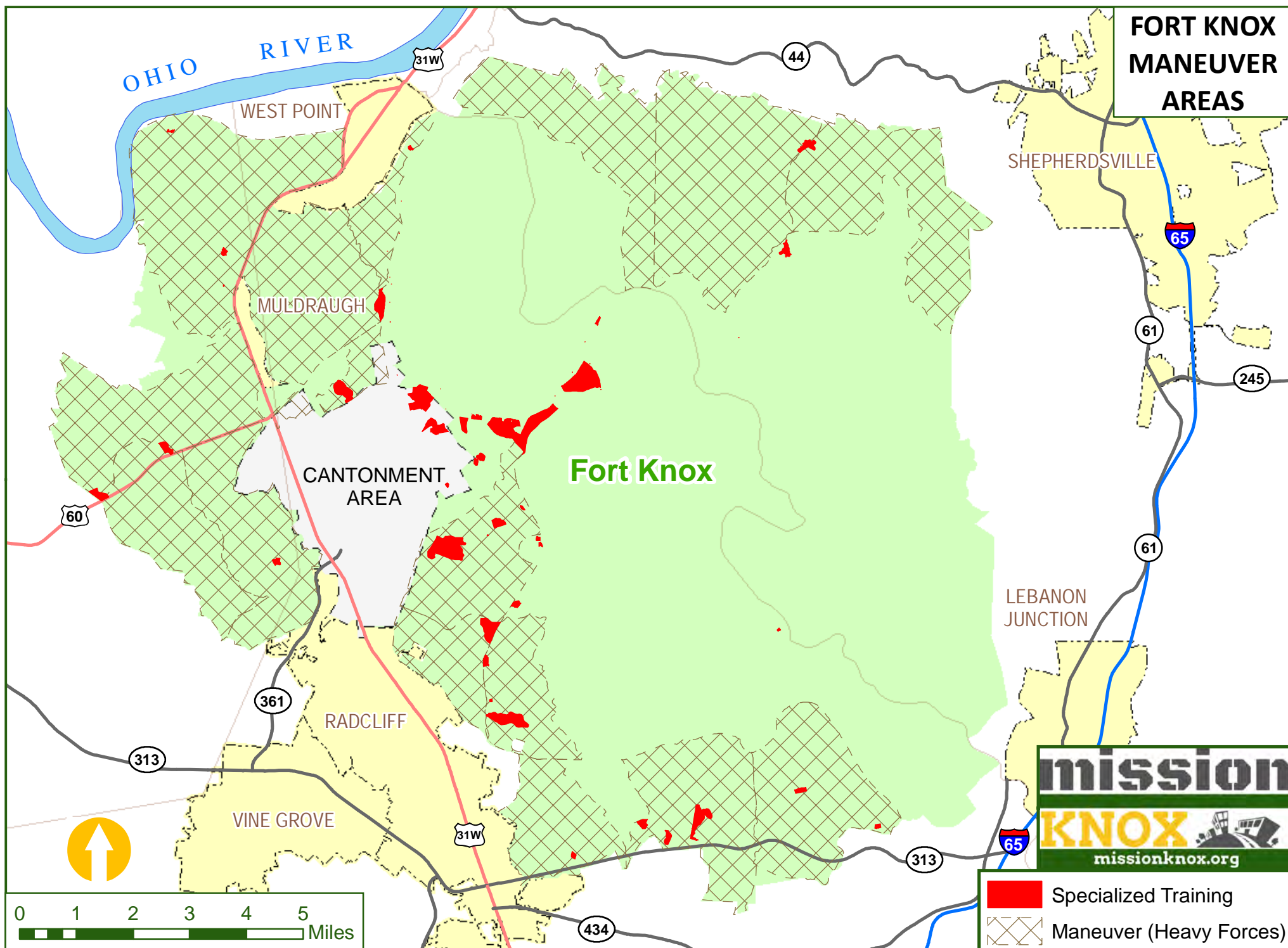


**Figure 30 Riverine Training.** Source: Fort Knox Garrison Command.



**Figure 31 Zussman Combined Arms Collective Training Facility.** Source" Fort Knox Garrison Command.





MAP 22 - MANEUVER AREAS

## Aerial Operations

### Airfields and Landing Strips

Godman Army Airfield (FKT) on post has operations capabilities for both fixed and rotary wing aircraft. Two runways, 5,184 and 4,853 ft. in length<sup>61</sup> assist in providing service and “...air traffic control operations in support of the Army Reserve Aviation Command (ARAC) and aviation multi-service joint training and operations. Provides Air Traffic and Airspace (AT&A) management and Weather Operations for the Installation and Fort Knox Mission Partners and MFGI units.”<sup>62</sup> It can support airlift including C-130 and C-17 aircraft. Map 23 shows the Airfield and aerial ranges at Fort Knox.



Figure 32 Army Helicopter at Godman AAF. Photo Credit: Eric Pilgrim, Fort Knox News, 2020.

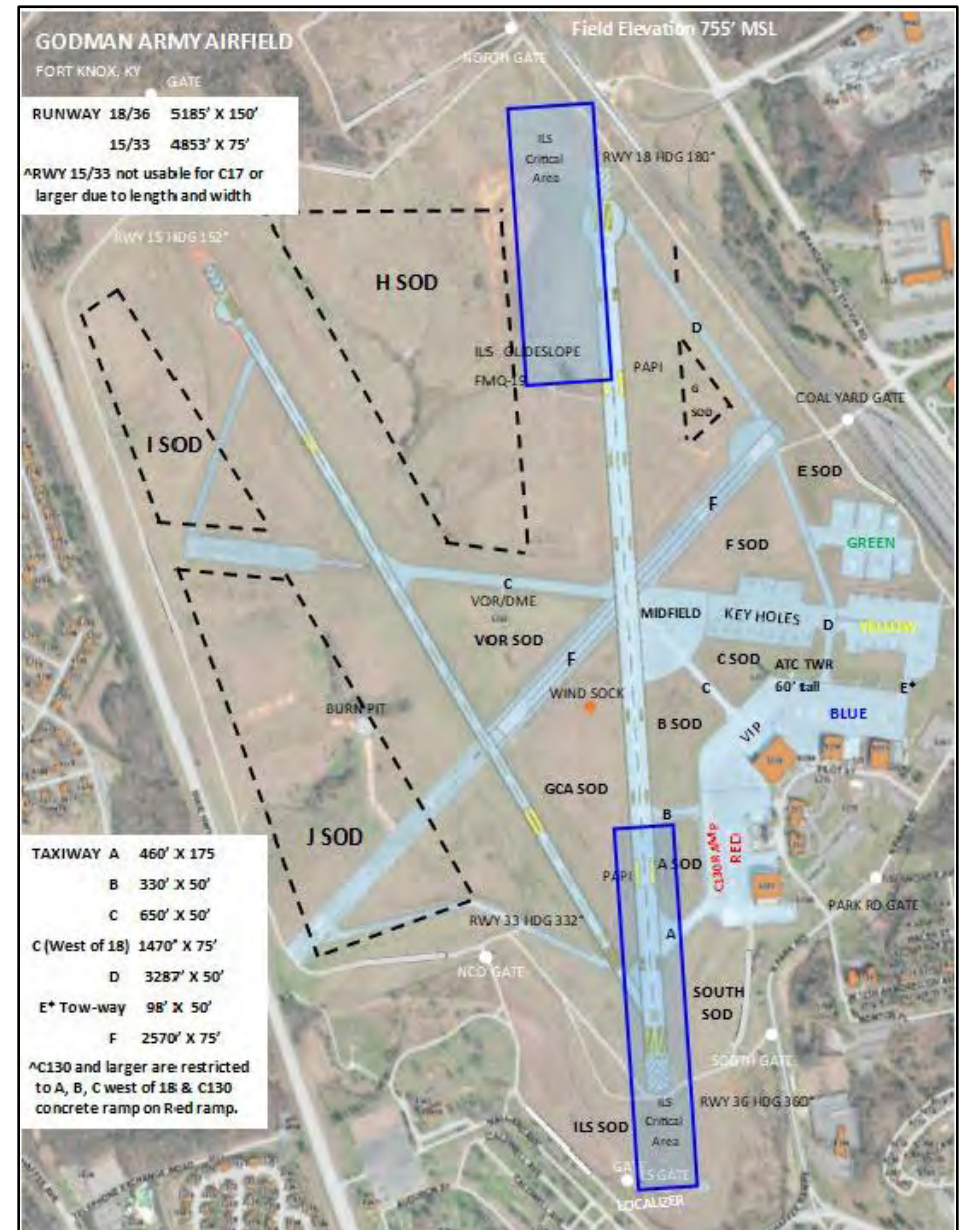
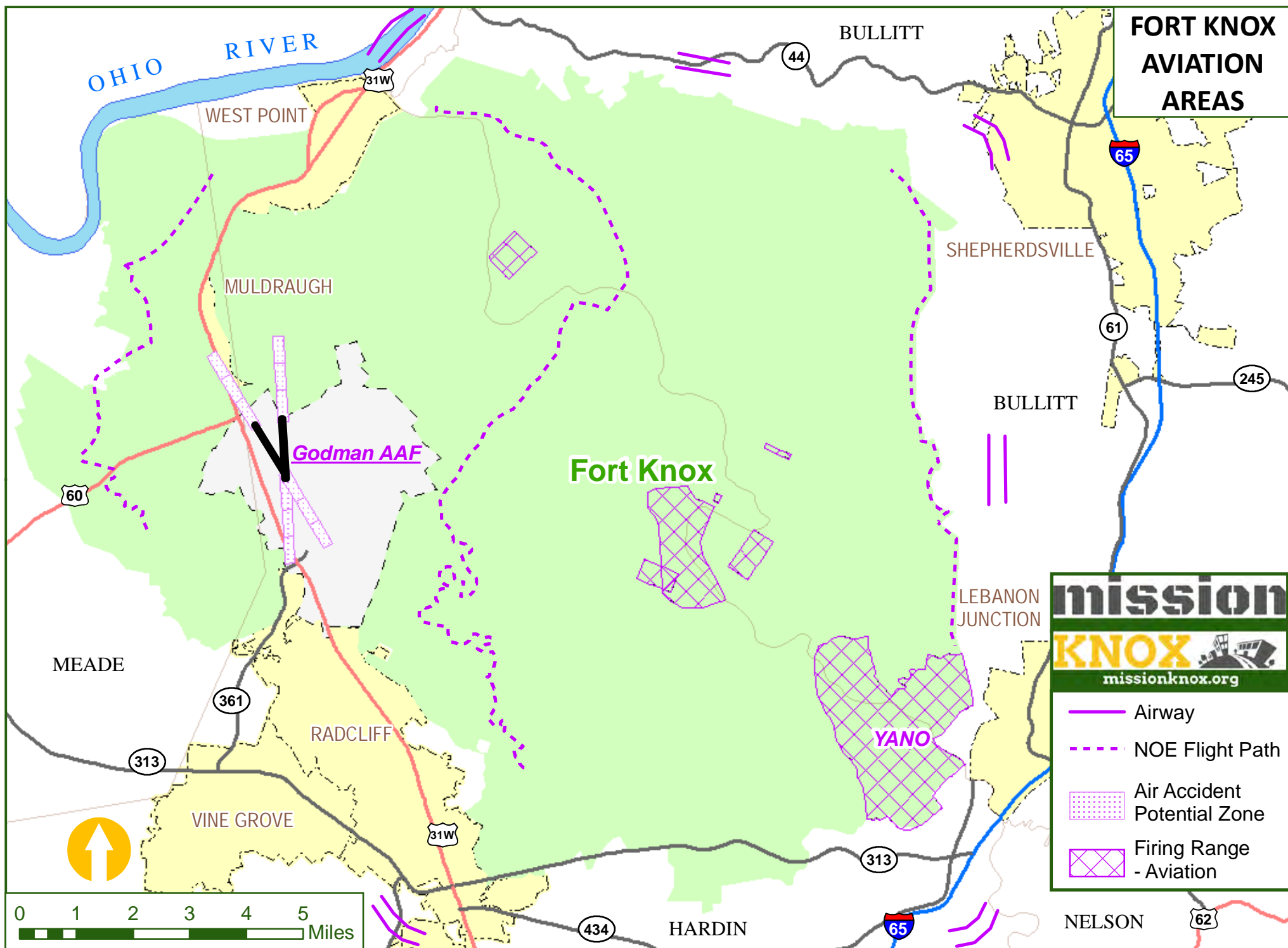


Figure 33 Godman AAF, Source: Local Flight Rules, Fort Knox Reg. 95-1.





## Ranges and Noise

Fort Knox maintains over 38,000 acres of range and impact areas. The utilization rates rank among the highest in CONUS. Typical use includes over 10,000 range days annually and support of 100 plus training events during some days during summer.<sup>63</sup> See Map 24.

Of particular concern over the years has been complaints due to noise. Two recent studies have been done, in 2006 and again in 2018.

Noise is typically measured in decibels (dB) but since sounds vary and the effects upon humans it is graded by different methods. One, Peak Noise, exceeded by 15% metric or “PK15 (met)”, is a single event noise of the firing of a single weapon once. The peak level is exceeded only 15% of the time.<sup>64</sup> Also this type of noise may be measured by the Day-Night Level (DNL) metric. It is also useful for quantifying other loud blast noises, e.g., aerial bombs or high explosives. This allows for averaging the noise over a longer duration (24-hour day) vs. the single instance “peak” noise. DNL adds 10 dB to “nighttime” measurement to account for less ambient noise masking that may occur during the day. Often the DNL is weighted over time to account for the peaks using an “A” or “C” weighting. The A is designed to mimic the human ear’s response to loudness. It does not however do well with low frequency sounds. The C accounts for how the human ear responds to different frequencies, especially at levels greater than 100dB.<sup>65</sup> C weighting measures uniformly across a frequency range of 30 to 10,000 Hz allowing better understanding of noises that are “felt” as well as heard due to vibrations.<sup>667</sup> Thus the CDNL metric gives a better evaluation of how the human ear will respond to loud noises over a longer duration. It should be noted that weather and atmospheric conditions play a large role in what is heard and if it is deemed to be annoying. Noise

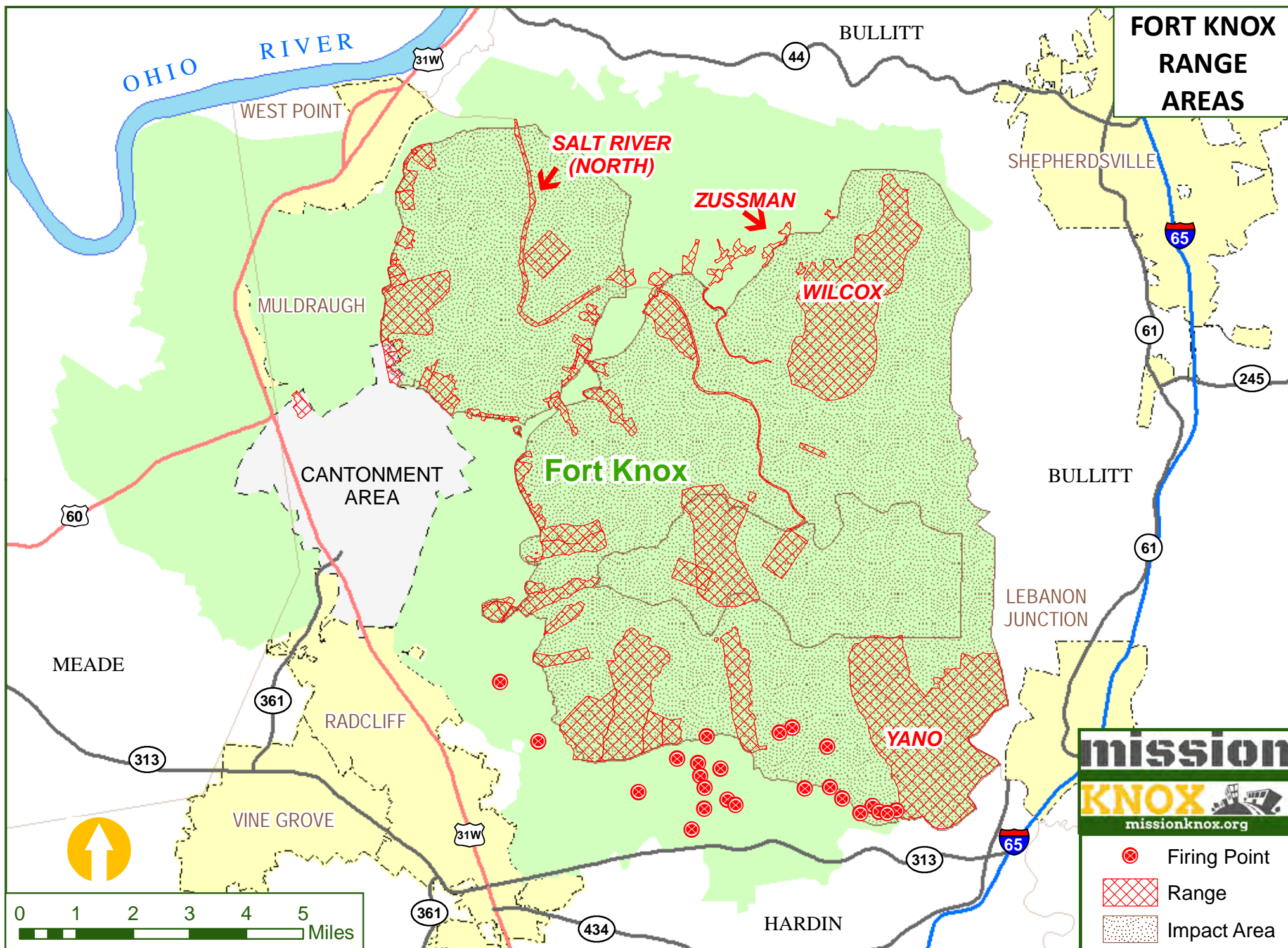
level variations by up to 50dB have been noted in experiments.<sup>68</sup> The PK15 (met) works to account for the weather-related statistical variations.<sup>69</sup>

In turn the understanding of the measurements regarding what land use is compatible with this exposure must be considered. If we look at Table 13 we see a breakout across dB levels for the various Noise Zones and their limits based on the metrics used.

**Table 13 Noise Limits for Noise Zones<sup>70</sup>**

Noise Limits for Noise Zones			
Noise zone	Noise limits (dB)	Noise limits (dB)	Noise limits (dB)
	Aviation ADNL	Impulsive CDNL	Small arms — PK 15(met)
LUPZ	60 - 65	57 - 62	N/A
I	< 65	< 62	<87
II	65 - 75	62 - 70	87 - 104
III	>75	>70	>104
<p>Legend for Table 14-1: dB=decibel LUPZ=land use planning zone ADNL=A-weighted day-night levels CDNL=C-weighted day-night levels PK 15(met)=Single event peak level exceeded by 15 percent of events &lt;=less than &gt;=greater than N/A=Not Applicable</p>			

The zones are defined by compatible use in Table 14. Comparing these uses with the Zone type, percent “highly annoyed” (%HA) and the CDNL range provides insight on acceptable land use for areas covered by these zones. Thus, in a Zone II, the noise has the potential to highly annoy 15 to 39% of persons exposed. It illustrates possible land use issues for specific zones and their respective metrics.



MAP 24 - RANGE AREAS

**Table 14 Noise & Land Use Zones (AR200-1<sup>71</sup>)**

Noise Zone	%HA	CDNL	Compatible for residential use (schools, housing, and medical)
Zone I	< 15%	<65	Yes
Zone II	15-39%	65-75	Not normally recommended
Zone III	>39%	>75	Not recommended

Table 15 also list the levels of complaints that are risked by an area’s inclusions in areas of a particular decibel level.

**Table 15 Risk of Noise Complaints by Level of Noise<sup>72</sup>**

Risk of Noise Complaints by Level of Noise	
Risk of Noise complaints	Large caliber weapons noise limits (dB) PK 15(met)
Low	< 115
Medium	115 - 130
High	130 - 140
Risk of physiological damage to unprotected human ears and structural damage claims	> 140

See further details on Table 15 in Appendix B “Noise and Encroachment Complaints” recounting the need for adjustments in building codes for Zone II should undesired uses be determined to be of value.

### Small Arms Noise

The noise levels associated with small arms fire can be seen in Map 25. As illustrated, all Zone III noise levels that result from small arms fire remain on the base itself, and do not impact the communities near and around the base. However, the Zone II noise levels, which have a mean of 87 dB per PK15 (met), do extend past the installation boundaries at several locations. These include portions of Hardin and Bullitt Counties including the cities of Lebanon Junction, Radcliff, and West Point. These are contained in the one-mile study buffer. As referenced in

Table 14 residential development is not recommended, however it does exist.

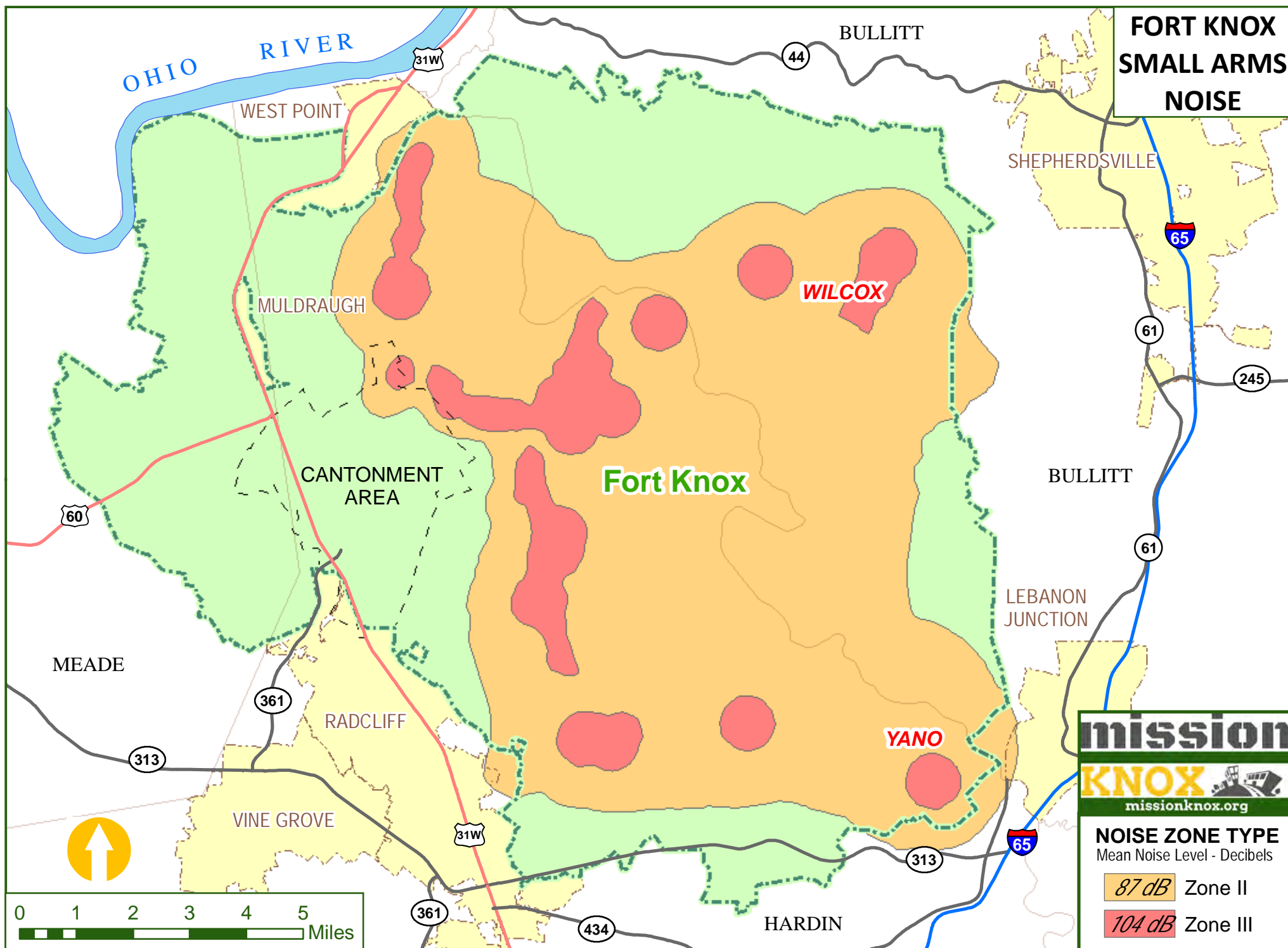
### Large Caliber Weapons Noise

The noise levels associated with large caliber weapons can be accessed by both risk complaint level using PK15 (met) and with CDNL due to the studies that have been done. The risk complaint is highlighted on Map 26 and elevated noise does extend outside the boundaries of the base. Large areas of the one-mile buffer area are within the 115 dB PK15 (met) zone. In some cases, it also extends almost two miles into the five-mile buffer. This area is associated with a moderate risk of complaints due to noise. All four counties in the study area are crossed by this zone. Several incorporated cities including the entirety of Muldraugh, and the bulk of Lebanon Junction, Radcliff, and West Point. Sections of Vine Grove are also in this zone. At the south end of Yano Range, portions of the area known as Cartwright Estates lay within the 130 dB PK15 (met) zone. This area would be associated with a high risk of complaints.

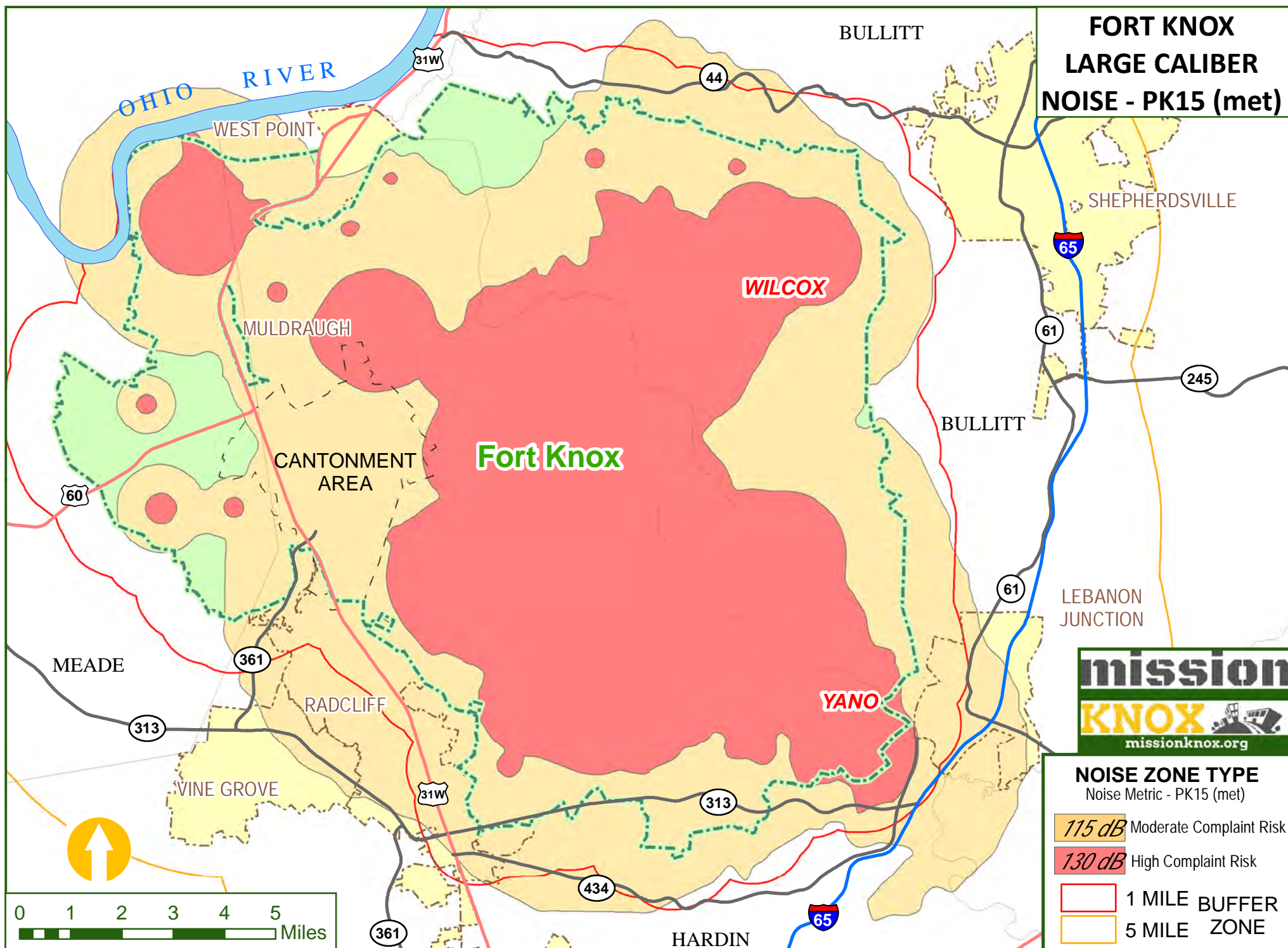


**Figure 34 M1 Abrams Tank firing at range. Source: Fort Knox Garrison Command, Directorate of Public Works, Environmental Management Division, c. 2007.**

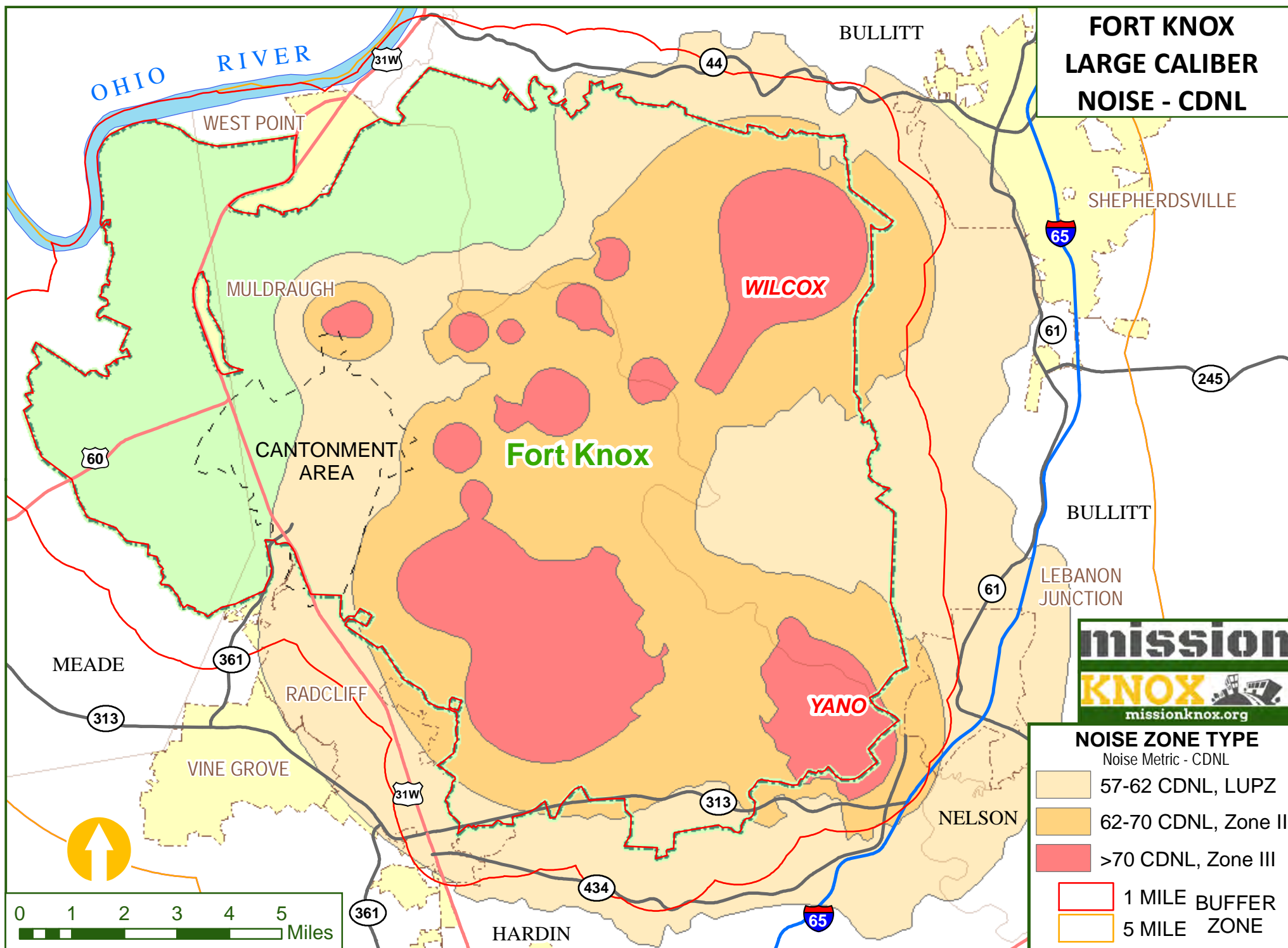




MAP 25 - SMALL ARMS NOISE



**MAP 26 - LARGE CALIBER, NOISE - PK15 (met)**





Review of Map 27 shows the noise as classified by the CDNL criteria. This reveals the extension of potential problems even further east than the PK15 (met) method. Here Zone I is defined as the Land Use Planning Zone (LUPZ). Because of varying perspectives on what is acceptable noise, this zone provides the ability to intercept problems. Going beyond a concept that uses such as residential may be compatible, local planning agencies have or should implement additional planning strategies in this zone. This can provide a buffer against future noise conflicts. Almost the entire one-mile buffer in Bullitt and Hardin County are covered by Zone I. A portion of it extends over two miles into the five-mile buffer. This includes into Nelson County. Zone II, which is of concern regarding residential use covers large sections of the one-mile buffer including portions of Lebanon Junction and Radcliff. Again, at the south end of Yano Range, Zone III crosses the post boundary into an area with 15 existing residences.

#### DAGIR Noise

Once the DAGIR range is operational, nearby residents will experience increased noise levels. Currently Wilcox Range has absorbed some of the training load which has shifted some noise levels to the north. Communications with officials outside the post have been ongoing but the change can be expected to of concern and will hopefully be assuaged via open dialogue and use of media.<sup>73</sup> The new range will be constructed over the top of the existing Yano Range. Map 28. At over 3,600 acres it is easily the largest range on post. One factor of consideration is the higher level of use will increase air traffic both at Godman AAF and in the surrounding area due the uptick in training flights.<sup>74</sup>



**Figure 35 Yano Range looking northwest. Source: Fort Knox, Directorate of Public Works, Environmental Management Division, c. 2007.**

#### Aircraft Noise & Encroachment

The airfield and numerous aerial training ranges create overflight concerns and issues. Map 29 show that Godman AAF itself has all noise buffers contained within the reservation boundaries. There is a small Air Accident potential zone that extends across US 31W in two places and into portions of Muldraugh. The more general concern is the overflights by rotary aircraft during unit transitions or training patterns that take routes over the surrounding communities. There are several documented complaints that are discussed in more detail in Section III, Compatibility Issues. The study research also documented four instances of air crashes that were both associated with Fort Knox and occurred in the immediate vicinity of the study area. All involved rotary wing craft. A total of 17 fatalities and numerous injuries resulted. All

being crew members of the craft involved. They are documented as follows:

8 May 1967, 10 fatalities, 10 injured, two craft collided via blade mesh, over Dorret's Run firing range.

15 May 1973, 7 fatalities, night flight, mechanical and hit overhead wire, 2 miles northeast of Muldraugh.

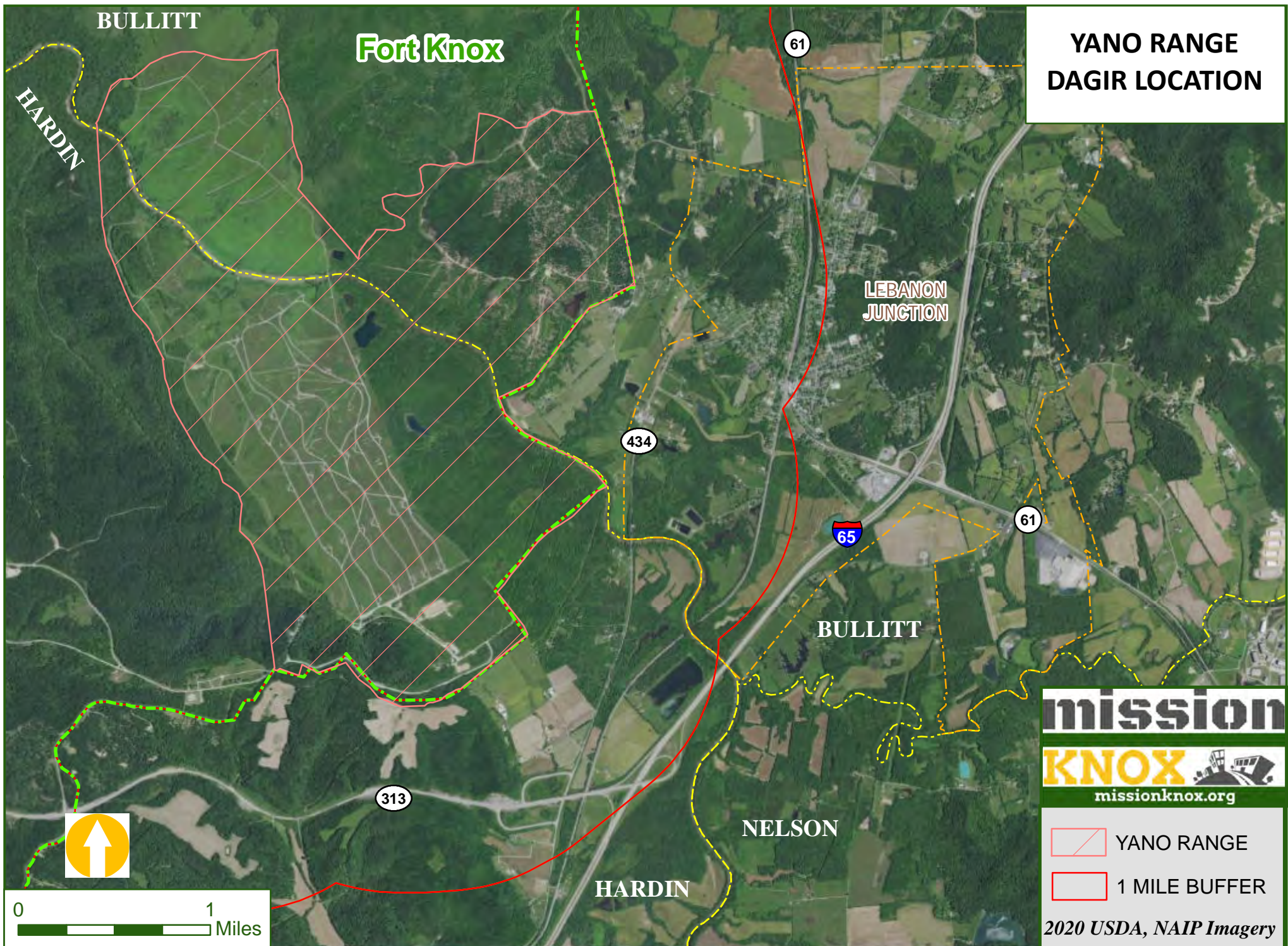
14 July 1977, 1 injury, engine trouble and hit windsock pole, near Vine Grove enroute to Fort Knox.<sup>75</sup>

The most recent event occurred in September 2019. A Navy helicopter, enroute to the Atlantic coast in response to Hurricane Dorian, lost a door over the City of Radcliff. The helicopter had stopped over at Fort Knox during its journey. The door became unhinged, fell, and struck a house in the city. No injuries were reported. There was damage to the structure. The homeowner, who had only recently moved into the area, was quoted, *"I have heard helicopters and things like that around here but never dreamed anything like that could happen...We were very lucky, it could have been worse."*<sup>76</sup>



**Figure 36 Helicopter door. Source: Radcliff Police Department photo as published by The News-Enterprise.**

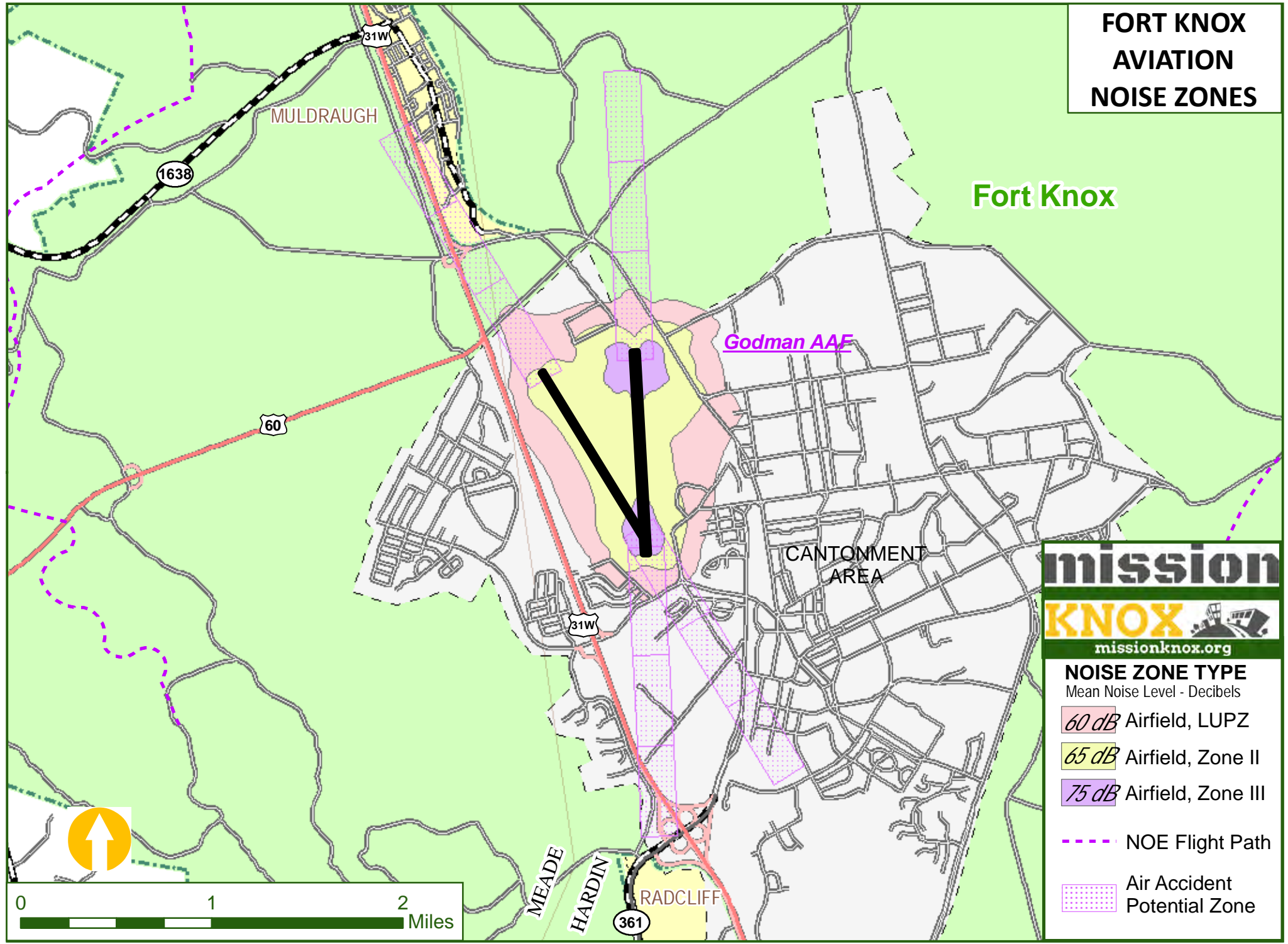




MAP 28 - YANO RANGE - DAGIR LOCATION



# FORT KNOX AVIATION NOISE ZONES



- NOISE ZONE TYPE**  
Mean Noise Level - Decibels
- 60 dB Airfield, LUPZ
  - 65 dB Airfield, Zone II
  - 75 dB Airfield, Zone III
  - NOE Flight Path
  - Air Accident Potential Zone

MAP 29 - AVIATION NOISE ZONES

## Internal Land Use Planning

Fort Knox, like any other community, engages in land use planning to best allocate their resources and create a vibrant and livable community for their citizens. This planning is engaged through regulations that are applied DoD wide. The rotational change of various commands and population fluctuations due to training doctrine adjustments are much like any community dealing with the arrival and departure of industries and transient populations that occur over the months and years. Planning also deals with utility and transportation infrastructure, housing, schools, recreational facilities, environmental issues and other lands set aside for various uses, all to promote growth and stability. This being done to foster long term viability while adapting to a changing world.

Fort Knox, in September 2021, completed their Real Property Vision Plan (RPVP). This plan defines the goals and strategies to support DoD's missions while accomplishing the aforementioned planning activities. These are promoted through their vision:

*Fort Knox supports the Total Army Community by sustaining current and future mission readiness, promoting resource efficiency, and maximizing partnerships while honoring traditions and the environment.*<sup>77</sup>

The vision was created during workshops conducted in March 2021. Other outcomes of this effort included establishment of the plan's four primary goals. See Figure 37.

Each of these goals was broken down further into specific objectives to assist the planners work towards meeting them. Many of these objectives are of specific interest to this study. The following is a brief discussion of each.



**Figure 37 Fort Knox Vision Report Goals. Source: Real Property Vision Plan, p. 11.**

The airfield capabilities and range capacity can be tied directly to the prevention of installation encroachment. Each of these elements are listed as objectives under Goal 1.<sup>78</sup> The need to support existing and future mission is very dependent upon the unique geography and size of Fort Knox. This advantage can be directly compromised by non-compatible uses which can make large tracts of the existing installation unviable for many of the military's needs.

An objective of Goal 3 is to “*promote compatible growth with the greater Fort Knox region.*”<sup>79</sup> This is a goal of mutual benefit for both inside and outside of the fence. The economic impact of Fort Knox to the region, and the state as a whole, cannot be expressed in too strong of terms. The growth in population, amenities, and infrastructure that

the region has can be directly tied to its long association with the military at Fort Knox.

A final component of the RPVP is the awareness of implementation tools to use in support of the goals and objectives. These were presented via a series of maps. One set outlined the current networks such as transportation and the existing green infrastructure. These are tied directly to the surrounding communities. Other maps laid out the various constraints that are placed on any new or changed development or mission as directly related to the cantonment area. Also connected to the region are elements such as utilities, environmental sensitive areas, or safe zones required of the various hazardous operations that are required for missions. These overlays reveal lands that are available for future development internal to the post. For the cantonment area this is defined as developable areas.<sup>80</sup>

#### General Infrastructure

It is estimated that it would cost over \$10 billion to rebuild the existing on-post infrastructure. The installation contains over 11 million sq ft of buildings not including housing with over 2,300 structures total.<sup>81</sup> It also includes the various support infrastructure required of any city, including roads, water, sewer, telecommunications, and energy. Fort Knox also has a community clinic, various convenience stores, the post exchange, and several parks and recreational facilities.

#### Housing on the Installation

A crucial aspect to the success of the military operations in Fort Knox is ensuring there is ample and adequate housing for soldiers and their

families on the installation who need it. Fort Knox operations benefit from soldiers having secured housing; they offer services and advice to soldiers through the Housing Division Office. Additionally, Soldiers are provided “basic allowance for housing” to offset costs for their housing needs. This fund can be utilized on either on off-post or on-post housing.<sup>82</sup> Historically, Fort Knox has had high satisfaction rates for their on-post housing. According to a 2019 survey, the Fort Knox private military housing partner received “good” or “very good” ratings in every category.<sup>83</sup> Housing on post was privatized in 2006.

A recent trend that has emerged has been a limit on the availability of affordable housing in the study area. At time of writing, home prices in the area and across the country have risen to undesirable levels and the quantity has also gone down. This situation is worsened for Fort Knox soldiers as a shortage of houses on the installation is more apparent and a deteriorating satisfaction with on post housing is becoming an issue. In a March 2021 speech, Fort Knox’s Garrison Deputy Commander, Jim Bradford pointed out that the installation was short nearly 200 houses for families.<sup>84</sup> Meanwhile, Fort Knox leaders have been working on a plan to address complaints of residence, that include uncontrolled pets and landscaping issues.<sup>85</sup> Issues with living on the post may force soldiers and their families to look outside of the installation for homes. But as the market outside continues to become unstable or unreliable, the situation for soldiers and their families becomes more complicated and less secure.

Per the 2020 Census, there were 2,290 Housing Units at Fort Knox. Other sources indicate that there are currently over 2,300 homes on post.<sup>86</sup> This does not include the barracks areas for single soldiers which number 672 and an additional 168 single-occupant studio style



apartments. There are also over 12,000 guest barracks rooms for the large number of trainee's that transient through the installation.<sup>87</sup>

Housing as a compatibility issue is discussed further in Section III. This includes review of projects to improve and expand available housing both on and off post.

### Transportation

Through the three entrance gates over 25,000 people arrive per day.<sup>88</sup> This involves transiting the roadways leading to the post and the primary access road US 31W. See Map 19. The creation of the Bullion Blvd connector road (KY 361) in conjunction with KY 313 has allowed some easing of congestion on 31W as described in Section I.

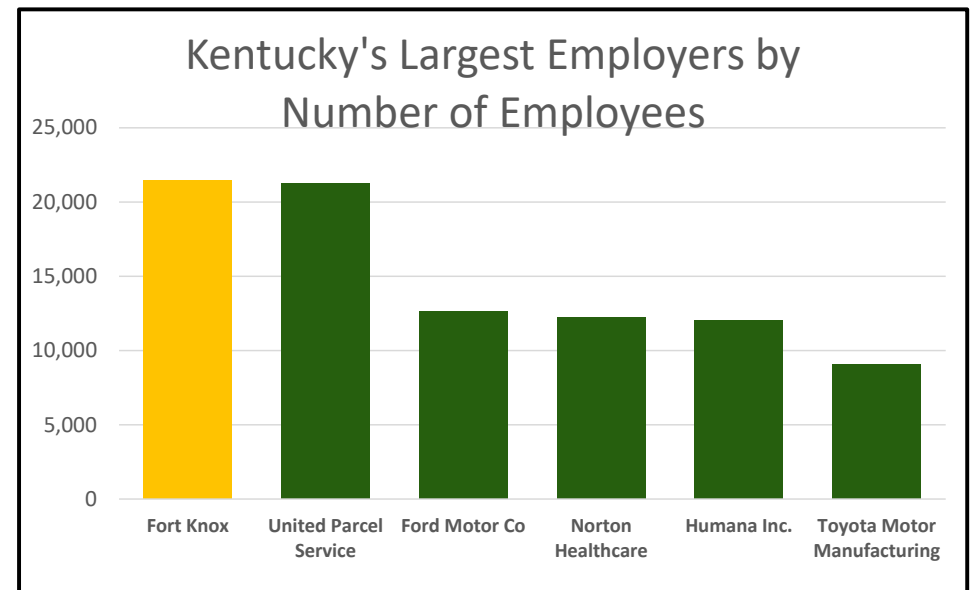
## Economic Influence

As a “city” with a typical daytime population of over 26,000, Fort Knox is a community like no other in the state. It has an annual economic output of \$2.6 billion, which includes a payroll of \$750 million.<sup>89</sup> The impact to the region as an employer and neighbor is broad in scope. Fort Knox the “city” would be the 16<sup>th</sup> largest in the state by population, between Frankfort and Paducah.<sup>90</sup> The 170 mi<sup>2</sup> area of responsibility would make in the 3<sup>rd</sup> largest in the state by land area behind Metro-Louisville and Lexington-Fayette Urban County Government.

If considered a single enterprise, Fort Knox is also one of the larger employers in the state. To understand its full scope a comparison of its relative size in the state as a whole will help provide context. Chart 8 illustrates the largest employers in the state by number of personnel based on late 2019 numbers. They can be compared to Fort Knox as an employment destination.

UPS, Ford, Norton, and Humana are primarily resident in Louisville, with Toyota located in Georgetown. For reference, Wal-Mart employs 31,646 individuals. They are however dispersed across the state in 102 retail outlets and 2 distribution centers.<sup>91</sup> The University of Kentucky has 14,000 employees in their system, the vast majority located in Lexington.<sup>92</sup>

**Chart 8 Kentucky's Largest Employers**

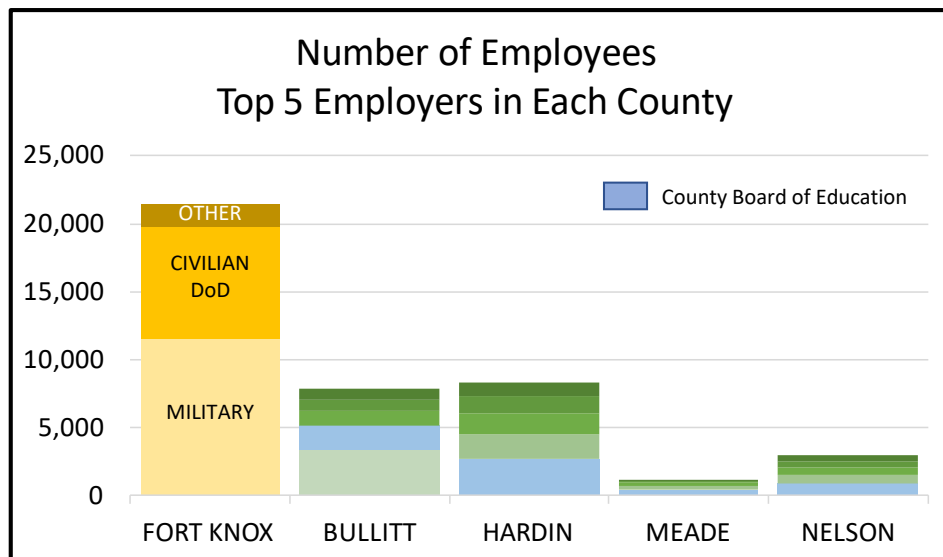


*Excludes Education and Retail*

*Sources: KY Cabinet for Economic Development, Dun & Bradstreet, Greater Louisville Economic Development*

In looking closer at the study region, Fort Knox is by far the largest single employer. The over 20,000 employees it has serve as a magnet for commerce, traffic, and housing. Chart 9 compares Fort Knox to the other top five employers in each county. These are provided in detail in Table 1. The region is currently experiencing a growth pattern and these numbers will be changing. The largest current project is in Meade County where Nucor has broken ground on a \$1.7 billion dollar steel plant that will create 400 jobs when in operation.<sup>93</sup> Numerous warehousing and distribution centers are being created in Bullitt County and both Bullitt and Nelson are continuing to experience the expansion of the bourbon industry. All this creates additional opportunities for growth in the study area.

**Chart 9 Top 5 Employers by County**



Sources: KY Cabinet for Economic Development, Dun & Bradstreet, Bullitt County Board of Education

Thus, Fort Knox is a formidable economic engine for the entire region, even beyond the study area. The ability to sustain current operations at Fort Knox with a growth-positive outlook is key from a continued economic success perspective. It is vital for study area communities, being in close proximity to Fort Knox, to factor this into any decision-making process. Incoming personnel continue to reside in the local area, bring an influx of families who may also desire employment, and add to the overall economic prosperity of the area.

**Table 16 Top 5 Employers by County**

FORT KNOX	Military	11,600
	Civilian DoD	8,200
	All Others	1,673
BULLITT	Amazon	3,300
	Bullitt BoE	1,800
	LSC Communications	1,100
	Louisville Seating	825
	Geek Squad	800
HARDIN	Hardin BoE	2,650
	Metalsa	1,875
	HMH*	1,470
	Akebono	1,300
	Baptist Healthcare	1,005
MEADE	Meade BoE	412
	Lusk Group	250
	Monument Chemical	242
	Fiscal Court	130
	Meade RECC	114
NELSON	Nelson BoE	896
	American Fuji Seal	593
	Tower Automotive	537
	Sazerac Distillers	473
	Heaven Hill	413

Sources: KY Cabinet for Economic Development, Dun & Bradstreet, Bullitt County Board of Education. 2019 data.

\*Hardin Memorial Health was absorbed by Baptist Healthcare in Sept. 2020.

The payroll from Fort Knox plays an important role in the region's economy. The combined military and civilian workforce payroll spreads across and beyond the region. The data in Chart 10 illustrates the geographical spread of this money as a portion of the total number of military members on post. The active-duty, base pay rate total of \$223.3 million, includes only permanent stationed members and not



any training or temporary duty population nor reserve component military. These additional transient personnel would more than double the number. The base resident population comprises 54% of this payroll. An additional 24% of active duty personal live off post in the study area and the remaining 22% living within commuting distance.<sup>94</sup>

Chart 10 Military Payroll

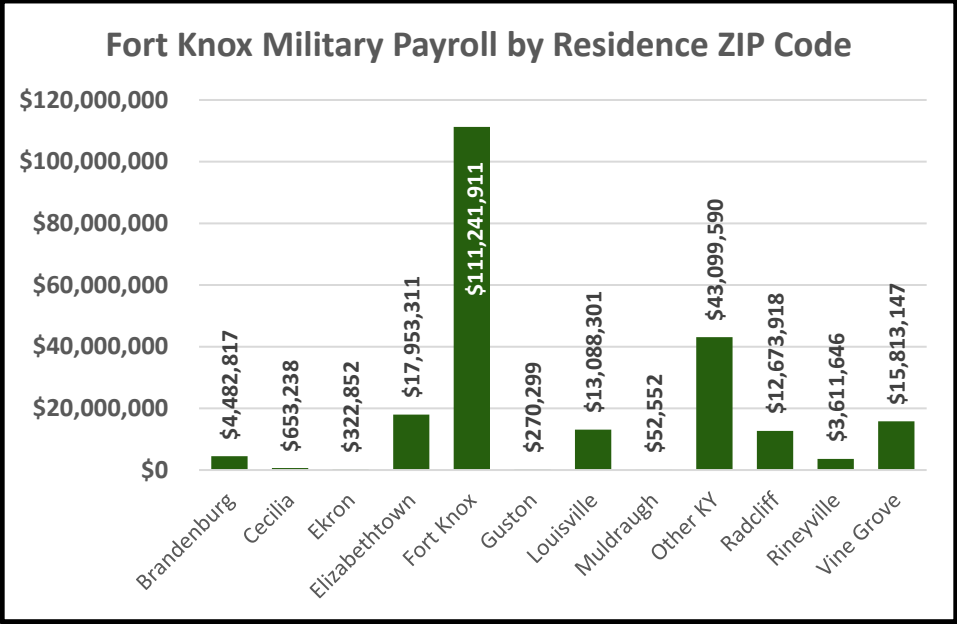
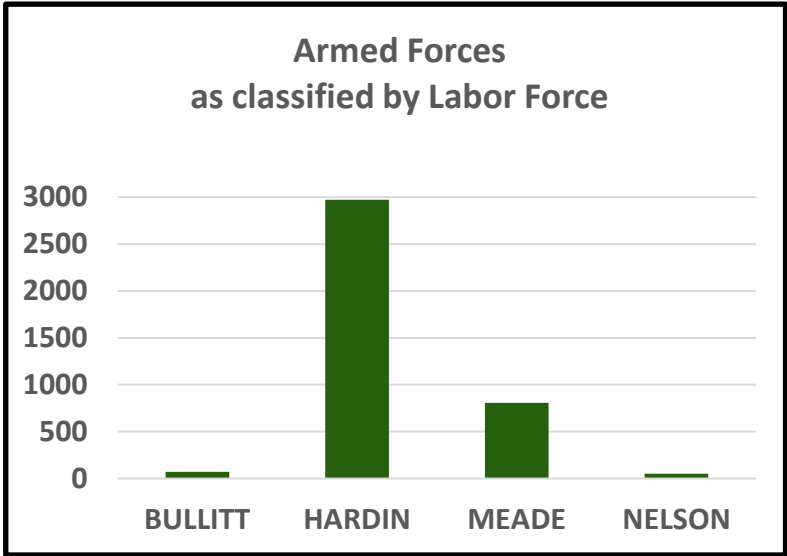


Chart 11 provides another perspective by using the Census “labor force” category to portray the numbers of employees classified as “armed forces” in the four-county study area. Since this is an estimate and a “snap-shot” in time many may be missed. This is relevant to Fort Knox because of the transient nature due to the training load in any given week. These numbers represent 3.6% of Meade and 3.5% of Hardin County’s labor force and less than 1% of Bullitt and Nelson County’s.

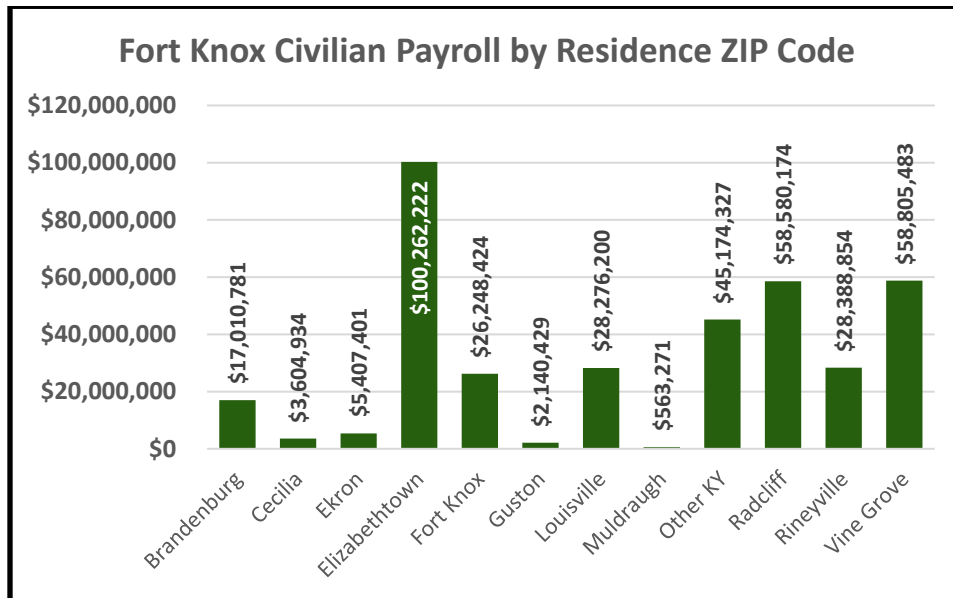
Chart 11 Armed Forces in Labor Force



U.S. Census, American Community Survey, 2019, Table DP03, 5-Year Estimate.

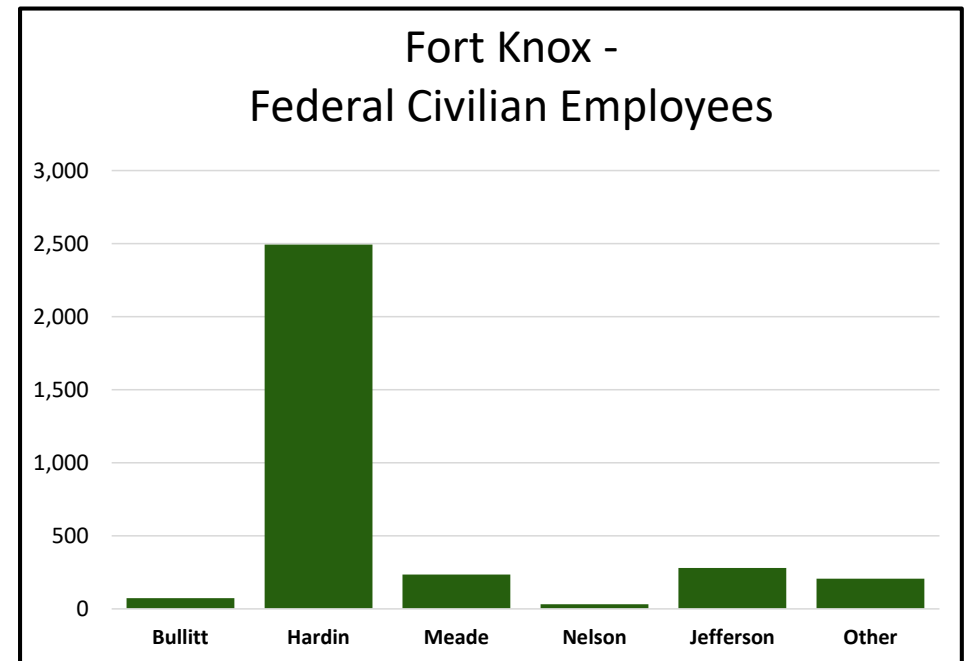
The civilian payroll recipients (Chart 12) live across the region with the highest total being in the 42701 ZIP Code (Elizabethtown). This \$364.5 million does not include many civilian employees such as reserve component civilian personnel, Department of Defense Education Activity (DoDEA) (300+), Medical and Dental Activity (MEDDAC) (750+), U.S. Mint/Treasury (200+), U.S. Army Corps of Engineers (50+), Defense Commissary Agency (DeCA) (100+), and non-appropriated funds employees.<sup>9596</sup> These would add over 3,000 additional employees and millions of dollars to this list.

**Chart 12 Civilian Payroll**



Another snapshot of the general geographic dispersal of some employees is portrayed in Chart 13.

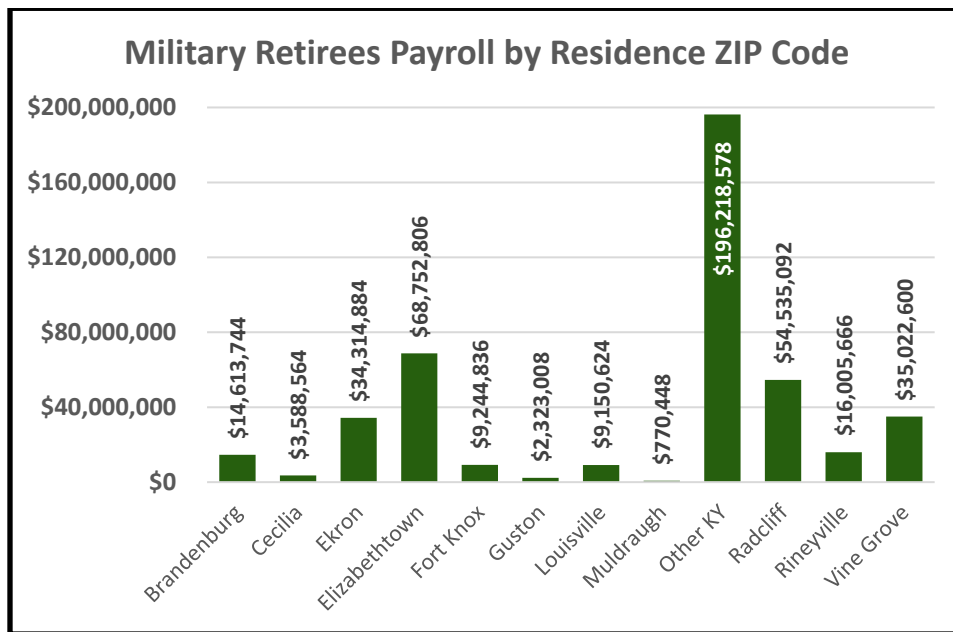
**Chart 13 Federal Civilians by County of Residence**



Source: Fort Knox Garrison Command, Public Relations Office, December 2019  
Only includes employees processed through Fort Knox Personnel Advisory Center.

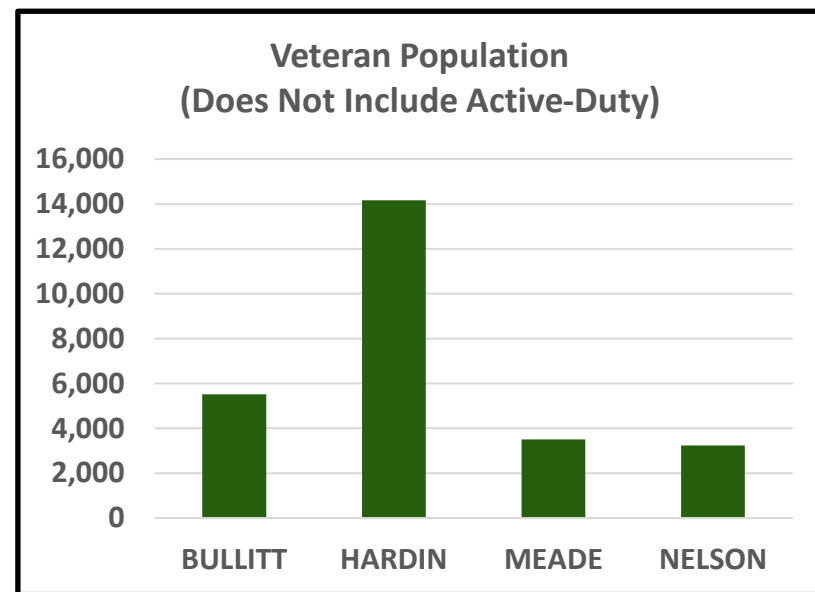
An additional component of this regional impact is the income received by military retirees. Chart 14 displays the payments of over \$444 million to retirees residing within 40 miles of Fort Knox and over \$239 million of that amount being paid to retirees living in the ZIP Codes of the study area.

**Chart 14 Military Retirees Payroll**



The total number of military retirees in the region form a large cohort of the permanent residents. The 2019 ACS numbers are show in Chart 15. For comparison, Veteran’s constitute 18% of Hardin County’s total population. They are also a large constituency for Bullitt – 9%, Meade – 17%, and Nelson 9%. Garrison Command puts the number of Military Retirees within 40 miles of Fort Knox at 12,686 plus an additional 45,451 dependents.<sup>97</sup>

**Chart 15 Veteran Population by County**

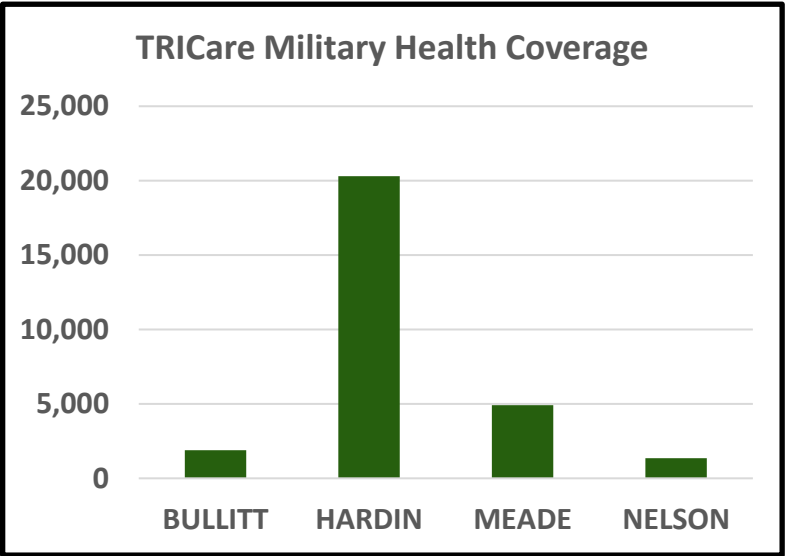


U.S. Census, American Community Survey, 2019, Table S2101, 5-Year Estimate.

The prevalence of health insurance providers through the Tricare, Military health program is another revealing factor related to the presence of Fort Knox in the region. See Chart 16. This coverage is available for various groups including active-duty, retirees, national guard member and others including families. Covering 11% of the population, it forms a large part of the health care system in the region.



Chart 16 *Tricare Health Insurance*



U.S. Census, American Community Survey, 2019, Table C27008,  
5-Year Estimate.

### III Compatibility Issues

#### Overview

The ongoing ability of Fort Knox to perform its current and future missions has a primary dependence upon the consensus of the surrounding community to adapt to the external effects of these missions. This consensus can be acquired and maintained only through a continual effort. This effort must involve communication not only between Fort Knox and the region but also between the individual component governments, institutions, businesses, and other entities that comprise this region. The first step was to define what specific issues create problems either on or off post. This section will lay out additional examples, not previously referenced, that have either been documented as having occurred in the past, may be ongoing, or may arise in the future because of change in Fort Knox's missions or change in the surrounding communities.

#### Physical Encroachment

In discussing the number of residential structures in the buffer zones previously; the focus was on U.S. Census data. The rate of growth was indicated by building permit data from both the U.S. Census and local agencies responsible for permitting. To obtain another perspective, data was acquired from local E-911's. Table 17 shows the actual number of residential addresses within each buffer zone. The one-mile buffer total of over 8,000 excluding Bullitt County amplifies the role that physical encroachment may play on maintaining missions at Fort Knox.

**Table 17 Residential Structures Per E911**

RESIDENTIAL STRUCTURES PER E911		
	1 MILE BUFFER	2-5 MILE BUFFER
Bullitt County	<i>nda</i>	
Lebanon Junction		
Shepherdsville		
Hardin County	777	5,624
Elizabethtown		4,580
Radcliff*	5,439	4,669
Vine Grove		2,880
West Point	522	
Meade County	778	4,372
Brandenburg		
Muldraugh	616	
Nelson County		204
<b>TOTAL</b>	<b>8,132</b>	<b>22,329</b>

Source: Respective County E911 Agencies

Hardin County - 22 Sept. 2020, Meade - 13 Oct. 2020,

Nelson - 22 Sept. 2020.

In looking at the data further in Table, Hardin County has 103 residences within 100 ft of the post boundary, 95 of those in the City of Radcliff. Meade County has 46 residences within this perimeter, 35 of those in the City of Muldraugh. Going out to 500 ft these numbers increase to 518 for Hardin and 492 for Meade, the vast majority in Muldraugh. At 1,000 ft, it yields 1,122 and 771 respectively, again with the majority being within Muldraugh. An issue of concern would be the increase in these numbers. In reviewing the permit data presented earlier, it can be found that 48 of the residential permits issued in Hardin County since 2009 were within 1,000 ft of the reservation boundary, 33 of these in Radcliff. Looking at Radcliff further, 19 were

within 500 ft with 5 being within 100 ft. In Meade County, 27 permits were issued within 1,000 ft, 11 of those under 500 ft. Of those only 4 were within Muldraugh. In Bullitt County no permits were issued

**Table 18 Residential Structures Within Distance of Boundary**

RESIDENTIAL STRUCTURES WITHIN DISTANCE OF BOUNDARY						
Existing from E911	100 ft		500 ft		1,000 ft	
	Existing	Permitted	Existing	Permitted	Existing	Permitted
Bullitt County	nda	0	nda	2	nda	9
Lebanon Junction						0
Shepherdsville						
Hardin County	8	2	127	5	217	15
Elizabethtown						
Radcliff*	95	5	338	19	805	33
Vine Grove						
West Point	0	nda	0	nda	102	nda
Meade County	11	0	77	9	141	23
Brandenburg						
Muldraugh	35	0	415	2	630	4
Nelson County						
TOTAL	149	7	957	37	1,895	84

Source: Existing, Respective County E911 Agencies, Hardin County - 22 Sept. 2020, Meade - 13 Oct. 2020, Nelson - 22 Sept. 2020.

Permitted - \*Radcliff- Official data only available for 2017 - 2019. Years 2009-2011, 2016 from newspaper accounts. Unable to locate in which buffer.

nda = no data available.

NOTE: these are inclusive, thus the 100 ft are also in the 500 & 1000 zones.

within 100 ft. Of the 2 within 500 ft, one was the replacement of an existing mobile home with a newer one. Only 7 more were permitted out to 1,000 ft.

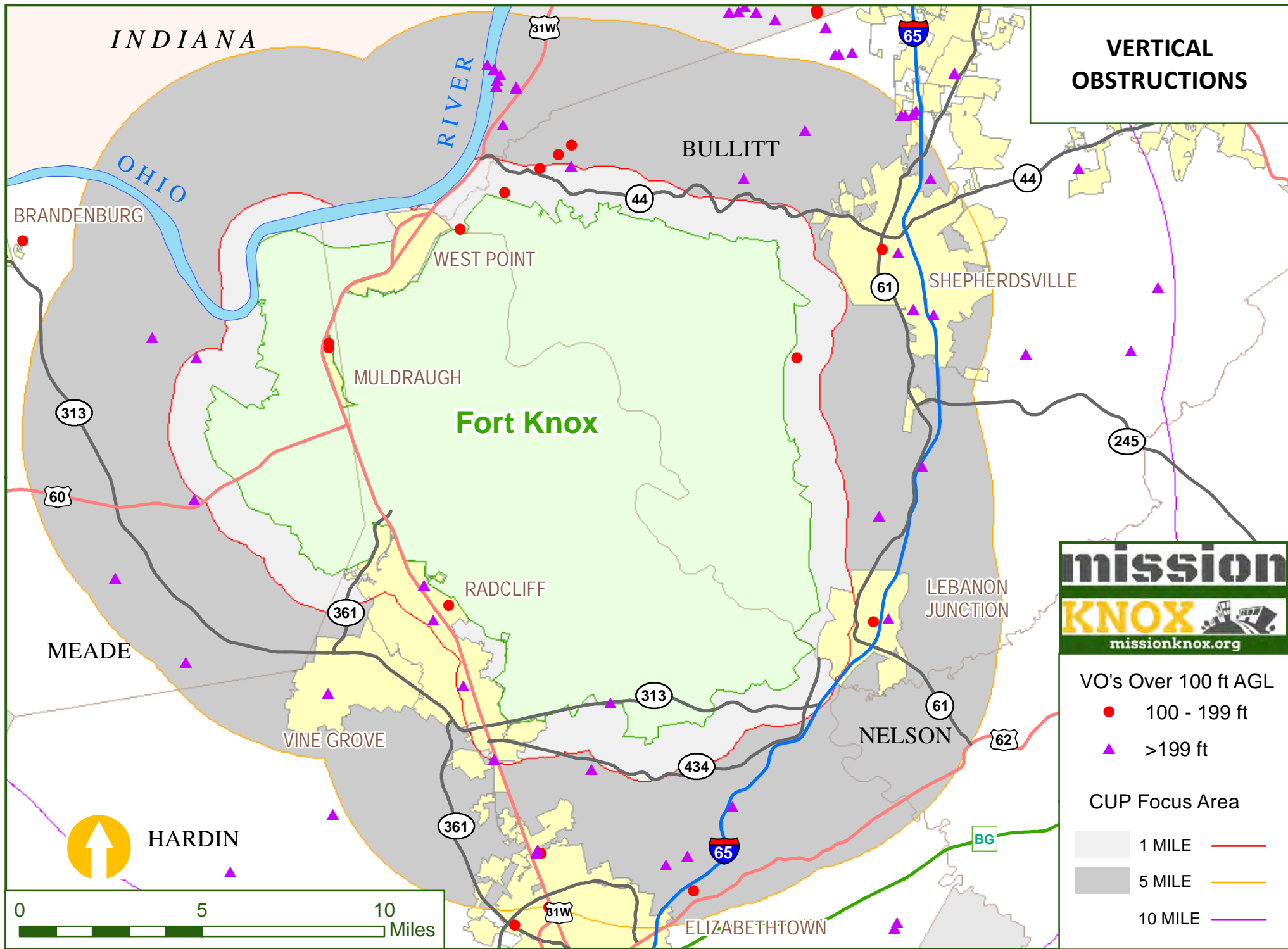
## Vertical Obstructions

Physical encroachment can also be vertical. Vertical Obstructions (VO) to aerial platforms are a hazard to operations in and around Fort Knox. Map 30 shows many VO's that may impede missions. There are seven towers of 200 ft or greater within the one-mile buffer and an additional 31 in the five-mile zone.<sup>98</sup> See Table 19. As will be addressed in the frequency spectrum section, cellular communications towers can also create other issues such as interference. In the study area they are currently all under 200 ft. This included five over 100 ft, two in the five-mile and three more in the ten-mile buffer. More are being constructed due to the rapid expansion of cellular phone service. Data available shows 52 in the study area as of 2019 versus 19 in 2002.<sup>99</sup> This excludes cell towers located on post. See Map 31.

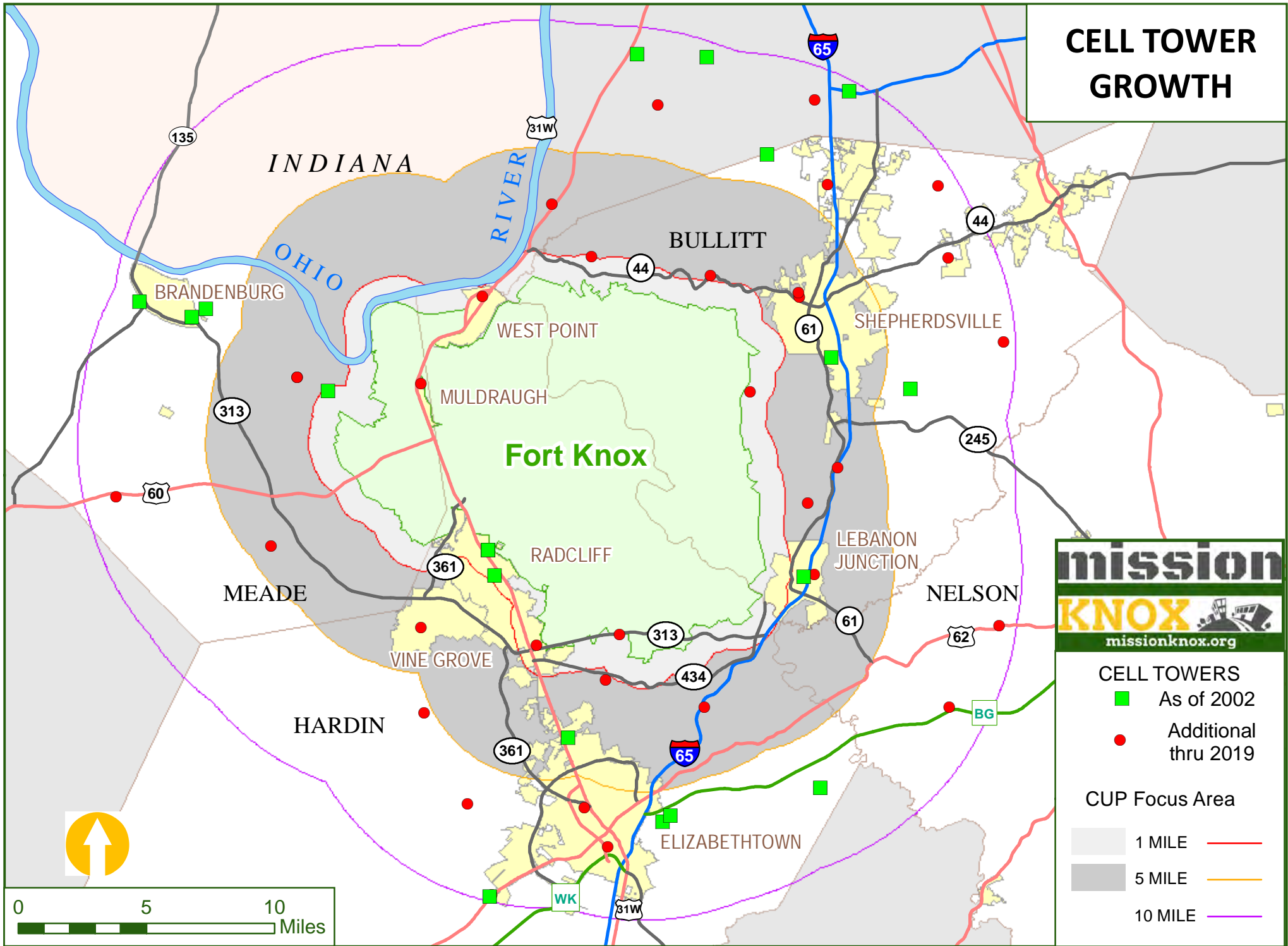
**Table 19 Vertical Obstructions Over 100 ft.**

VERTICAL OBSTRUCTIONS			
Height	1 Mile	5 Mile	10 Mile
Over 100 ft	7	6	29
Over 200 ft	7	31	48





MAP 30 - VERTICAL OBSTRUCTIONS

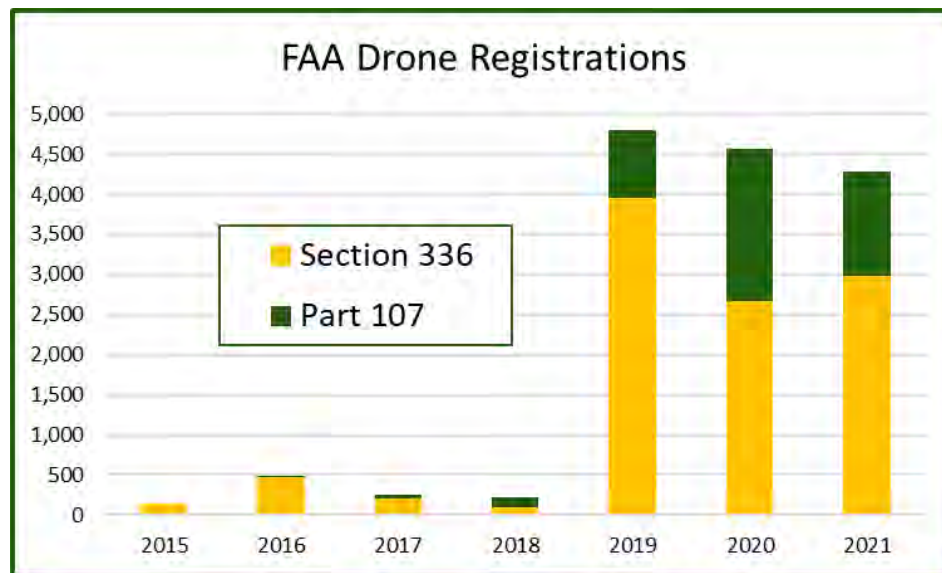


MAP 31 - CELL TOWER GROWTH

## Drones

A more recent concern is the proliferation of private and commercially owned drones operating in and around military facilities and restricted airspace. **Error! Reference source not found.** shows the growth in numbers since the Federal Aviation Administration (FAA) registration has been required for drones with a mass of 0.55 pounds or greater. The data includes the number of registrations by ZIP Codes that fall within the 10-mile buffer zone of Fort Knox. Beginning 21 December 2015, owners who purchased drones must register them with the FAA prior to first flight. Persons who owned drones prior had until 19 February 2016 to register those drones.<sup>100</sup>

**Chart 17 FAA Drone Registrations**



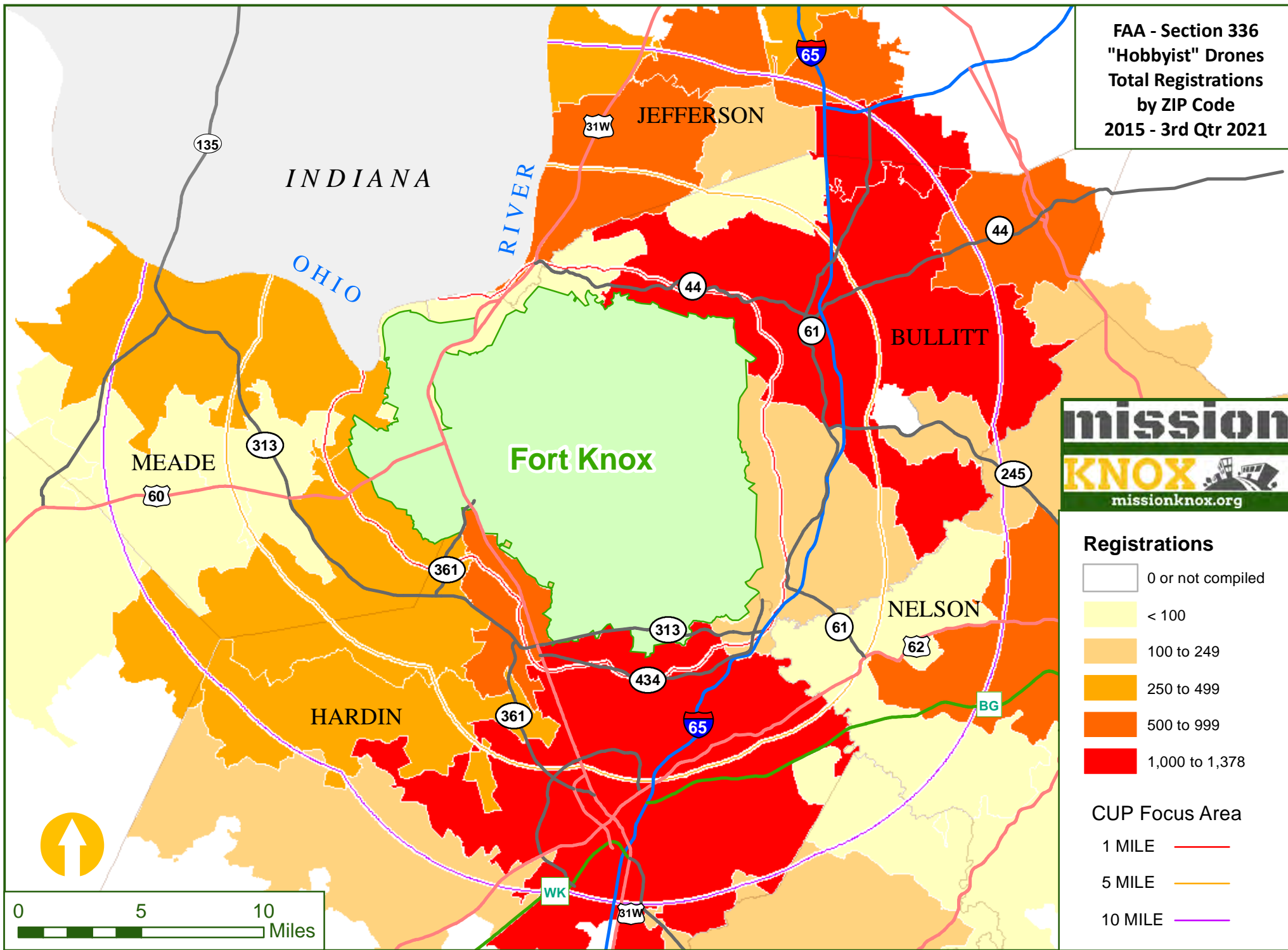
The data was compiled from the available data of 2015 through the 3<sup>rd</sup> quarter of 2021. Note that registrations are valid for three years prior to renewal. The FAA does not distinguish in the available data if they

are new or re-registrations, but it can be assumed that subsequent to 2018, some are classified as re-registrations. Even with that, it may be considered that potentially over 12,000 privately owned drones exist in the immediate vicinity of Fort Knox. Map 32 & Map 33 also depict the number of registrations in and around the 10-mile buffer zone.

**Table 20 Drone Registration by ZIP Codes**

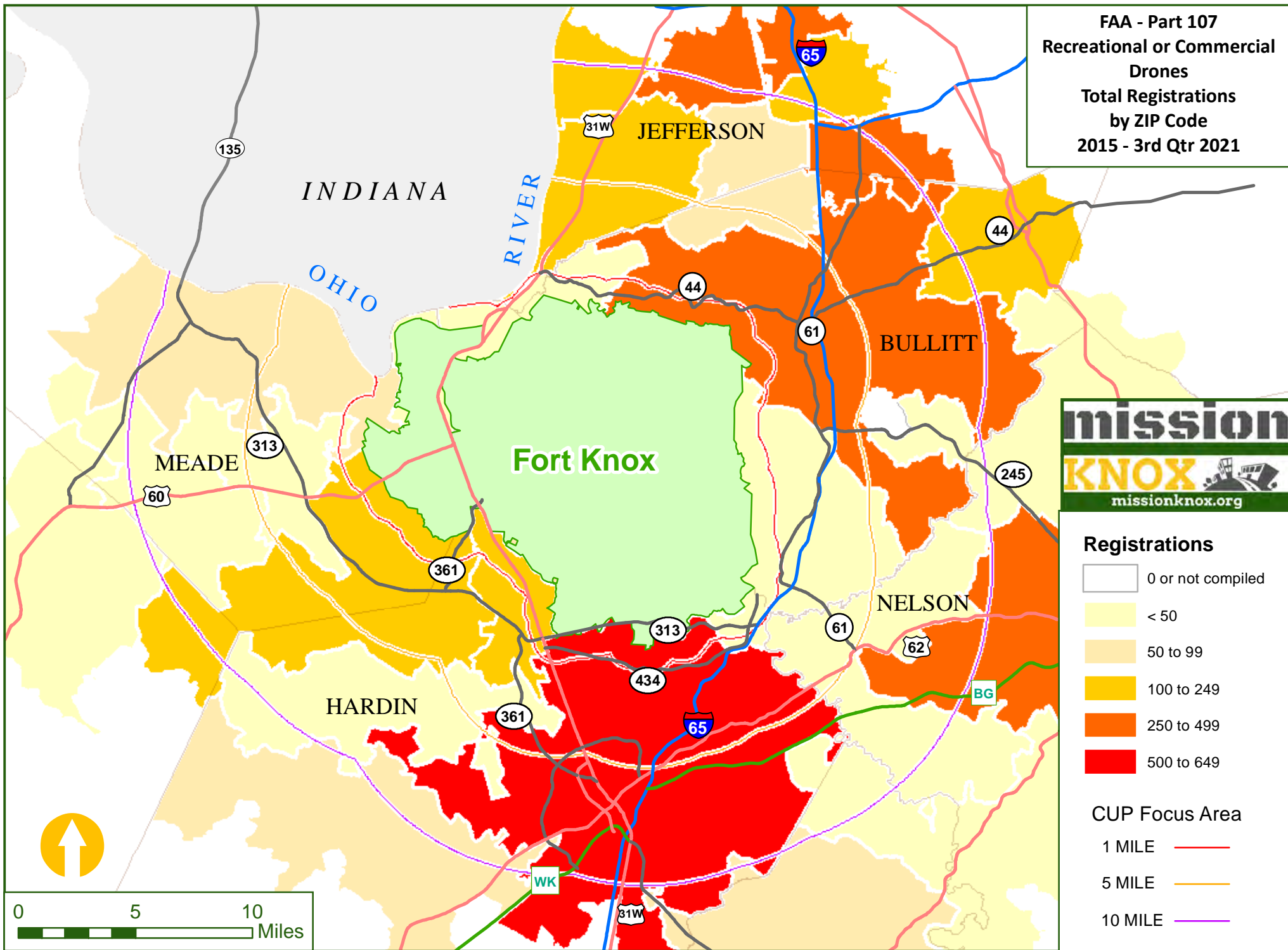
ZIP Code	PO Name	2019 POPULATION	REGISTRATION TOTALS	
			SECTION 336	PART 107
40004	Bardstown	30,349	807	333
40107	Boston	1,911	25	9
40108	Brandenburg	11,839	293	80
40109	Brooks	3,171	55	77
42724	Cecilia	4,567	163	67
40110	Clermont	1,174	0	0
40013	Coxs Creek	5,742	197	25
40117	Ekron	2,793	95	19
42701	Elizabethtown	53,525	1,378	649
40118	Fairdale	10,186	182	59
40121	Fort Knox	11,145	167	81
40142	Guston	2,107	55	14
42748	Hodgenville	9,086	112	85
40146	Irvington	4,472	94	30
40150	Lebanon Junction	5,101	130	24
40213	Louisville	17,620	361	424
40214	Louisville	46,705	696	261
40219	Louisville	38,706	674	223
40229	Louisville	38,540	1,068	379
40258	Louisville	26,890	450	204
40272	Louisville	38,036	582	233
40047	Mount Washington	23,022	616	244
40155	Muldraugh	1,124	33	17
40051	New Haven	4,913	78	9
40160	Radcliff	24,798	512	159
40162	Rineyville	5,863	268	43
40165	Shepherdsville	36,391	1,009	360
40175	Vine Grove	15,200	440	104
40177	West Point	1,348	11	2

Source: FAA, Cumulative for 2015 thru 3rd Quarter 2021.



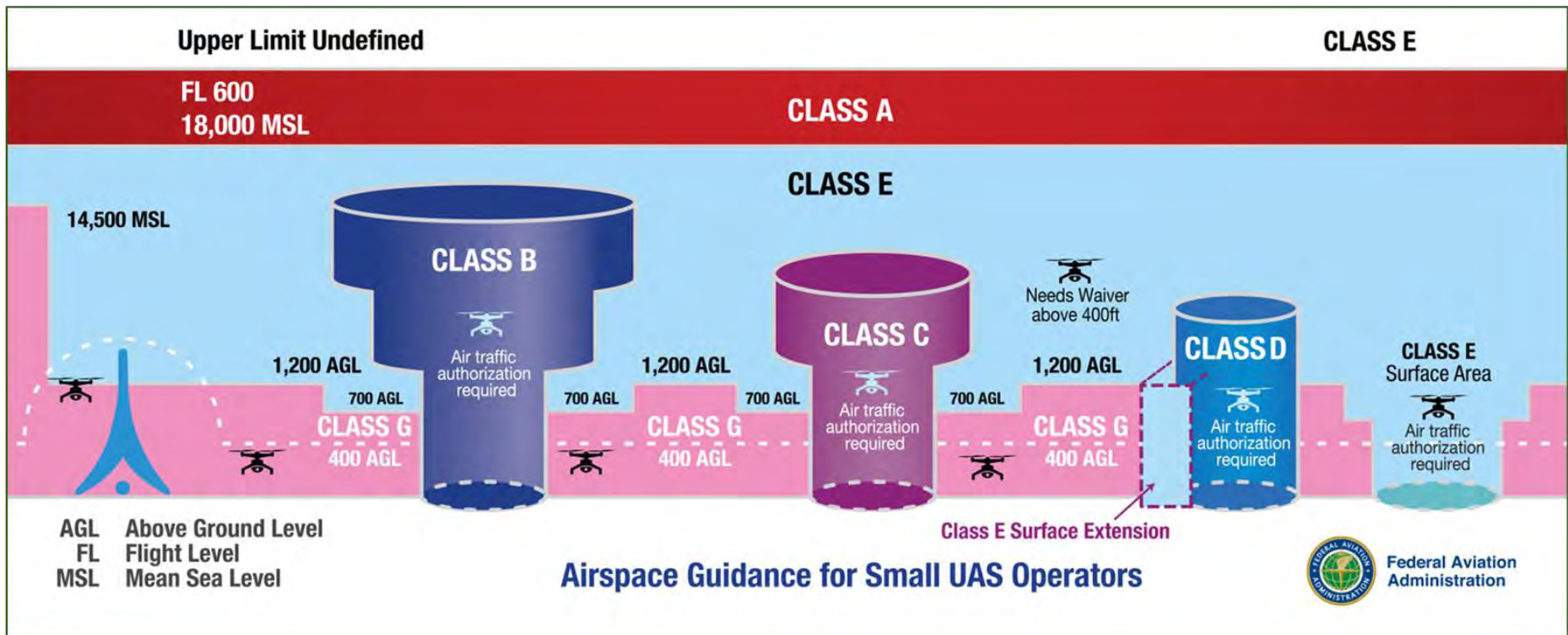
MAP 32 - DRONE REGISTRATIONS - SECTION 336





**MAP 33 - DRONE REGISTRATIONS - PART 107**

Figure 38 Airspace Guidance for Small UAS Operators



Source: Federal Aviation Administration

The data presented is for Unmanned Aircraft Systems (UAS) which is both the drone or vehicle and the system operator. That definition also accounts for the control system that interlinks the two. The FAA also uses the term Unmanned Aircraft (UA) in reference to the drone itself although in the industry, it may be referred to as an Unmanned Aerial Vehicle (UAV). The UAS is regulated by CFR Title 14, Chapter I, Subchapter F, Part 107 – Small Unmanned Aircraft Systems. This applies to UA between 0.55 and 55 pounds, the most common type of recreational or commercial drone. Prior to December 2020, recreational only were categorized under Section 336 “Special Rule for Model Aircraft”<sup>101</sup>, but this has since been modified under 49 USC

44809: *Exception for limited recreation operations of unmanned aircraft.*<sup>102</sup>

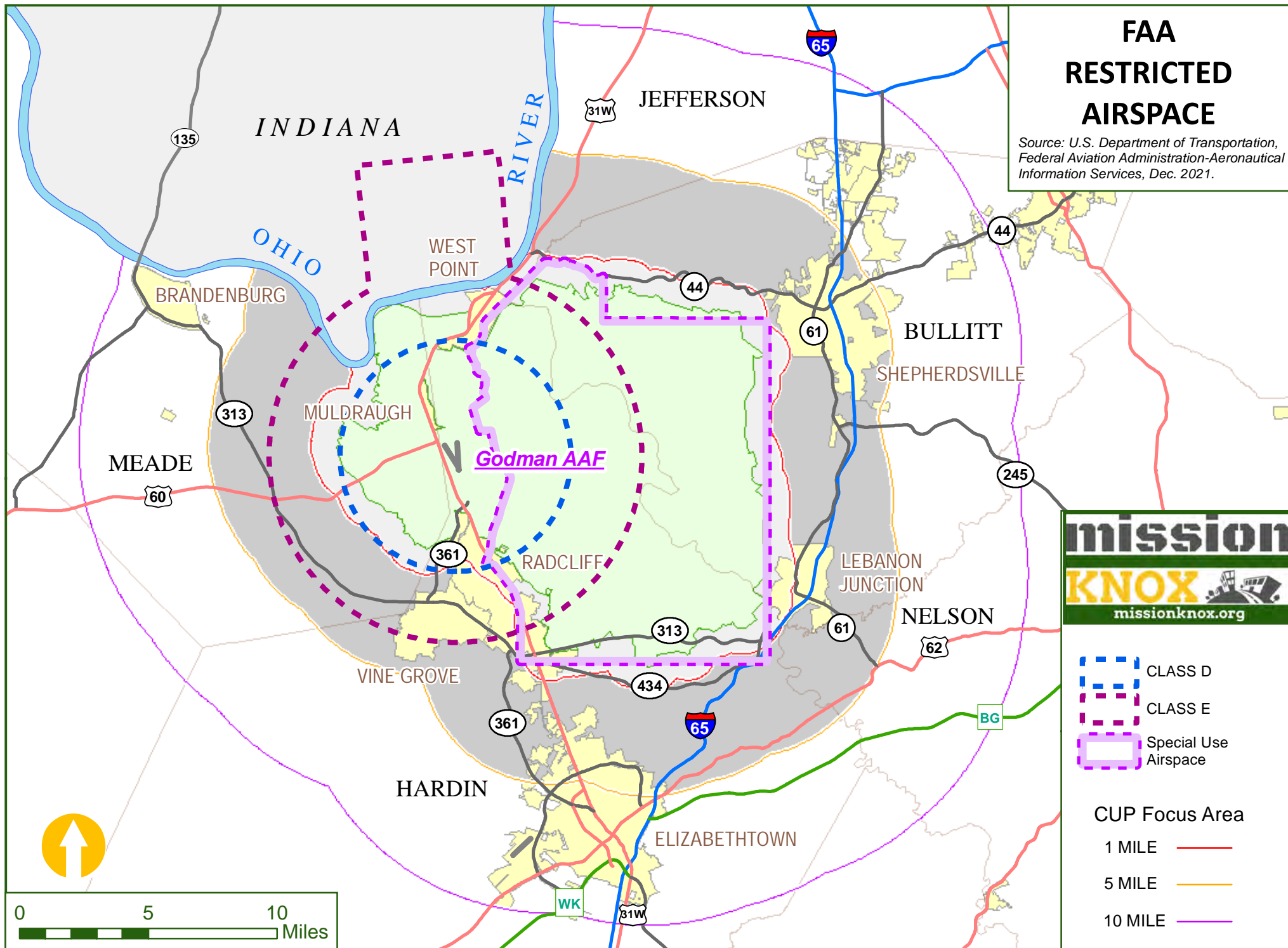
Research recorded no specific incidents of private drones conflicting with Fort Knox's airspace, but it could be considered to only be a matter of time. Between the period of March 2015 and June 2021 there were 53 reported "sightings" of UA in conjunction with airports and airspace in Louisville/Jefferson County, KY.<sup>103</sup> A news report from 2017 highlighted the prohibitions of operating private UA over Fort Knox's property. There were instances however where *"...people have been spotted flying drones in Kilianski Sports Complex which is against federal regulation..."*.<sup>104</sup>

The entire Fort Knox installation is defined as Special Use Airspace. This prohibits overflight by private UA. Furthermore, a 4.5-mile radius buffer from a point at Godman AAF is also considered Class D, which places restrictions on areas outside of the installation in and around parts of the Cities of Muldraugh and Radcliff and into Meade County. A further buffer out to seven miles is Class E, again with prohibitions on drone flights. See Map 34.

Education regarding these restrictions and concerns is potentially the best method of addressing this issue. Schools are one avenue as many of these drones can be presumed to be operated by young adults. Other means include raising the media's attention regarding this topic to raise the public awareness of these potential conflicts. Figure 38 illustrates some of the restrictions on drones for specific airspaces. In this situation, Class D and E. Drones also are restricted to flight below 400 feet AGL without specific waivers.

# FAA RESTRICTED AIRSPACE

Source: U.S. Department of Transportation,  
Federal Aviation Administration-Aeronautical  
Information Services, Dec. 2021.



- CLASS D
- CLASS E
- Special Use Airspace

## CUP Focus Area

- 1 MILE ---
- 5 MILE ---
- 10 MILE ---

MAP 34 - RESTRICTED AIRSPACE



## Noise

Noise from the installation is commonly considered to be an issue. The result of munitions use in training and overflights in and around the post boundaries; both have anecdotal and documented histories of conflicts between the military and the surrounding communities. The results of which have resulted in Fort Knox having had curfews at times; other installations have had ranges closed or limits placed on the size of explosions.

*“...blast noise cost the Army millions of dollars a year. As more people move closer to military installations (a current trend), encroachment issues such as noise have the potential to cause further repercussions.”<sup>105</sup>*

Noise sources can be considered to arise from three sources: Small Arms Weapons, Large Caliber Weapons and Explosives, and Aviation Activity. These noises emanate from the over 100 ranges located throughout the post. The CUP study reviewed data and insights from two noise studies that have been conducted at Fort Knox since 2009 in Section II.

Documented noise complaints were reviewed to understand both their type and location. The primary source for this data was an inventory of complaints and responses collected by the Garrison's Public Affairs Office. The dataset, covering the years from 2007 – 2019, can be broken into two types of noise related issues. Noise in general considered to be loud sounds coming from the installation or from aircraft associated with the military and vibrations resulting from these same activities that may have resulted in longer term affects.

For the purposes here the data is portrayed in Map 35.

Further details regarding this data may be found in Appendix B - Noise and Encroachment Complaints.

## DAGIR

As discussed in the Fort Knox future mission's profile in Section II, the DAGIR will be a high use facility. The noise levels and frequency customary over the past few years are expected increase dramatically. When the construction stated on the DAGIR ranges information was released regarding the new facilities. The information emphasized the increase noise levels that would occur.

*““... there will be a shift in noise levels as they make the transition to the DAGIR range. Wilcox Range is already experiencing heightened levels because of the diversion from Yano. Once Yano construction is complete in 2023, residents in nearby Bullitt County can expect increased noise levels as the DAGIR range goes live.””<sup>106</sup>*

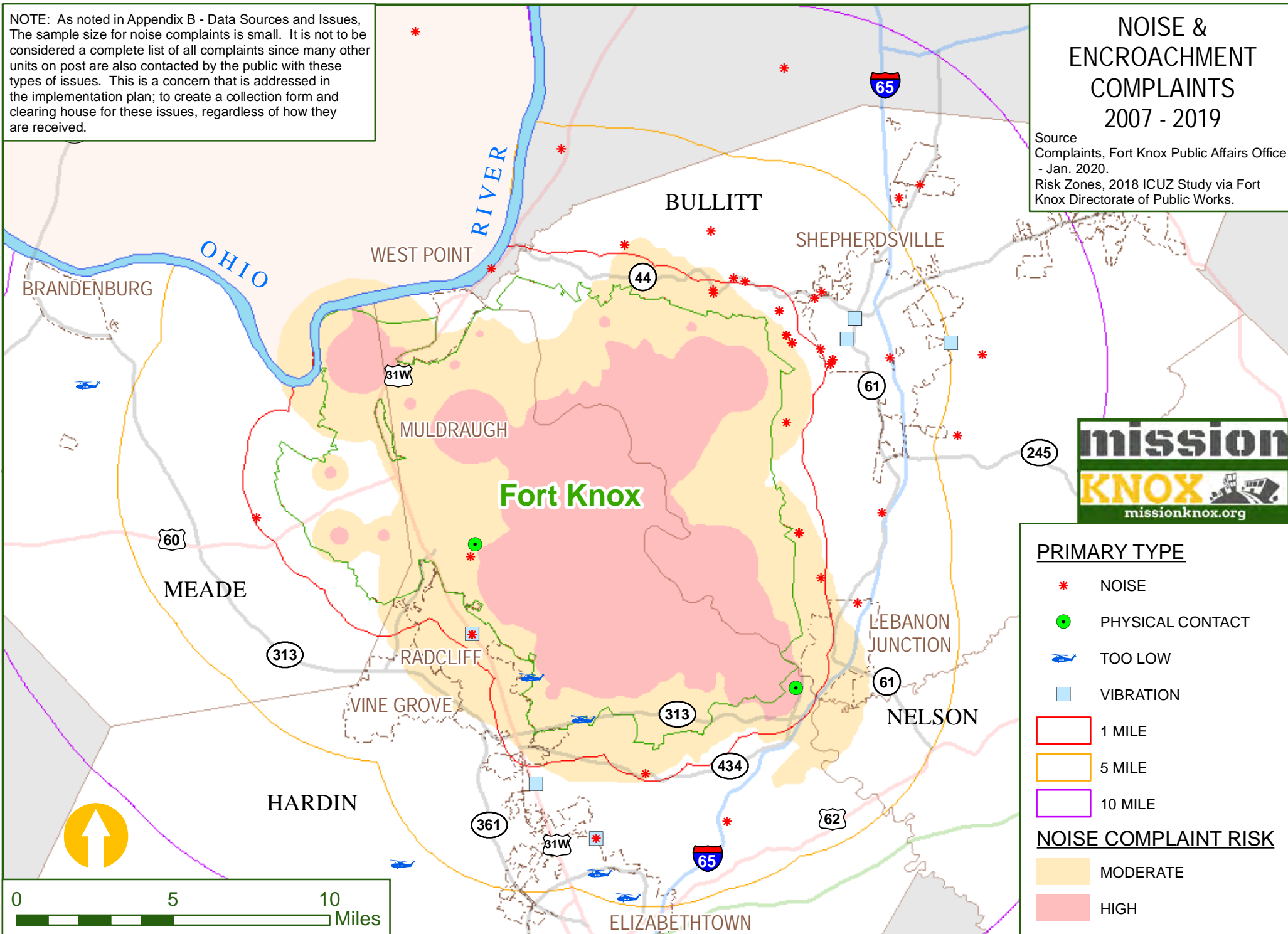
It should be noted that a finding of “...no significant impact...” was decided in the Environmental Assessment (EA) conducted prior to beginning construction of the DAGIR via the conversion of the existing Yano range area.<sup>107</sup>

It will be strongly suggested in Section V, Implementation Strategy that use be made of tools and studies available to mitigate this most personal conflict between some of the surrounding community and Fort Knox. This is yet another factor that should be addressed in the short term through communication methods in the Implementation Strategy. The long-term methods suggested such as building codes and realty disclosures may also help alleviate some of the future complaints that will be forthcoming.

NOTE: As noted in Appendix B - Data Sources and Issues, The sample size for noise complaints is small. It is not to be considered a complete list of all complaints since many other units on post are also contacted by the public with these types of issues. This is a concern that is addressed in the implementation plan; to create a collection form and clearing house for these issues, regardless of how they are received.

# NOISE & ENCROACHMENT COMPLAINTS 2007 - 2019

Source  
Complaints, Fort Knox Public Affairs Office  
- Jan. 2020.  
Risk Zones, 2018 ICUZ Study via Fort  
Knox Directorate of Public Works.



MAP 35 - NOISE & ENCROACHMENT COMPLAINTS

## Spectrum Frequency

Spectrum frequency issues for this study are broken into two categories. Communications, which include items such as voice, data, navigation, detection, or other systems and visible light, which is a predominate concern during the hours of darkness.

As a communication tool, the electro-magnetic spectrum frequency suffers from the fact that it is a constrained and limited resource. It is basically the same situation we see in any other resource such as land, transportation, or housing as an example. There is only so much available and while sometimes it is possible to create more, such as housing or roads, it isn't always thus. Like land, there is no more frequency ranges available, so they are allocated based on regulation. In addition, the increase can have other issues, more housing can lead to other conflicts with noise as an example. As with the other resources the demand is both from the military and community side of the boundary.

Visible light presents the opposite issue. The excess of ambient light during the night creates issues with mission conduct and with various tools used. Creation of unnatural night-time environments can lead to degradation of training.

### Communications

Primary uses in the military involve the obvious communication aspects via radio and satellite links. The other parts of the spectrum are also used such as radar, infra-red, and microwave.

The civilians in the community rely on cellular, radio, tv, and other types of communications. The advent of numerous wireless devices

such as door openers, cameras, lighting, and many other home convenience items place additional demands on the available bandwidth. The proliferation of cell phones has increased the demand for towers. In addition to the use of the spectrum itself conflicts arise from the physical infrastructure required. Cellular, microwave, and other communications towers create flight hazards. These towers can also impact radar and other conflicting transmitters or receivers.

In looking at the study area specifically, the siting of towers in and around the urban areas to keep up with demand creates additional VOs. Along the major highways such as I-65, 31W, and KY 313 the need for these towers to manage communication traffic has increased. The physiography of the Knobs creates natural high points to try and locate these towers due to their proximity.

### Light

Light pollution can serve as a deterrent to mission conduct by creating areas unsuitable to conduct nighttime operations in a proper combat scenario. This can have a direct impact on the level of effectiveness of training.<sup>108</sup>

An additional consideration of light pollution is the concern of its affects upon protected species. The bats of the region can be susceptible to issues involving their travel corridors. While night lighting might attract greater densities of food source, it is believed that it can also disrupt their commuting patterns. The Gray Bats forage along streams and lakes while the Indiana Bats avoid open fields for woodlands.<sup>109110111</sup>

To understand what impacts light pollution may have on the missions of Fort Knox a understanding of the level of pollution present is

required. One source of night light data is the Suomi National Polar Partnership satellite flown by NASA and NOAA. It provides a polar orbiting satellite which collects nighttime data worldwide daily. The primary imagery from the satellite is the Visible Infrared Imaging Radiometer Suite (VIIRS). VIIRS data is available from the National Oceanic and Atmospheric Administration (NOAA).<sup>112</sup> Map 36 shows the study area with this data overlain. The various cities and the cantonment area are visible in this view from March 2019. It provides a reference of looking at the illuminated terrain from above. We can enhance the data and use a false color image to provide additional details in Map 37. In looking at the change back in time from Map 37 to Map 38 which shows the same area in March 2013, one noticeable feature is the fading of the core range area of the installation as it has become brighter in 2019.

An issue with VIIRS imagery is the available resolution. Ranging between 0.6 to 2.7 km it has restricted value in a small study area. One method to obtain higher resolution is to create a simulation of nighttime lighting using other data. Two other methods were applied during this study to provide this visual simulation of the potential light pollution in our study area. The first was through the use of E911 point structure addresses as shown in Map 39. Revealing a more detailed portrayal of the contrast between areas, it brings out the development along roads and highlights the urban cores and enhances the less densely populated rural areas. Data availability presents a problem with this method due to the inability to illustrate Bullitt County or Fort Knox. To circumvent this, the same technique was applied with Microsoft's "US Building Footprints" dataset.<sup>113</sup> See Map 40. This data, which is available nation-wide, provides the more complete view desired. Instead of the points from the E911 data we see the outlines

of individual buildings. It depicts the more dramatic dark areas of the installation and the more precise areas of residential development seen previously in the study area review of housing. This simulation reveals specific areas on interest that could provide opportunities for study and the use of tools to minimize their impacts.

Natural growth of industrial, commercial, in addition to residential will only increase the issued related to light pollution over time.

Consideration should be given to mitigation policies some of which are presented in next section and included in the Implementation Strategy.

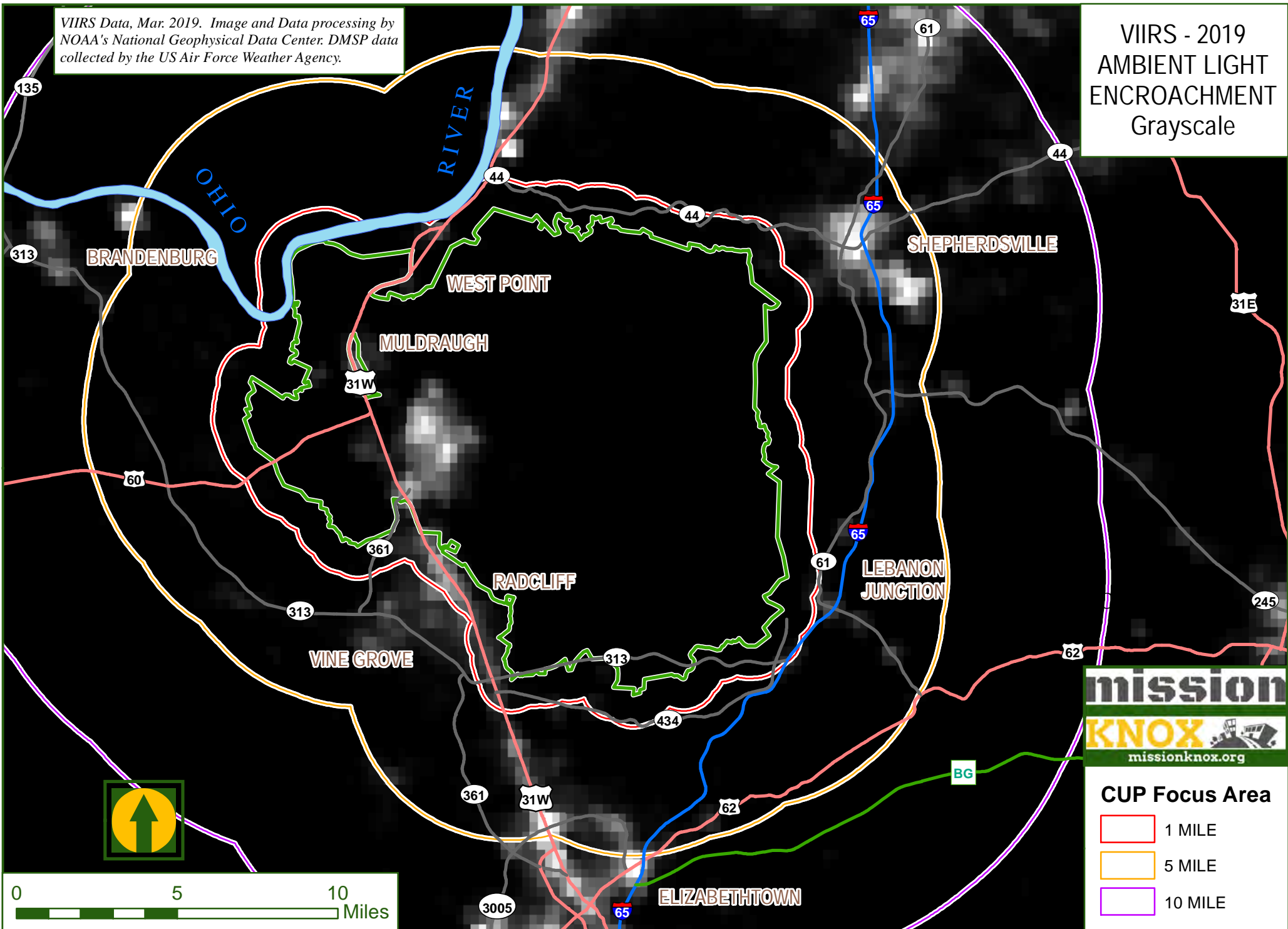


**Figure 39 Night Sling Load Training.** Source: U.S. Army, Fort Knox Garrison Command.



VIIRS Data, Mar. 2019. Image and Data processing by NOAA's National Geophysical Data Center. DMSP data collected by the US Air Force Weather Agency.

# VIIRS - 2019 AMBIENT LIGHT ENCROACHMENT Grayscale



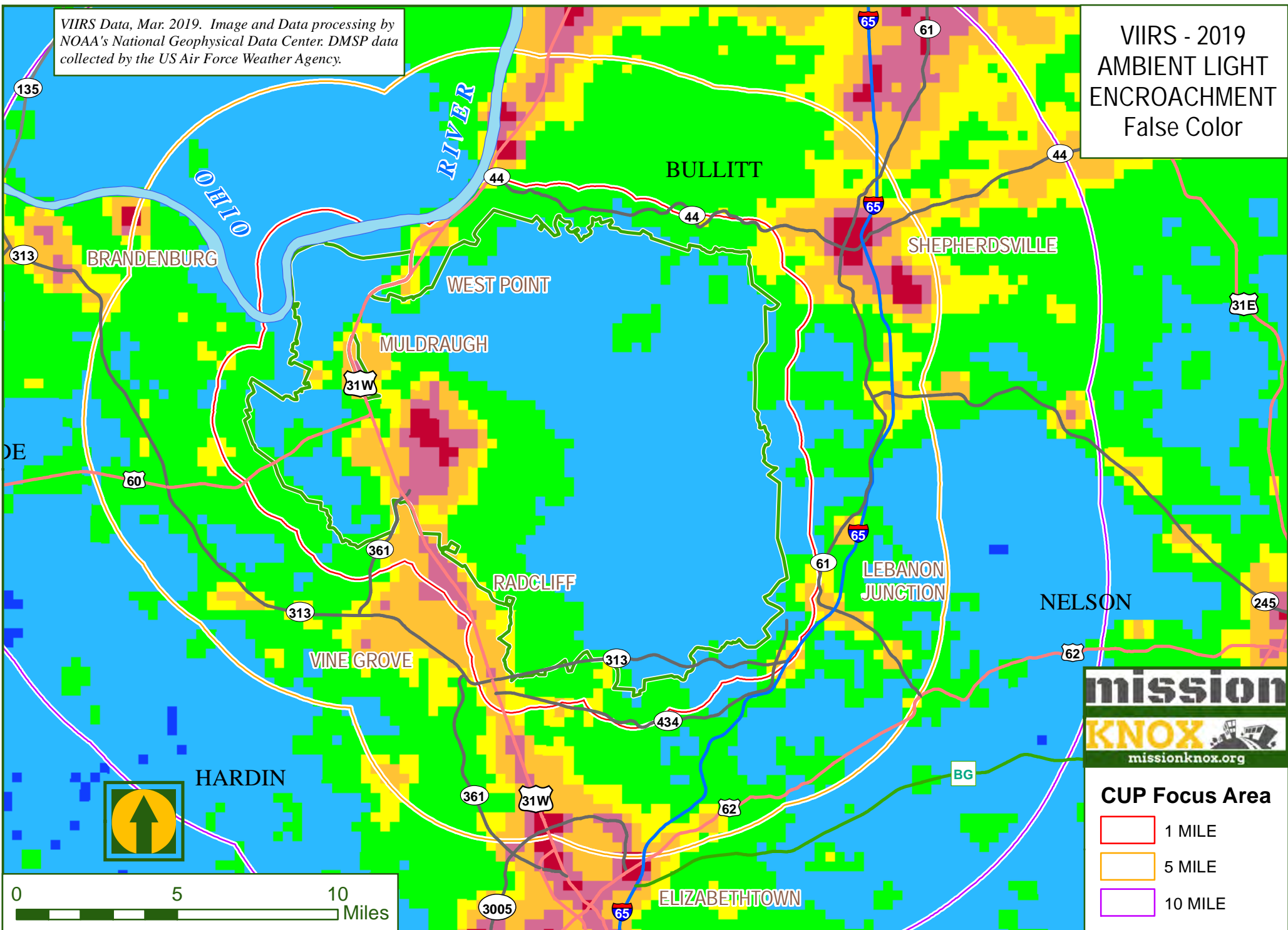
## CUP Focus Area

- 1 MILE
- 5 MILE
- 10 MILE

MAP 36 - VIIRS - 2019, AMBIENT LIGHT ENCROACHMENT

VIIRS Data, Mar. 2019. Image and Data processing by NOAA's National Geophysical Data Center. DMSP data collected by the US Air Force Weather Agency.

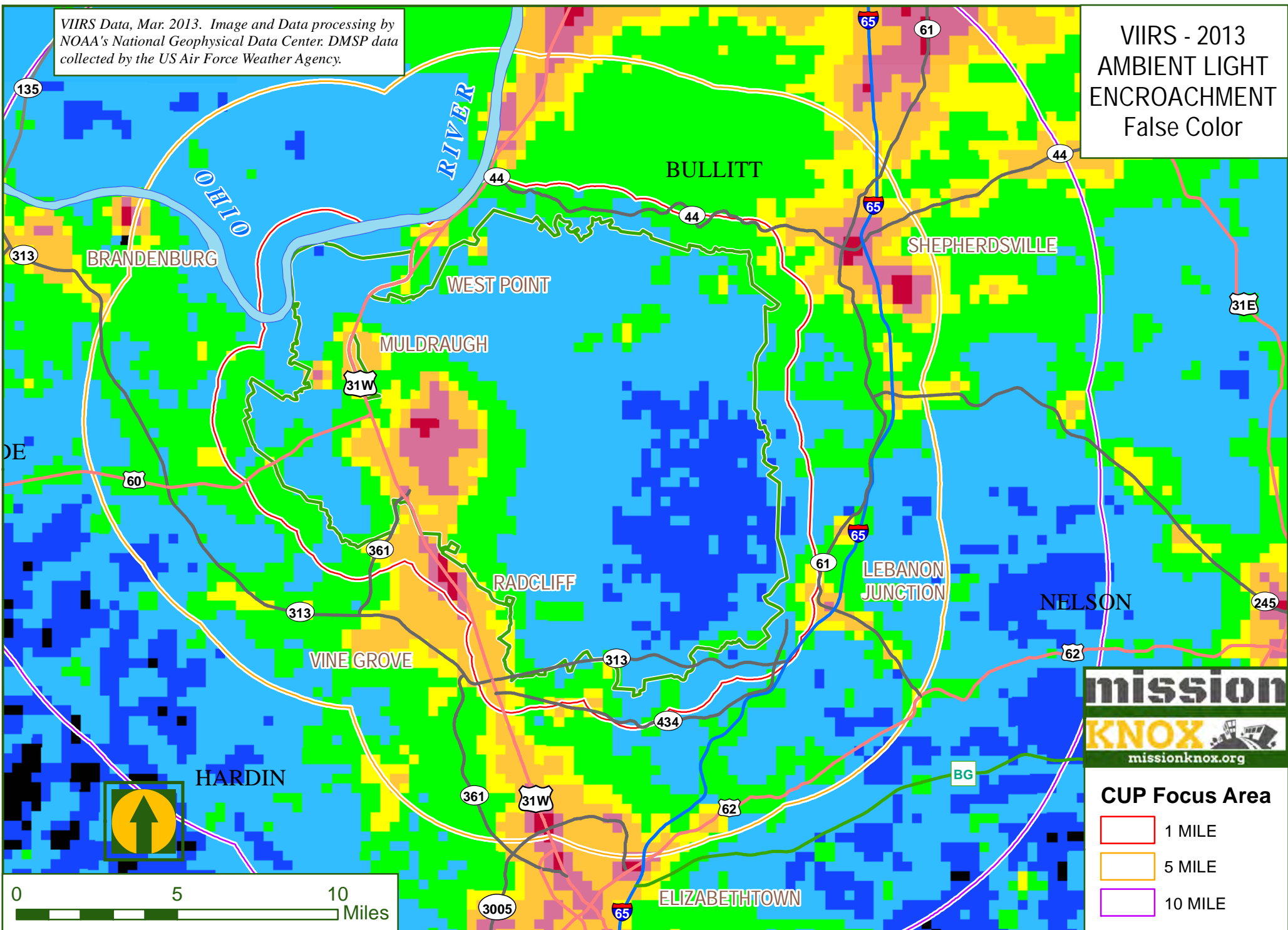
VIIRS - 2019  
AMBIENT LIGHT  
ENCROACHMENT  
False Color



MAP 37 - VIIRS - 2019, AMBIENT LIGHT ENCROACHMENT

VIIRS Data, Mar. 2013. Image and Data processing by NOAA's National Geophysical Data Center. DMSP data collected by the US Air Force Weather Agency.

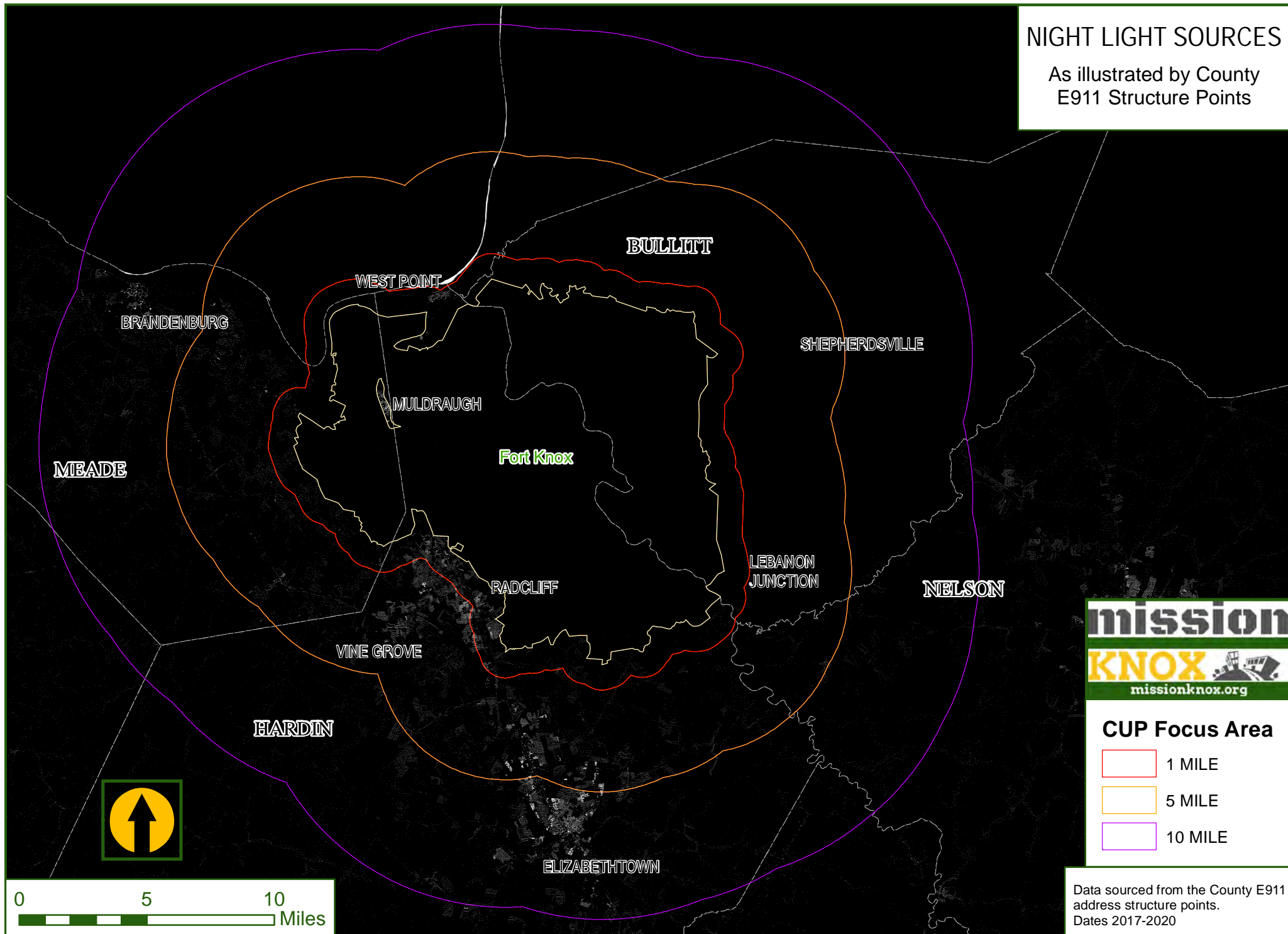
VIIRS - 2013  
AMBIENT LIGHT  
ENCROACHMENT  
False Color



MAP 38 - VIIRS - 2013, AMBIENT LIGHT ENCROACHMENT

## NIGHT LIGHT SOURCES

As illustrated by County  
E911 Structure Points

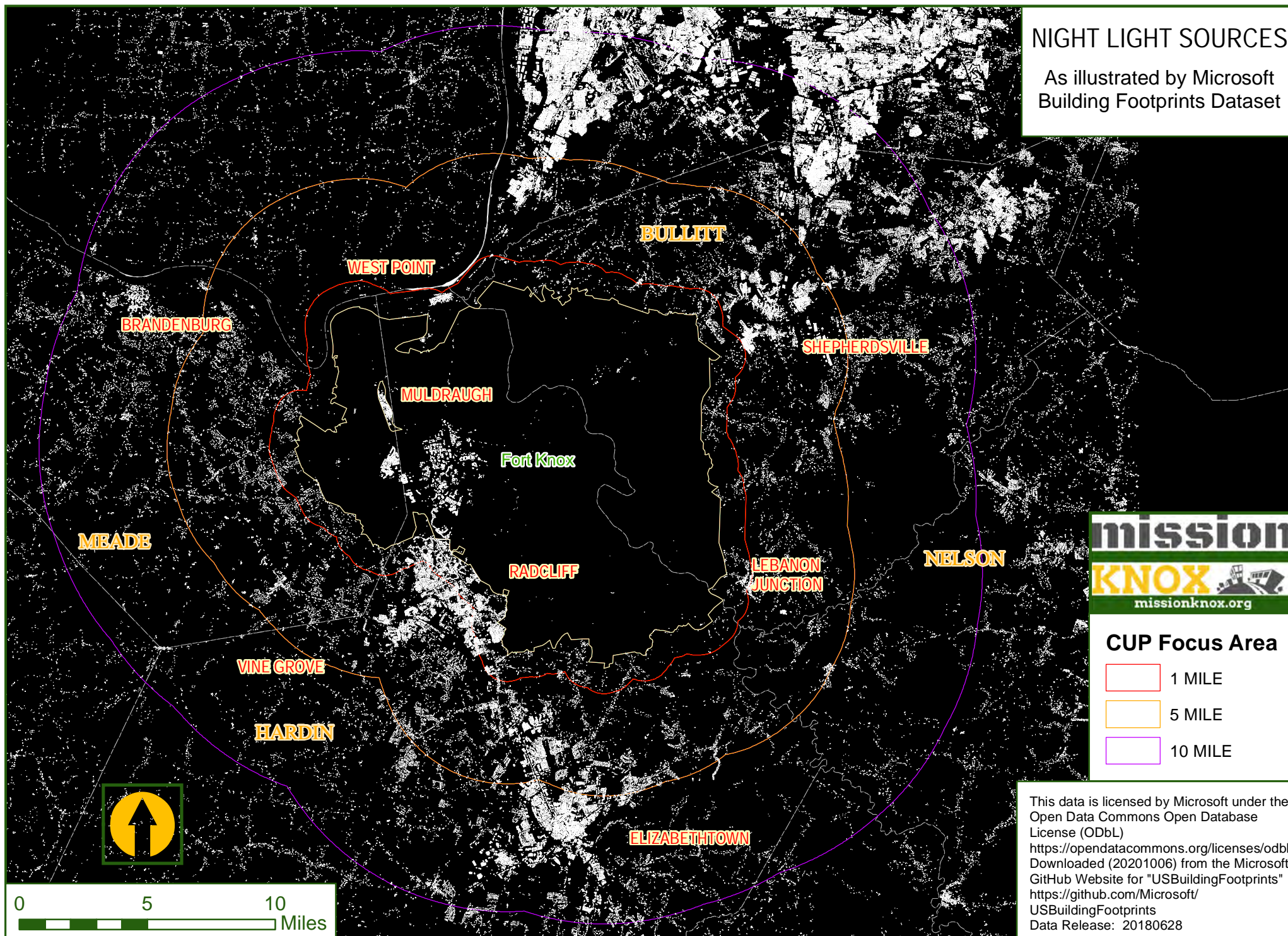


MAP 39 - NIGHT LIGHT SOURCES - E911



## NIGHT LIGHT SOURCES

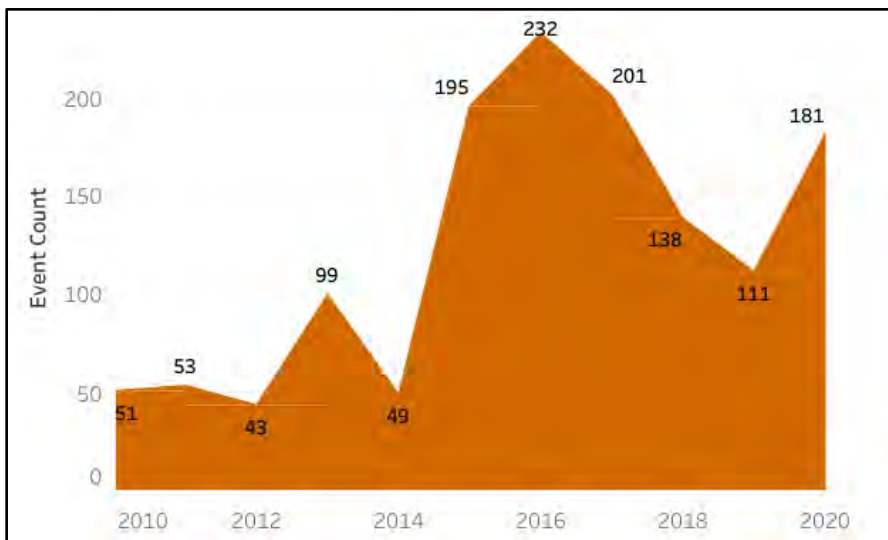
As illustrated by Microsoft  
Building Footprints Dataset



MAP 40 - NIGHT LIGHT SOURCES - MS BUILDING FOOTPRINTS

## Laser Encroachment

Incidents of individuals targeting aircraft with lasers were first reported in the 1990's with the advent of wide-spread low-cost devices becoming readily available. The FBI started keeping records of such events in the mid 90's and the FAA began tracking in 2010.<sup>114</sup> Since 2005 with a report of 311 incidents, it rose to over 2,800 in 2010 nation-wide. It continued to a peak of 7,383 incidents in 2016, fell off under 6,000 but rose again to 6,852 in 2020.<sup>115</sup> Figure 40 shows the number of incidents in Kentucky over the past 10 years.



**Figure 40 Laser Events in Kentucky.**<sup>116</sup>

Fort Knox had reported incidents in 2021. In two cases lasers were pointed at civilian aircraft using Special Use Airspace around ranges on the installation. Both incidents were from an area north of KY 313 near KY 251. Military Police were dispatched but no culprits were apprehended.<sup>117</sup> Federally, individuals can be prosecuted both criminally and civilly with penalties up to \$250,000 and five years in

prison.<sup>118</sup> The frequent aircraft overflights, use of night vision equipment, and rise in cases make this an area for concern. Education and enforcement are the current options for confronting this issue.



**Figure 41 Green Laser in Cockpit.** Source: *api.army.mil*

## Environmental

Environmental issues can be broad in concept; thus, they are defined as follows for this study. Protection of species and habit, Natural disasters and their mitigation Land loss to over-development. In due course, all of this tie back to the preservation of land in an undeveloped or minimal state of development.

### Endangered Species and Habitat

Land use of both Fort Knox and the surrounding communities influence several species in the local environment. The military and the local communities both have a vested interest in protecting the wildlife in the area. The military has legal obligations to protect any endangered species that are present within the installation's borders. According to the Center for Public Environmental Oversight, "Some of the biodiverse creatures and flora are protected by the Endangered Species Act, the Migratory Bird Treaty Act, the Marine Mammal Protection Act, and other laws".<sup>119</sup> The military may also find itself being graced with positive public relations when enacting policies that aim to protect wildlife and lead them to be viewed as an example in ecosystem-preservation. Meanwhile, the surrounding communities often care about ecosystem preservation, it may stem from pride in their local environment. The wildlife in the area is often a symbol of the region and preserving it is like preserving a local identity.

The Fort Knox and the study area have a large wildlife profile. Within the Fort Knox area there are 13 species that are considered either endangered, threatened, or of special concern by the state of Kentucky. Three of these are considered endangered; the Indiana Bat, and the mouse-eared (*Myotis*) bats - Northern Long Eared, and Gray. Two

additional are listed as threatened, the Bald Eagle and the Kirtland's Snake. The remaining species are of special concern, meaning the species should be monitored, examples include the Evening Bat and the Henslow's Sparrow.<sup>120</sup>

**Table 21 Fort Knox – Threatened and Endangered Species**

THREATENED, ENDANGERED, AND SPECIAL CONCERN SPECIES				
Scientific Name	Common Name	Class	US Status	KY Status
<i>Haliaeetus leucocephalus</i>	Bald Eagle	Aves	No Status	Threatened
<i>Junco hyemalis</i>	Dark-eyed Junco	Aves	No Status	Special Concern
<i>Nycticeius humeralis</i>	Evening Bat	Mammalia	No Status	Special Concern
<i>Orconectes inermis inermis</i>	Ghost Crayfish	Malacostraca	No Status	Special Concern
<i>Myotis grisescens</i>	Gray Myotis	Mammalia	Endangered	Threatened
<i>Hyla versicolor</i>	Gray Treefrog	Amphibia	No Status	Special Concern
<i>Centronyx henslowii</i>	Henslow's Sparrow	Aves	No Status	Special Concern
<i>Myotis sodalis</i>	Indiana Bat	Mammalia	Endangered	Endangered
<i>Clonophis kirtlandii</i>	Kirtland's Snake	Reptilia	No Status	Threatened
<i>Ictinia mississippiensis</i>	Mississippi Kite	Aves	No Status	Special Concern
<i>Myotis septentrionalis</i>	Northern Myotis	Mammalia	Threatened	Endangered
<i>Cistothorus platensis</i>	Sedge Wren	Aves	No Status	Special Concern
<i>Accipiter striatus</i>	Sharp-shinned Hawk	Aves	No Status	Special Concern

Source: KY Dept. of Fish & Wildlife Resources, Query of USGS Quadrangle "Fort Knox"



**Figure 42 Gray Bat (*Myotis grisescens*). Photo: John MacGregor, KY Dept. F&WR.**



The presence of endangered and protected species affects Fort Knox's missions. There are several national and state laws that dictate how the installation can operate when it comes to protecting the species. For example, any actions on the installation that may affect the animal's habitat must be coordinated with environmental personnel. A large amount of responsibility for this problem can be placed on development of the outside communities. As the land around the installation becomes more developed, the natural habitats of these species are destroyed and often move into the installation where there are large tracts of undeveloped land. The development of the rural landscape creates a situation where Fort Knox will be confronted with additional species seeking refuge resulting in more limitations on activity.



**Figure 43 Indiana Bat (*Myotis sodalis*).** Photo: John MacGregor, KY Dept. F&WR.

Fort Knox and the surrounding area's goals can work to protect local wildlife and mitigate operational slowdowns on the base. In 2005 a large maternity colony of Indian Bats was discovered in the northeastern area of the installation. In response Fort Knox created the Indiana Bat Management Area (IBMA). This area of over 1,400 acres has served to protect the species and through efforts to increase summer roosting sites the bats have flourished.<sup>121</sup> This location is in Bullitt County and there are other areas of concern in the one-mile buffer. See Map 41. It should also be

noted that all of Meade County is considered by United States Fish & Wildlife Service (USFWS) to be "Critical Habitat" for the Indiana Bat.<sup>122</sup> Fort Knox continues to work with the USFWS and the Kentucky Department of Fish and Wildlife Resources (KDFWR) in operating around the protected species. Fort Knox monitors the protected species' status, any current habitats on post. Fort Knox and the surrounding communities should work together to identify natural resources and habitats and resolve to limit the encroachment in those areas.



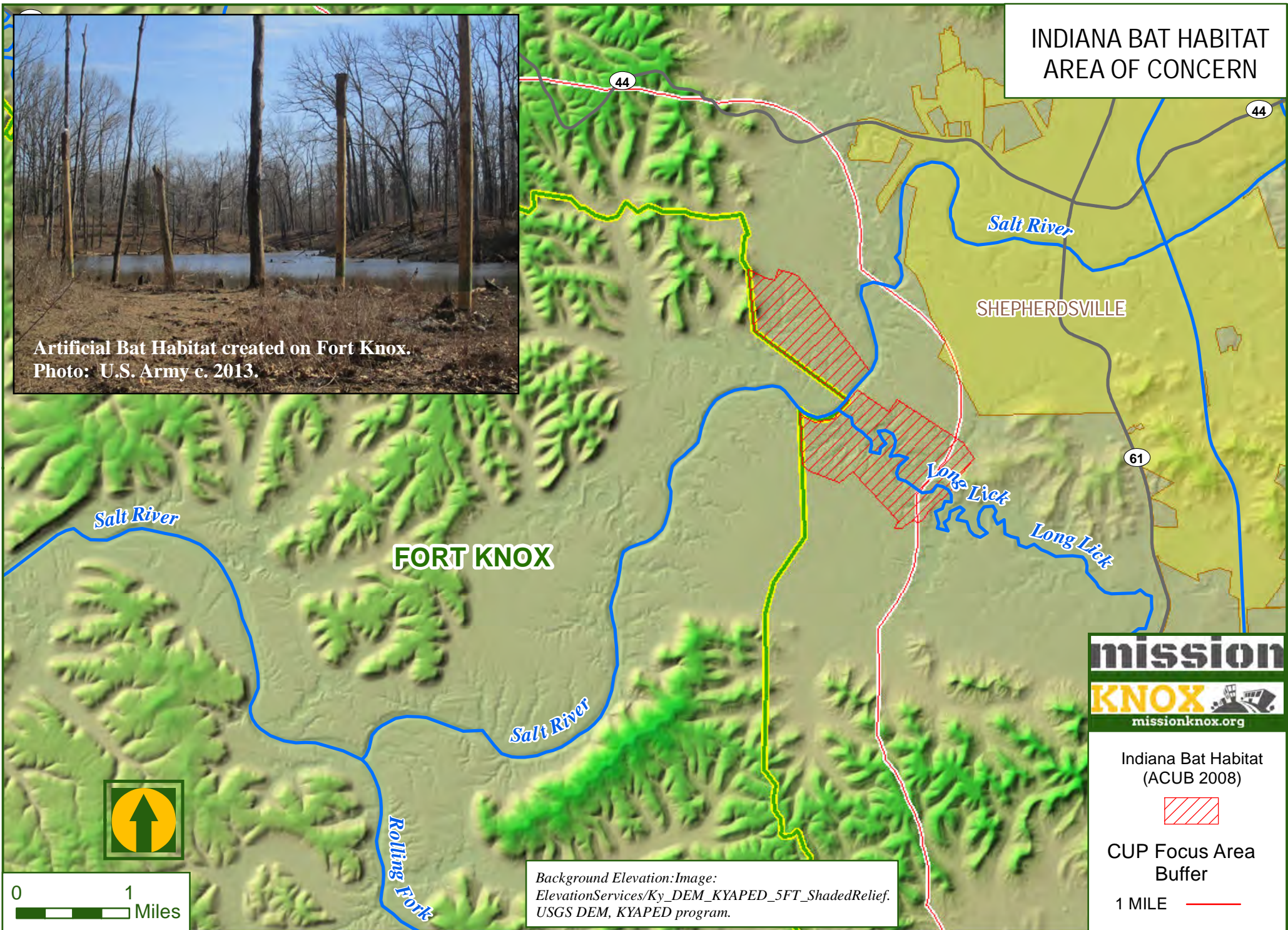
**Figure 44 Artificial Bat Habitat created on Fort Knox.** Photo: U.S. Army, c. 2013.

### Invasive Species

Invasive species are plants or animals that come into an area quickly and heavily alter the native ecology. They are usually unwanted and tend to have a degrading effect on the existing environment. A famous example of invasive species is Kudzu, a leafy vine whose growth has been known to overtake large swaths of land. While invasive species are not a major issue for the operations at Fort Knox, the possibility of invasive species in the installation could pose a

threat to operations. Development outside of the installation always has the potential to alter the ecosystem and create an unwanted or harmful scenario.





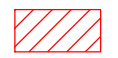
# INDIANA BAT HABITAT AREA OF CONCERN



Artificial Bat Habitat created on Fort Knox.  
Photo: U.S. Army c. 2013.



Indiana Bat Habitat  
(ACUB 2008)



CUP Focus Area  
Buffer

1 MILE

Officials in Kentucky are currently monitoring and dealing with many invasive species that have a wide range of effects on the natural Kentucky ecosystem and human development. They include plants that outcompete other native plants for nutrients and space, such as Garlic Mustard, Purple Loosestrife, and Eurasian Water-Milfoil. Animal species that outcompete other animals for food and take over habitats, such as zebra mussels, are also of concern.<sup>123</sup> Potential concerns in the study area also include Asian Carp and wild pigs. They are now resident in the state and are spreading.<sup>124</sup>

While Fort Knox does not report any serious threat from invasive species on operations, continuous development in the outside community can push the habitats of many species closer to the installation. An example is the presence of coyotes. The Fort Knox website detailed in an announcement “*Dealing With Wildlife Native To Kentucky*” on how to manage an increased presence of coyotes on post for personnel operating in the area.<sup>125</sup> The increase in wildlife in the installation could bring in species that have the potential to harm the natural habitat and thus the mission. To deter the threats of invasive species, Fort Knox and surrounding communities should continue to identify natural resources/habitats and limit the encroachment in those areas.

### Natural Disasters

Natural disasters as they relate to the study are ones that are the result of or the change of landforms. These include flooding, karst, land subsidence, and landslides as predominant issues in the study area.

### **Flooding**

Flooding is one of the most common disasters in the state and certainly in the Fort Knox Area. In the last 50 years the state of Kentucky has experienced over 50 Presidential flood declarations. Specifically in the Fort Knox area there are many rivers with a history of flooding, including the Ohio, Salt, and Rolling Fork Rivers, along with creeks that are susceptible to flooding that include Mill Creek and Cedar Creek.<sup>126</sup> With the ever-growing threat of climate change, there is the increased threat of flooding in the state. According to the Environmental Protection Agency (EPA), since 1958 the southeast region of the United States has experienced a 27% increase in precipitation during heavy rainstorms and annual precipitation in Kentucky has increased 5% since the first half of the 20th century; both trends are expected to continue.<sup>127</sup> The chance of flooding in the future is elevated for Fort Knox and the study area. See Map 42.

The risk of flooding in the area threatens both the installation and the development of surrounding communities while simultaneously hindering encroachment onto the base. The risk of flooding associated with the multiple rivers and creeks in the installation can pose challenges to military operations. It can affect trainings and potentially damage infrastructure. Meanwhile, urban development near the installation poses additional threats through urban flooding. Resulting from the increase in impervious surface that reduces the natural ability of the area to absorb rainfall thus magnifying hazards downstream.<sup>128</sup> The development of roads or parking lots in surrounding communities have the potential to affect the installation in this manner.





Flood risk zones do work to limit encroachment onto the installation by the surrounding communities. The rivers and streams running through and around the installation and the respective flood plains can serve to limit development on portions of land that are in proximity. Building on or near any floodplain takes considerable planning and often involves heavy regulations. These types of restrictions can help limit encroachment onto the installation and is a benefit to mission protection.

Going forward, Fort Knox should work with its nearby communities on the flooding concerns. This includes continuing to monitor any development near floodplains and working with communities to protect against flooding. This could include reducing pavement and other construction that limits natural water absorption, maintaining proper stormwater management, and development of codes to these ends.

### Wildfire

Fire is of concern due to large tracts of grass and forest lands that make up and surround the installation. 2010 was a year of reckoning with the accumulation of down timber from the 2009 ice storm and drought. Fort Knox had over 12,000 acres subject to wildfire. Working with the surrounding communities through existing mutual aid agreements, Fort Knox and several area fire departments responded to fight these fires.<sup>129</sup> Kentucky Air Guard Blackhawks using sling load water buckets assisted.<sup>130</sup> During October wildfires also occurred off post in Bullitt County near the boundary along KY 44 and Hardin County over 1,000 acres burned in agriculture lands near I-65 in the southern part of the county.<sup>131</sup> Cooperative agreements proved effective in dealing with this situation.



**Figure 45** Firefighters respond to wildfires at Fort Knox, Oct. 2010.. Photo: U.S. Army.



**Figure 46** KYANG Blackhawk assist with wildfires at Fort Knox, Oct. 2010. Photo: U.S. Army.



## Karst

A large portion of the study area landscape is a karst topography. Karst topography is described as having “...rocky ground, caves, sinkholes, underground rivers, and the absence of surface streams and lakes it results from the excavating effects of underground water on massive soluble limestone.”<sup>132</sup> The primary hazardous conditions associated with karst is sinkholes. Sinkholes are depressions in the ground that are caused by caves which become large enough that the tops extend to the surface and eventually collapse in. Sinkholes have the potential to cause both human and economic loss. This can occur through cover-collapse; where the ground above the sinkhole collapses into itself completely. When there is anything above the collapse it will be affected; infrastructure, agricultural products, and human life are all at threat. Additionally, sinkholes can have flooding, where the amount of precipitation exceeds than what can flow through the conduit and subsequently floods the surface. Again, effecting nearby infrastructure, agricultural products, and human life.<sup>133</sup>

The state of Kentucky is historically, one of the most karst prone regions in the world. The springs and wells inherent to karst landscape, provide water to many Kentucky cities. Approximately 55% of Kentucky is underlain by rocks that could develop karst, given enough time, and about 38% of the state has some karst development. The state is known to have well-developed karst features in another 25%.<sup>134</sup> This karst topography forms the Mammoth Cave System in Kentucky. The world’s longest cave system at over 400 miles in length.<sup>135</sup> The Fort Knox region is not excluded from the large presence of karst landscapes, specifically in the western half of the installation and the communities there. See Map 43. The threat of sinkholes associated with this karst is ever present.



**Figure 47 Sinkhole Flooding, Photo credit: Kentucky Geological Survey.**

Sinkholes are a threat that will inevitably hinder some operations and trainings that take place within the installation. Having to work around sinkholes that have been, or will, completely collapse or by having to avoid sinkhole flooding. However, the presence of karst landscape on the western portion of the base can be a clear influence in limiting encroachment. The presence of karst topography in the region directly surrounding the installation needs to maintain careful development and should hinder the amount of development that will reach the borders of Fort Knox. Fort Knox should work with neighboring communities to identify and educate regarding karst and sinkhole areas. With a primary focus to help avoid poor, dangerous investments and further inhibit encroachment.

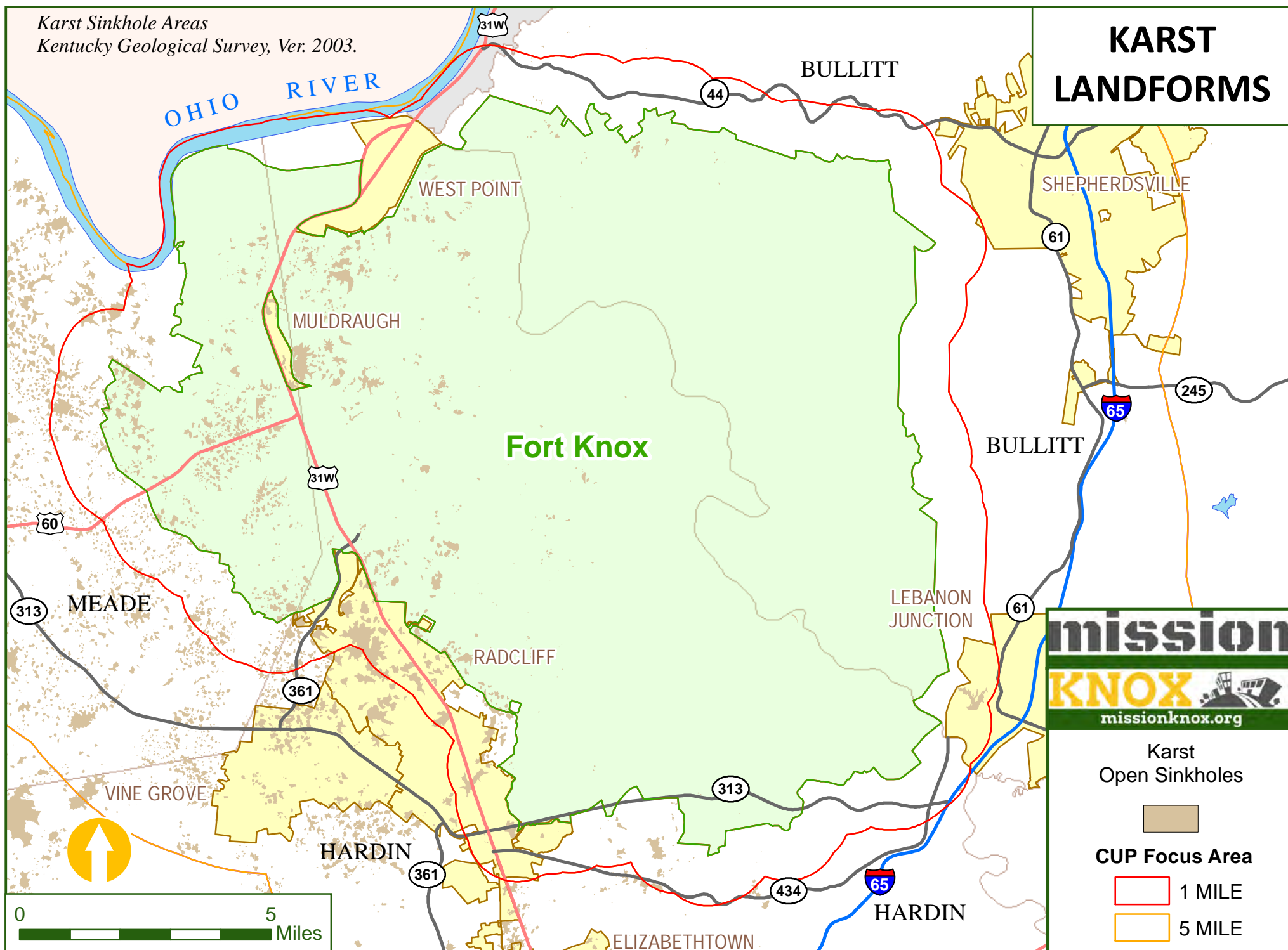
As an example, Meade County’s Subdivision Regulations contain the following regarding easements which limits construction near sink holes.

*Drainage Easements - Drainage Easements over all watercourses, drainage ways, channels, streams or sinkholes are hereby granted. Said easements are 20 feet in width, centered on each primary drain, being 10 feet[sic] on each side of said flow line or a 20-foot radius around the center of a sinkhole. The storm water easement is a non-buildable area. This does not prohibit pond or retention basin construction in the area. No building or structure may be constructed within or protrude into this non-buildable area.<sup>136</sup>*

This provides some protection but with the expansive nature of karst, larger areas of restriction could be more valuable.

Karst Sinkhole Areas  
Kentucky Geological Survey, Ver. 2003.

# KARST LANDFORMS



MAP 43 - KARST LANDFORMS

## Landslides

Landslides are flows of rock, earth, or debris due to gravity and the combination of soil, moisture, and slope angle. Landslides can either be a slow, gradual processes or an abrupt, sudden occurrence. They can be caused by hazardous weather conditions, such as rainfall, earthquakes, or erosion. They can be caused human activity, including vibrations from traffic and machinery, blasting, deforestation, and agriculture. Munitions use for training can potentially contribute to this on a localized level and could be reviewed further. The consequences of landslides are damage to infrastructure and loss of life. Landslides are estimated to cost the United States \$1 to \$2 billion annually and cause more than 25 fatalities. In Kentucky they exceed \$4 million annually.<sup>137</sup> Most landslides that occur in the state are in the mountain regions of the eastern half of the state. However, the study area has experienced several landslides in its history. A landslide inventory placed Hardin and Nelson Counties in the top 50 by the number of landslides recorded in Kentucky.<sup>138</sup>

Landslides are a hazard for the installation and the surrounding communities. The threat of landslides caused by natural weather conditions are a concern and can be detrimental to operations and development. However, landslides can also be caused by human factors. As development gets closer, especially in the Knobs area, this threat grows. At the same time continuous military operations could set off a landslide in the outside community in areas that are at risk. See Map 44. Fort Knox and the surrounding communities need to work together to avoid these hazards and any economic loss due to landslides in area. Developing an inventory of high-risk landslide areas could be of value.

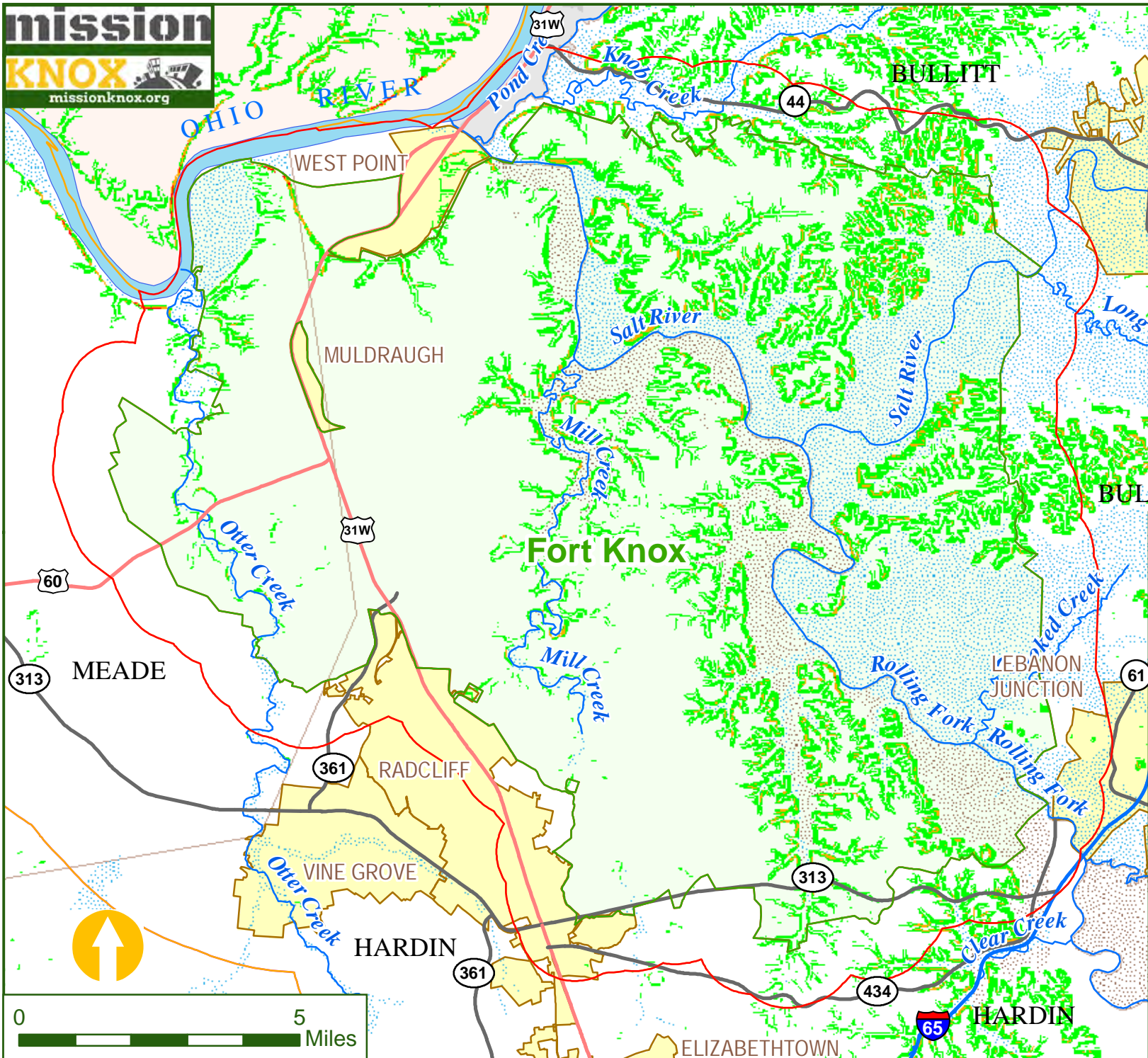
Landslides occur in areas of steep slopes, particularly in areas of unstable soils. Map 44 shows locations in the study area with slopes in excess of 5%. This is noticeable in the zone along the Muldraugh Escarpment on the west side of the Salt River and Rolling Fork. It also carries into the Knobs area. Rock falls, a type of landslide, tend to occur in areas of limestone cliffs. Road cuts tend to exacerbate this issue. Along the Bluegrass Parkway in Hardin County coming down from the Muldraugh Escarpment is very illustrative of this phenomena locally.



**Figure 48** *Rock slide along the Bluegrass Parkway. Source: Kentucky Geological Survey.*



# LANDSLIDES AREAS OF RISK



- Slopes**
- 5 - 10%
  - 11 - 15%
  - 16 - 23%

- General Geology**
- Alluvium
  - Clay, silt, sand, and gravel
  - Artificial fill

- CUP Focus Area**
- 1 MILE
  - 5 MILE

Slopes calculated from USGS, 30m DEM.  
General Geology, Kentucky Geological Survey, 2005.

**MAP 44 - LANDSLIDES - AREAS OF RISK**

### Land Development

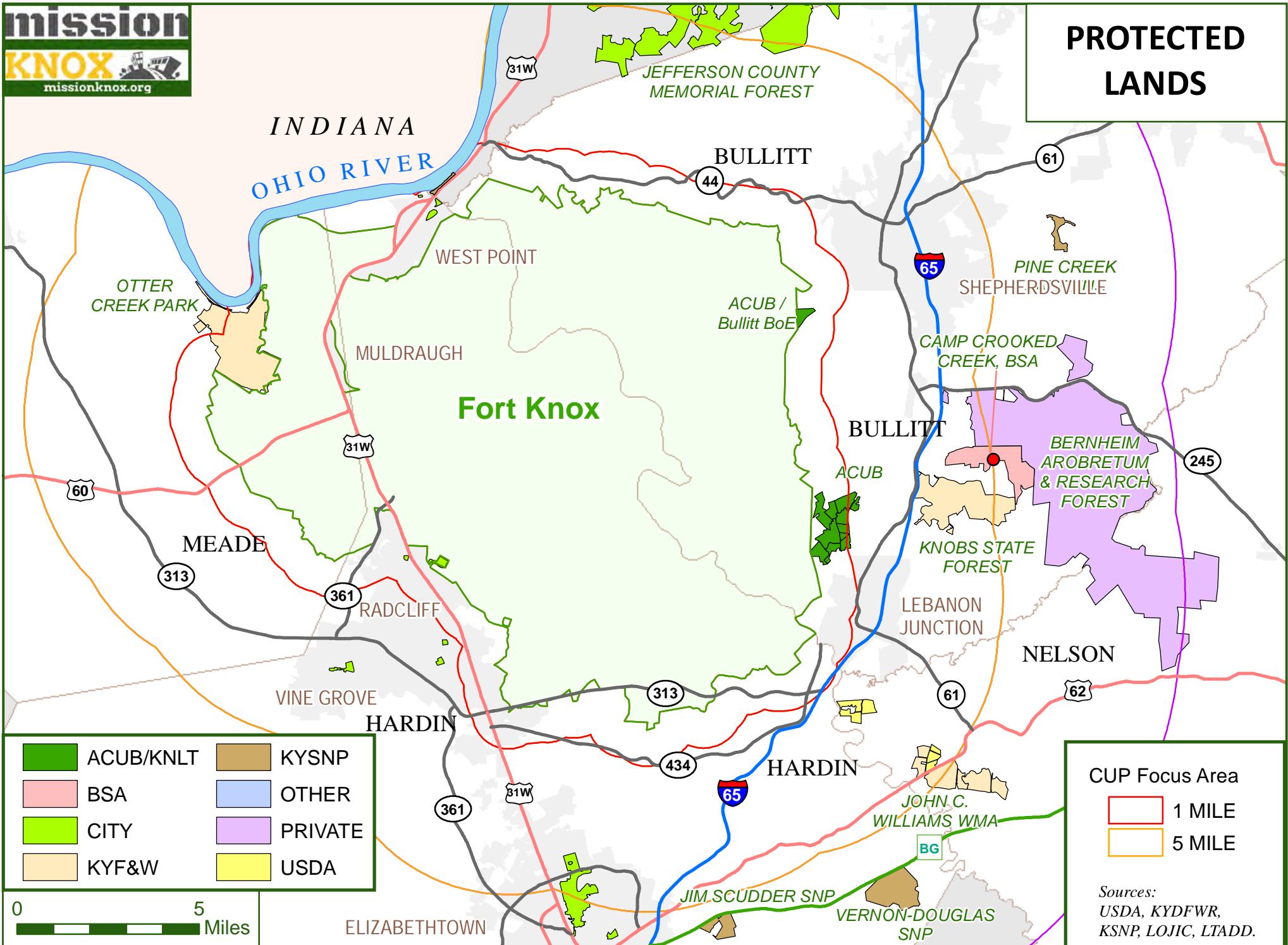
A basic concept for all compatible use is that the type of development “outside the fence” is directly related to the issues that arise that lessen mission capability. From the aspect of environmental concerns, the conversion of forest, wetlands, or agricultural land into residential, commercial, other denser types of use increase the chance of conflict between the post and the surrounding communities. The need for land use policies remains key to creating a scenario where the land can continue to be use but in ways that enhance its compatibility or at the least do not increase tensions. The continued pressures for growth in the region require careful planning by all parties. As is presented in Section IV – Compatibility Mitigation Tools, there have been several successful programs implemented in the region. These include the use of the Army Compatible Use Buffer (ACUB) program, specialized zoning in the KY 313 Buffer Corridor implemented by Hardin County Planning and Development. The Purchase of Agricultural Conservation Easements (PACE) program which assist in maintain land in agricultural use. There remain many other opportunities available for these types of programs. These are discussed further in Section IV and in Section V - Implementation Strategy.

Fort Knox has neighbors that have numerous land holdings that serve to preserve habitat and thus protect its mission footprint. These conservation lands are dedicated areas whose operations intend to protect and care for natural lands for the public good and the sustainment of the ecosystem. These neighbors include conservatories administered by several different organizations working to preserve natural places. One entity’s operations near Fort Knox, the Bernheim Arboretum and Research Forest which comprises 16,137 acres. It worked with a coterie to include Fort Knox, that created the Bernheim-

Fort Knox Wildlands Corridor. The Kentucky Natural Lands Trust (KNLT) who manages the Crooked Creek Preserve of 155 acres and other conservation easements of an additional 308 acres and The Knobs State Forest & Wildlife Management Area with 2,035 acres, managed by KDFWR and the Kentucky Division of Forestry, are also partners in this effort.<sup>139</sup> See Map 45.

This preservation is in many ways a good thing for the Fort Knox installation. It serves to limit development on land directly adjacent and provides relief from wildlife movement due to urban development. Fort Knox can be hindered by these conservatory lands by having to concern itself with operations that may have a negative effect on these lands, such as noise and air pollution.

# PROTECTED LANDS



**MAP 45 - PROTECTED LANDS**



### Loss of Agricultural Lands

Across the state and in the Fort Knox region, farming still plays a vital role in the economy. Hitting a peak of \$6.5 billion in cash receipts for the state in 2014.<sup>140</sup> A significant portion of the land in the five-mile buffer zone around the Fort Knox installation is suitable for agricultural. Predominately present on the eastern and southern edges of the installation. See Map 46. This agricultural land is characterized as being sparsely populated and having little urban development associated with it. Farmland does not often contribute to activities that can affect installation operations. This agricultural land's placement is a benefit to installation operations by limiting urban encroachment, if it remains agricultural, urban development is deterred, serving as a buffer between the installation and urban encroachment.

This does not mean that the placement of agricultural land offers no downsides. Farm operations generally do not pose some threat to Fort Knox operations, however the use of herbicide and pesticide affecting air and water quality in the installation can be of concern. Largely though, agricultural operations near the installation do better than harm for military operations.

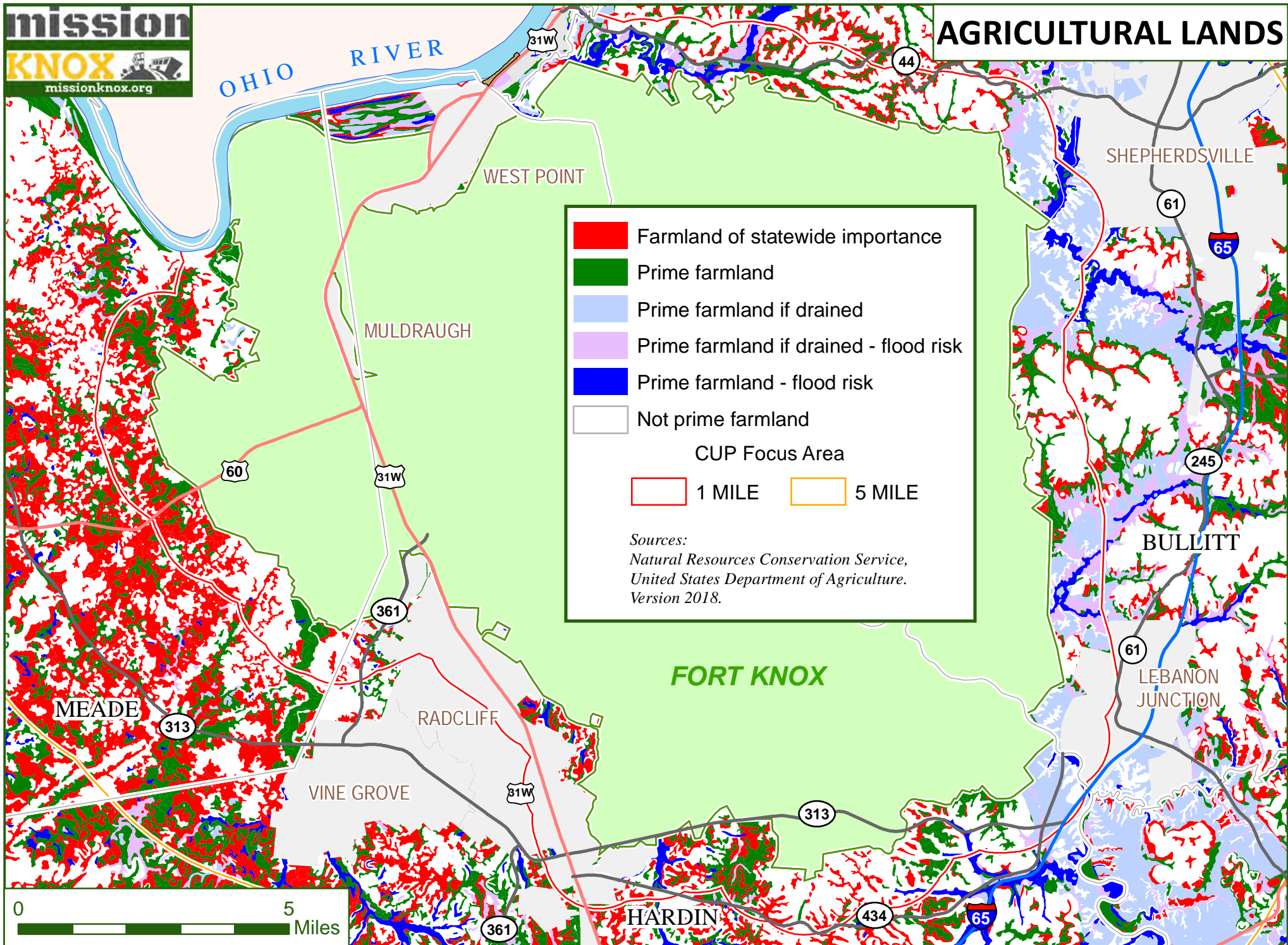
Although noise is a factor that can contribute to degradation of some types of farming, Fort Knox typically does not negatively affect farming. The larger issue is the subdividing and residential development of lands formally used for agriculture. As was previously laid out, the parcel count in the buffer zones has increased over the past several years. This is due to the creation of new residential subdivisions which are an issue with respect to compatible use. In an attempt to prevent this there are several programs that work at maintaining agricultural lands while still ensuring the owners are able to extract their investment.

Programs such as Purchase of Agricultural Conservation Easement (PACE) and Army Compatible Use Buffer (ACUB) will be addressed in Section IV, Compatibility Mitigation Tools.



*Figure 49 Tobacco in field. Source: LTADD file photo, 2013.*





### Air and Water Quality

Air quality and water quality are terms describing the standard expectations of the air and water used by humans to protect human health and public welfare. It relates to the level of pollutants in the air and the water the community uses daily. When the air or water is overrun with pollutants, it can be considered low quality. There are many reasons why both Fort Knox and the surrounding communities would strive for high standards of air and water quality. It can affect human health in a number of ways, including asthma, emphysema, chronic bronchitis, or damaged airways all from poor air quality and gastro-intestinal illness, eye infections, and increased cancer risks from poor water quality. The potential to affect things other than human health includes threatening recreational and fishing waters, or affecting crop production.<sup>141</sup> Thus, air and water quality standards are important for a community, both for physical health and the health of the environment. In the study area, the combination of the military operations and the growth of the outside community can complicate the ability to maintain air and water quality.

The installation and the communities have a level of legal responsibility to strive for high standards of air and water quality. There are two main pieces of legislation that establish this; the Clean Air Act and the Clean Water Act. The Clean Air Act is another federal law, passed in 1970, that regulates air emissions from stationary and mobile sources. It monitors the number of pollutants dispersed in the air and also sets air quality standards for the country.<sup>142</sup> The Clean Water Act was a federal law passed in 1972 that sets the standard for regulating how pollutants are discharged into waters in the United States. The law provided guidance for pollution control standards for wastewater and pollutant discharge and also set recommendations for water quality

criteria.<sup>143</sup> These standards, administered by the Environmental Protection Agency (EPA), are aimed at protecting air and water quality that will affect community development and operations.

Meanwhile, the post has the responsibility to follow the regulations of the Clean Air Act and Clean Water Act. According to the U.S. Army's Environmental Protection and Enhancement plan, army installations will: *"...comply with all legally applicable and appropriate Federal, state, and local air quality control regulations."*<sup>144</sup> and *"...comply with legally applicable and appropriate Federal, state, and local regulations regarding water resources management."*<sup>145</sup> The creates the legal standard, along with the duty to public health, and preservation of the ecosystem apply to the communities and the installation.

There are several activities the outside community and the installation do that will affect the air and water quality of the other. They include, but are not limited to, transportation activities, landfills, herbicide/pesticide application, ammunition exercises, wastewater treatment, animal waste being left, yard clippings disbursement, open detonations, open burnings, littering, ozone depleting chemicals use, and external combustion. Some of these activities are done by both groups, some are done solely by the external community, and some are done solely by the installation.

The focus for Fort Knox and the surrounding community is to limit the harm done by poor air and water quality by closely follow standards and guidance issued by the EPA and the Kentucky Energy and Environment Cabinet (EEC). These agencies establish the levels of pollutants allowed to be dispersed and enforce regulations that are enacted to protect air and water quality.

### Urban Heat Issues

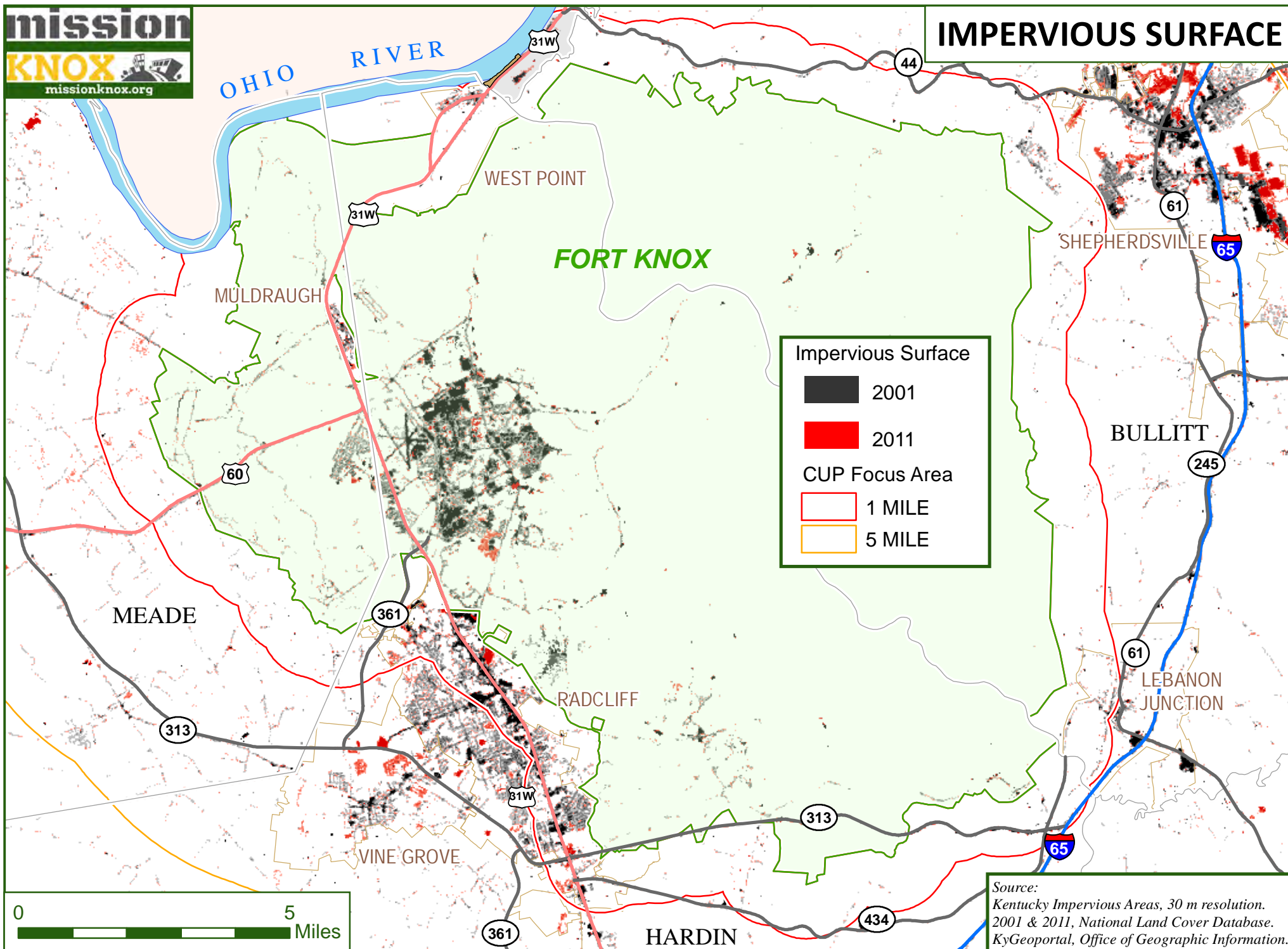
Urban heat, commonly referred to as heat islands, is urban areas with temperature significantly higher than rural areas nearby. This increased heat is due to buildings, roads, and other urban infrastructure that absorb and re-emit the radiation from the sun more than natural features such as trees and grass.<sup>146</sup>

With additional urban growth comes the destruction of features that reduce heat in an area. In nearby Louisville, parts of the city are so affected by urban heat that temperatures often reach 10 degrees warmer than other parts of the city.<sup>147</sup>

There are numerous results that occur on the urban area and on the neighboring places. These include increased energy consumption and cost, elevated air pollutant levels from energy creation, detriments to human health and comfort, and decreased water quality by increased temperature of stormwater runoff.<sup>148</sup>

The threats of urban heat looms over the Fort Knox installation as the outside community continues to develop to expand. As communities transition from rural to urban, the potential for urban heat grows in concurrence. If these communities replace trees and grassy areas with pavement and buildings, they face the possibility of increased temperatures like Louisville and other large urban areas. The effects of this may not be limited to the communities surrounding Fort Knox, the installation itself may see some consequences of the growth. This includes overflow of the heat in the surrounding urban areas to the detriment of the individuals on the installation, pollutants that find their way from the heat island sources, and the effect of increased energy cost.

Map 47 illustrates the issue via growth of impervious surfaces. Images from the National Land Cover Database compare the amount of impervious surface change between the years 2001 and 2011. This growth is easily visible even with the 30 m resolution of the product.



**MAP 47 - IMPERVIOUS SURFACE**



## Infrastructure

The availability of a highly developed infrastructure is key to attracting and maintaining a vibrant and growing community. Fort Knox in turn requires the same. Transportation networks, good and plentiful water and energy, and a nice place for families to live and enjoy themselves. As with many other factors this leads to potential conflicts. The balance of these features need to be maintained with a focus to location. New or improved roads create development, development creates housing, water, sewer, and energy demands.

### Water/Sewer

Kentucky is blessed with numerous sources of fresh water, with more miles of running water than any state except Alaska.<sup>149</sup> The limestone topography creates numerous aquifers that can also serve as water sources. Approximately 95% of Kentuckians have access to public drinking water.<sup>150</sup> In the 1990's Kentucky passed several laws to assist in the development of systems to provide drinking water to all its citizens. The four-county study area is covered by 16 separate water utilities. Some of these cross-county boundaries. Within the five-mile buffer zone, eleven of these systems provide service to some portion. Fort Knox's system is currently managed by Hardin County Water District #1. See Table 22.

**Table 22 Water Utilities**

STUDY AREA WATER UTILITIES						
	Households Served				Buffer	
	Bullitt	Hardin	Meade	Nelson	1 Mile	5 Mile
Lebanon Junction	922			10	X	X
Louisville Water Company	18,375			1	X	X
Hardin County Water District #1		11,139	227		X	X
Fort Knox	3	1,715	1,230			
Hardin County Water District #2		27,277			X	X
Vine Grove Water Dept.		1,852				X
West Point Water Dept.		473			X	
Doe Valley Utilities Inc.			796			X
Meade County Water District		14	3,211		X	X
Muldraugh Water			537		X	
Bardstown Municipal Water Dept.		157		10,519		X

Source: Kentucky Infrastructure Authority, WRIS Portal

Sewer is primarily provided in the incorporated cities of the study area. With a few package plants serving individual facilities such as schools or mobile home parks in the unincorporated parts of the counties. Standalone septic systems provide disposal for the remainder of the residents or commercial enterprises. See Table 23.

Residential and commercial development require access to water and waste treatment. Expansion of systems is usually costly and is done only on planned areas and typically not undertaken on spec by the systems themselves. Hookups along existing lines, however, are common as it increases customer base for basically no cost. The minimum lot size for septic can provide some resistance to denser development. Long stretches of water lines to serve a few customers can be expensive and costs are not typically recouped, but they do occur via low interest loan and grant programs thus can create further development in rural areas that otherwise might not happen. The situation of taxpayer dollars subsidizing improvements that increase

privately owned land value which is then sub-divided is of concern and an issue to be considered.

**Table 23 Sewer Utilities**

STUDY AREA SEWER UTILITIES					
	Households Served			Buffer	
	Bullitt**	Hardin	Meade	1 Mile	5 Mile
City of Lebanon Junction	705			X	X
City of Shepherdsville	5,470			X	X
City of Elizabethtown		13152		X	X
Fort Knox*					
Hardin County Water District #1 (Radcliff)		10,061		X	X
City of Vine Grove		2,088	2		X
City of West Point		445		X	
Doe Valley Association Inc.			813		X
City of Muldraugh			532	X	

Source: Kentucky Infrastructure Authority, WRIS Portal

\*No data available. Can be presumed to approximate water system to slightly fewer.

Fort Knox Wastewater Treatment Plant processes waste for the City of Muldraugh's collection system.

\*\* There are two additional package plants that serve small mobile home parks in the 5 mile buffer area.

## Transportation

In the Regional and Community Profiles, Section I, several roadway improvements were highlighted that were important for the viability of Fort Knox. They can, however, also create encroachment issues as land is opened up for development due to improved access. It is very important for local communities to consider the types and densities of development that may be allowed in certain areas along these major routes in the vicinity of Fort Knox.

Examples of these efforts include the KY 313 Corridor along the southern boundary of Fort Knox. By limiting the size of residential parcels, it helped to restrict residential development. This strategy has been effective as the current average parcel size in the corridor is 10.823 acres.<sup>151</sup> This is a great example of cooperation between local

government entities and Fort Knox to help protect the training capacity on Fort Knox while protecting local property owners from noise and other impacts that result from military training.

An additional example is in Bullitt County, where a portion of KY 245 has recently seen some local government influence. In April of 2021, Bullitt County Planning and Zoning implemented a tourism district on this segment of KY 245 which was established “...to provide areas in which the principal use of land is devoted to commercial establishments and resort and recreational areas which cater specifically to the needs of tourist-oriented trade.”<sup>152</sup> This section of roadway has an AADT volume between 10,000-15,000 vehicles.<sup>153</sup> It provides direct access from the City of Bardstown to I-65 and is along the route of the Kentucky Bourbon Trail. Permitted uses within this newly designated district were established to ensure that development fit harmoniously and are compatible, with inappropriate intrusion minimized. Included are new agricultural-tourism zoning classifications. This will likely reduce residential development within this portion of the study area. Additionally, the current KYTC *Six-Year Plan* has included construction funds to widen a two-mile portion of KY 245. This widening is scheduled to being in 2022 and extends westerly from the I-65 interchange, Exit 112. Research on reducing access points along this corridor to reduce congestion are also be considered.

Many areas of concern were addressed in Section I that involve growth around new and existing roadways. These include potential for residential development along KY 361 and KY 313, near the post. US 60 and KY 1882 in Meade County are also subject to this type of development. The new Exit 114 in Bullitt County, while intended to promote industrial growth such as warehousing related to logistics, has potential to encourage additional residential development in the one-

mile buffer. Any dense residential developments in these areas can also defeat the original intent of some of these roadways. To bypass existing congestion and promote overall better access.

It will be crucial for other local governments to consider similar types of policies to help protect the integrity of Fort Knox as well as landowners within the one-mile boundary of the reservation.

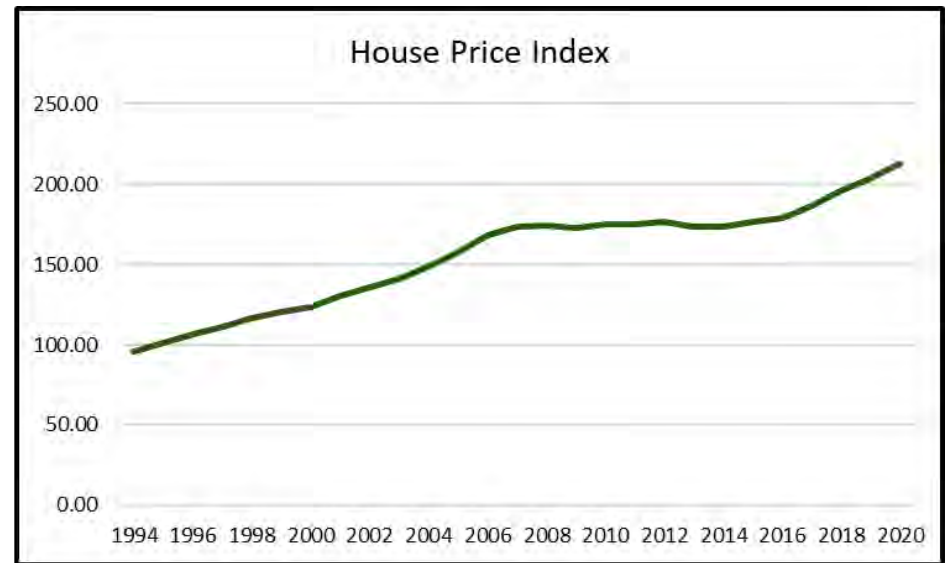
### Housing

The availability of affordable housing is an ongoing concern anywhere. The Fort Knox region has its own set of unique issues. Housing for permanent residents and a large transient population create a set of problems as the requirements for each may conflict with the other. Home prices have continued to rise. More recently it has been spurred on by a combination of demand, raw materials, uncertainties of the Covid-19 pandemic, and record low interest rates. Chart 18 shows the price index for the Elizabethtown-Fort Knox MSA over the past 16 years. A steady rise has made housing cost grow in excess of normal inflation.

Housing on the installation is privately owned and managed. There have been several new housing units built. There are currently over 2,300 homes on post.<sup>154</sup> This does not include the barracks areas for single soldiers. Currently approximately \$80 million is being used build another 60 new units and numerous renovations to existing homes.<sup>155</sup>

Section I illustrated the eb and flow of the new housing in the study area. While the need exists for housing, that must be tempered by the type and location where it is constructed.

**Chart 18 House Price Index**



U.S. Federal Housing Finance Agency. 1995 Q1 = 100.

While the need for housing exists, there are several compatibility issues associated with the need when housing outside of the installation comes into place. When private developers bring in housing closer to the installation, personnel who work at Fort Knox can utilize these houses. At the same time, the public who does not work on the installation may be eligible for this housing. There will be completion for these houses that the military personnel may not be able to compete for. Meanwhile as the public inches closer in these homes the military operations may be compromised by having to move certain operations and monitor nearby public activity. Fort Knox should continue to support development of housing on the installation for soldiers and continue to work with their neighboring communities to monitor any housing development near its borders.

## Electric Grid / Energy

### **Background**

Alternative energy, or renewable energy, are energy sources that are naturally replenishing and virtually inexhaustible, but are limited in the amount of energy that is available per unit of time. The common alternative energy sources are biomass (including wood, municipal waste, and ethanol), hydropower, geothermal, wind, and solar. In 2020, 12% of energy consumed in the United States was sourced by renewable methods. In 2000, this figure was only 6.2%, and while the number was at 6.5% in 1975, it included virtually zero solar, wind, geothermal, and biomass sources other than wood.<sup>156</sup>

The state of Kentucky's use of renewable sources trails that of the rest of the country. In 2019, only around 6.2% of Kentucky's energy consumption was fueled by renewable sources, and less than 0.3% of that was renewable sources other than biofuel and hydropower.<sup>157</sup> While the state does not have a large presence of renewable resources, it is ripe for increased renewable output; this is based on the state's natural landscape, the ongoing need for energy security, and the ongoing push to reduce greenhouse gas emissions.

Two of the most promising renewable energy sources in the region, however, also pose a threat to the harmony of Fort Knox and the surrounding communities: solar and wind power. With any new development near the Fort Knox installation and the advancement of renewable energy as a technology and a preferred energy source, solar panels and wind turbines could become more common near the installation.

### **Issues**

With any new development near the Fort Knox installation and the advancement of renewable energy as a technology and a preferred energy source, solar panels and wind turbines could become more common near the installation. Large scale infrastructure energy operations have the potential to negatively affect the operations of Fort Knox, including airspace issues, spectrum constraints, and safety concerns. The chief concern with solar energy on military operations is the threat of glare caused by solar panels that inhibits aircrafts operations. When positioned at the right place and at the right time, there is the possibility that a solar panel can reflect light that will adversely affects a manned aircraft. These can also conflict with any "dark skies" initiatives. Wind energy near the installation has two main issues. One is that the vertical height of wind turbines may create airspace issues; the number of and height of the wind turbines in an area can be a constraint on available airspace, leading to hazardous flying conditions. Additionally, spectrum capabilities such as radar can be hindered with the wind turbines. Weather or airfield radars require an unobstructed line of sight and wind turbines constructed in this line of sight may affect this. On-board or other weapons guidance systems may also be affected. The supporting electric transmission lines may provide additional issue as aerial obstructions. While beneficial toward conservation, street lighting and other utility energy saving programs are not necessarily aligned with dark skies policy and do not address glint and glare from residential solar arrays.

### **Implementation**

Fort Knox has been a leader in energy conservation and has shown success at being energy independent as necessary. In October 2018



they were able to successfully test going “off the grid”. They disconnected themselves completely from all external sources of energy becoming completely energy independent while continuing to perform all their normal activities.<sup>158</sup> This didn’t occur without prior planning and efforts. Fort Knox has worked to improve energy efficiencies in equipment, construction materials, and methods for several years. They had tried and tested many types of internal energy production. This included incinerators to burn waste, wind turbine experiments, and solar panels scattered around the post on buildings and in a separate field. The solar panels which at one point could produce over 3.5 megawatts of power are part of the overall solution. Geothermal became the backbone to this effort. In 2015 it was heating and cooling over 6 million square feet of floor space across the installation. Natural Gas also became a major part of the post’s efforts to become a net zero energy user.<sup>159</sup> All these efforts have combined to Fort Knox being recognized nationally with numerous awards and accolades resulting from their focus on energy. A small recent sample include:

2020 - Energy and Water Resilience Program Effectiveness, Secretary of the Army.<sup>160</sup>

2020 – Project Award, Federal Energy Management Awards, U.S. Department of Energy.<sup>161</sup>

2019 - Energy and Water Resilience and Individual Exceptional Performance, Secretary of the Army.<sup>162</sup>

2019 - Better Buildings Interior Lighting Campaign, U.S. Department of Energy.<sup>163</sup>

Numbers from 2015 illustrate the levels of success. 570 miles of geothermal piping tied to 6,000 geothermal wells on post, a 10-acre

solar array, in excess of \$18 million in annual savings, and a 57% savings in energy consumption.<sup>164</sup>

**Figure 50 Solar Panel Array at Fort Knox. Photo Credit: U.S. Army.**



Creating the necessary infrastructure.

There have also been successful energy stories off post. The Hardin County Landfill has had success with energy through a gas plant built onsite. Map 48. In 2005 East Kentucky Power Cooperative (EKPC) started construction on the plant which produces electricity from the methane created by the decaying trash. Working in cooperation with Nolin RECC, EKPC’s plant consisted of three generators producing about 2.4 megawatts of power.<sup>165</sup> In 2012 the County netted approximately \$140,000 of the \$176,000 generated from the carbon credits program over a three-quarter period.<sup>166</sup>



**Figure 51 Pearl Hollow Landfill Entrance. Photo Credit: Hardin County Fiscal Court.**

Issue in surrounding region involving LG&E pipeline expansion subject to lawsuits, solar field projects also have been sued, issues with the necessary zoning changes.

### **Future Considerations**

Recent interest in expansion of gas service in areas of Bullitt County and solar fields in Hardin County have raised compatibility concerns in this area.

In Bullitt County the extension of a Louisville Gas and Electric (LG&E) natural gas pipeline between US 31E and I-65 near the new exit 114 interchange has been proposed and challenged in the courts. Map 48. The proposed 12-mile pipeline, expected to cost \$74 million, would provide additional capacity to serve both industrial and residential customers in the area. It would cross several private properties

including lands owned by Bernheim Arboretum and Research Forest. This is being done via condemnation lawsuits that remain ongoing.<sup>167</sup> Growth in the area could occur as a result of this project, determination of the type of growth thus compatibility is an area to keep in focus.

In Hardin County, LG&E has proposed what would be the largest solar project in Kentucky. A 100-megawatt plant near Cecilia was originally planned to come online before 2024.<sup>168</sup> This project is located just outside the ten-mile buffer of the study area. See Map 49. It has become an issue locally with some local neighbor opposition. The requirements for rezoning and conditional use permitting process became a judicial issue.<sup>169</sup> There are currently 12 active solar projects in the region, two in Bullitt and ten in Hardin County.<sup>170</sup> Solar field projects have become contentious statewide, mainly due to concerns of losing agricultural lands. In February 2021 a bill was filled in the state legislature that could ban large-scale solar projects.<sup>171</sup> It would allow local governments to prohibit construction of solar arrays on farmland and further regulate some other farmland preservation programs to restrict solar arrays. Senate Bill 266 was introduced in committee but proceeded no further during the session.<sup>172</sup>

The ongoing demand for energy will continue to play a role in the region. The need for continued and enhanced communication would be beneficial to all. To completely restrict the development of solar and wind energy capabilities in the Fort Knox area would be too great a constraint on external development. Businesses and residents may want the benefits associated with these sources, thus limitations imposed by the base may cause tensions. Eliminating the possibility of renewable energy development could hinder economic and community growth for the area.

NOTE: Spatial Accuracy of this data is not valid for large scale mapping. Most is based on dated sources and at scales of 1:24,000 or smaller.

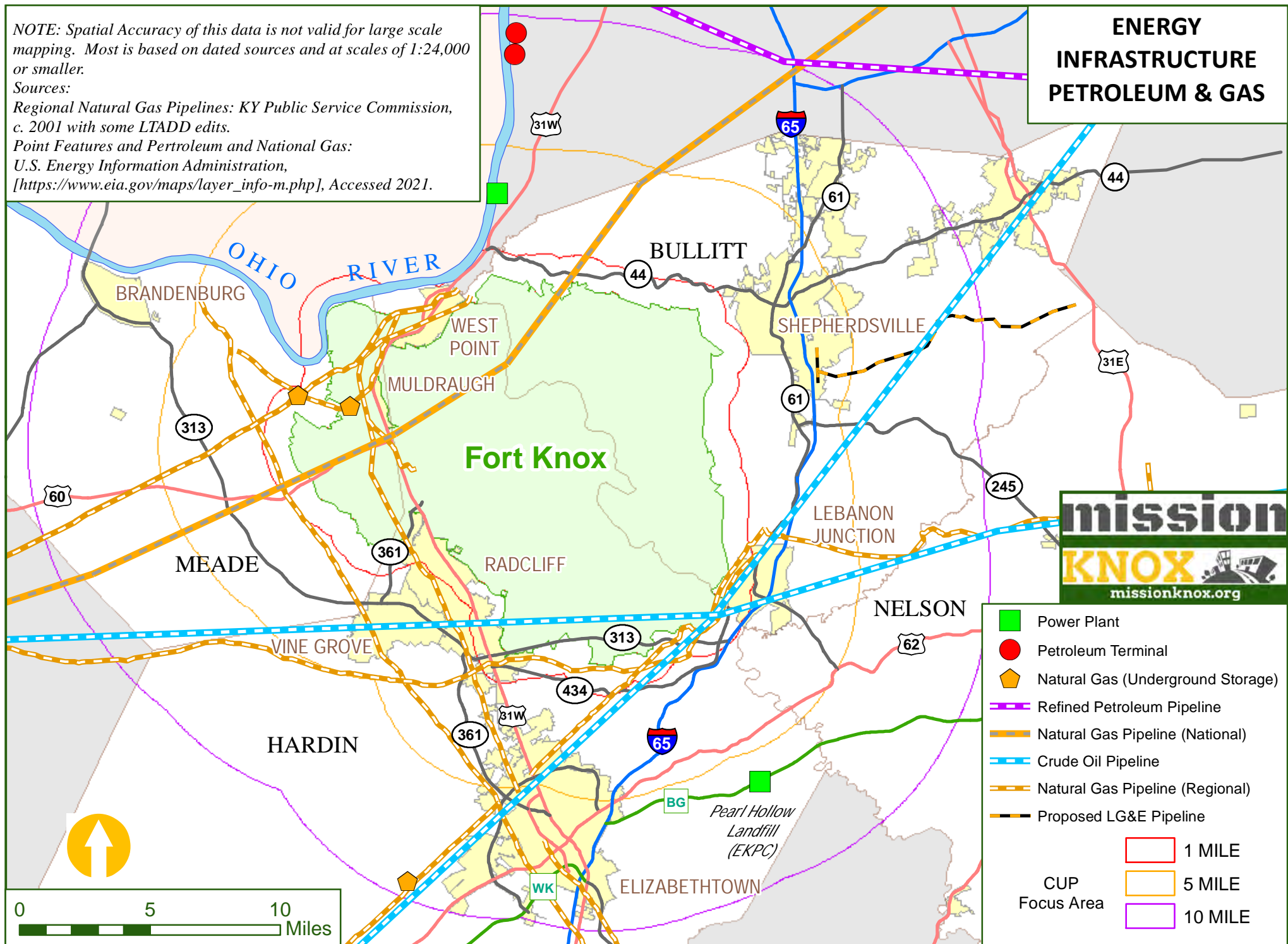
Sources:

Regional Natural Gas Pipelines: KY Public Service Commission, c. 2001 with some LTADD edits.

Point Features and Petroleum and National Gas:

U.S. Energy Information Administration, [https://www.eia.gov/maps/layer\_info-m.php], Accessed 2021.

## ENERGY INFRASTRUCTURE PETROLEUM & GAS



**MAP 48 - ENERGY INFRASTRUCTURE - PETROLEUM & GAS**

FORT KNOX COMPATIBLE USE PLAN - STUDY



NOTE: Spatial Accuracy of this data is not valid for large scale mapping. Most is based on dated sources and at scales of 1:24,000 or smaller.

Sources:

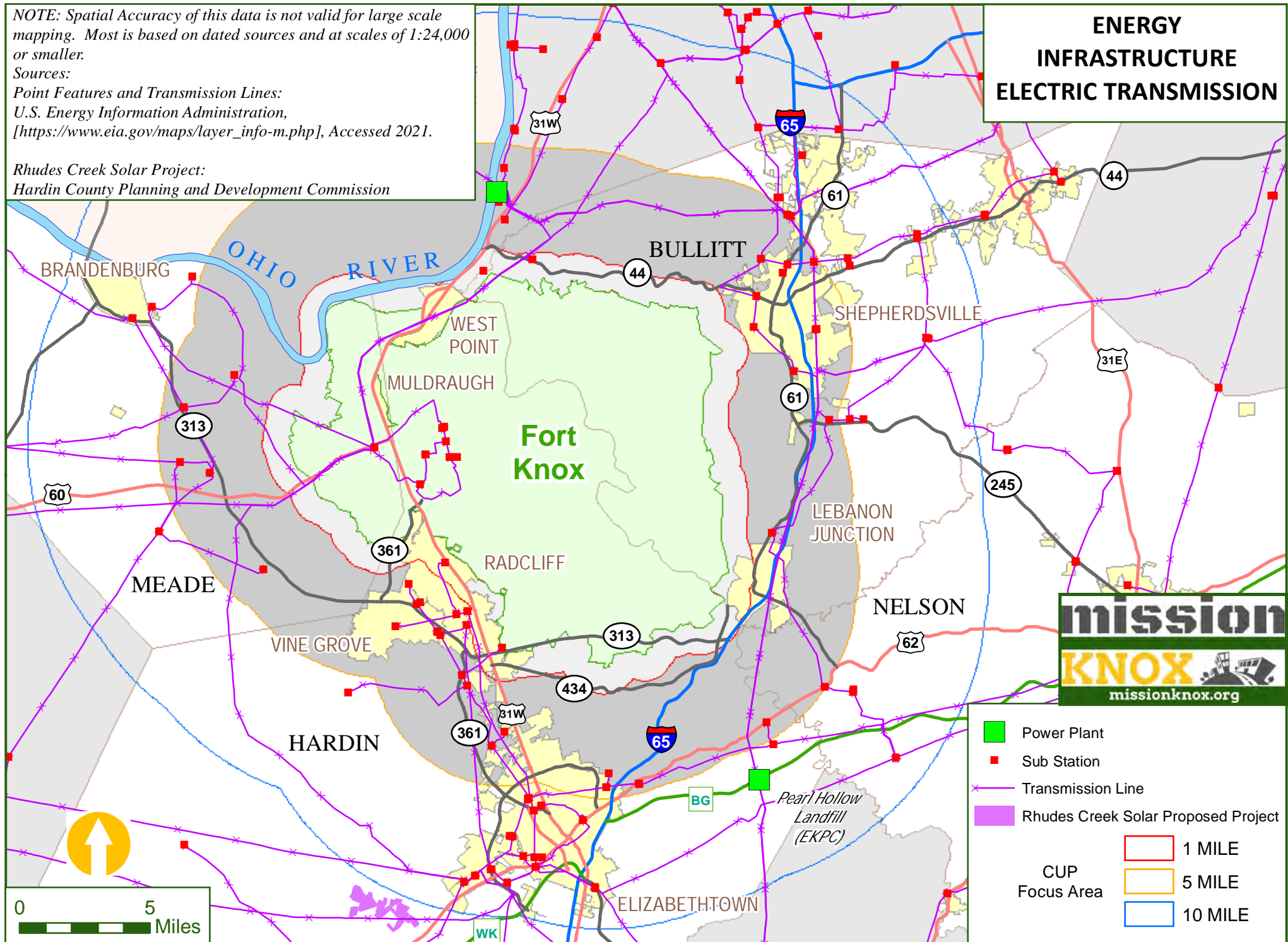
Point Features and Transmission Lines:

U.S. Energy Information Administration,  
[[https://www.eia.gov/maps/layer\\_info-m.php](https://www.eia.gov/maps/layer_info-m.php)], Accessed 2021.

Rhodes Creek Solar Project:

Hardin County Planning and Development Commission

# ENERGY INFRASTRUCTURE ELECTRIC TRANSMISSION



MAP 49 - ENERGY INFRASTRUCTURE - ELECTRIC TRANSMISSION



## Workforce / Labor Pool

As highlighted in Section II, Fort Knox has an enormous economic impact to the region. The availability of the workforce with the appropriate skill set is crucial to the continuation of current and future missions. The study area has a long history of growth and with current change dynamics on how work is completed places stress on the continued availability of this workforce.

The Elizabethtown-Ft. Knox MSA was recognized as No. 5 in the nation for Small Cities annual growth in business services jobs in NewGeography's 2016 report.<sup>173</sup> It placed 7<sup>th</sup> on the *All Cities* list in the same study. The region continues to adapt to the fluctuation in personnel, both military and civilian, at Fort Knox. The post continues to bring in small to medium-sized military units that help alleviate reductions from the past due to downsizing events such as BRAC. The most recent notable addition was in 2020 with the activation of V Corps. This brought 635 soldiers and their dependents to Fort Knox. Additional surges include the Army Cadet training for future officers which takes place on post during the summer months. This same timeframe also finds a major portion of ROTC training occurring on the installation. These incremental military increases also have brought additional civilian personnel as well boosting other sectors such as retail trade, accommodations and food services, and real estate. One result of this activity is the increased number of military spouses coming to the area. While providing an increased labor force with varied experience for business and industry to recruit from, the connection of this individual with the jobs has proven challenging. The region has been proactive in dealing with the various shortages and demands that are thus placed on the workforce. Three programs in particular highlight ongoing efforts for both Fort Knox and the region.

### III - COMPATIBILITY ISSUES

## Sector Training Focus

Currently there are 250+ open positions and job seekers in the Fort Knox local market do not possess the necessary coding skills and certifications. Thus, there are cases where defense contractors are forced to fly people in during the work week. This hurts the region's growth potential and more importantly the stability of the installation.



**Figure 52 Greater Knox Coding Academy Lab, Photo Credit: The News-Enterprise**

The Greater Knox Coding Academy was initiated as a pilot program operated by Elizabethtown Community and Technical College (ECTC) in January 2020 through a Statewide Reserve Grant administered by the Lincoln Trail Workforce Development Board (LTWDB). The Coding Academy was designed to support the civilian workforce shortages in the IT field at Ft. Knox. The Coding Academy allowed students to enter the job market within months through short term certifications in Java,

Security+, and CompTIA A+. Per discussions with Fort Knox contractors, many of these coding positions have starting annual salaries over \$65,000. In addition to the coding instruction, all students received assistance with career readiness, resume writing, job interviewing, networking, dress for success, social media, and emotional intelligence. The subsequent positive outcomes have resulted in the program continuing to be offered and has been placed on the State Eligible Training Provider List (ETPL). Of note are several companies who have supported the program with sponsorships to assist with program operations and student fees.

The Academy's creation was a collaborative effort. Partners in this initiative included ECTC, U. S. Army, KRDA, LTWDB, Local school systems in Hardin, Meade and Nelson Counties and the Kentucky Career Center - Lincoln Trail (KCC-LT).

The Coding Academy continues to focus on filling a critical shortage of IT workforce with coding skills with the Army and its contractors. Skills for positions such as network administration, systems engineers, cyber security and developers will be offered. Training on Dot Net, Microsoft, Unix, Cloud, Salesforce are examples of additional programs that are now offered. It is anticipated that this academy will continue to expand and become a talent pipeline for not only Fort Knox, but other area businesses and become a strong economic development tool for attracting businesses to the region. Covid-19 restrictions provided a few bumps along the way during the first class, but the second class began on February 16, 2021.

#### Military Spouse Employment Initiatives

KRDA has worked to develop a new process to assist military spouses relocating or currently stationed at Fort Knox. KRDA, in cooperation

with KCC-LT, LTWDB, and Fort Knox, has created an innovative, detailed model for employment assistance.<sup>174</sup>

*"Statistics say that upwards of 70 percent of job opportunities don't come from a job board but rather from professional relationships that military spouses, being new to the community, typically don't have," said KRDA CEO Brig. Gen. Retired Jim Iacocca. "We are tapping into our caring, supportive community to help our military spouses connect with organizations and people who may open the door to a new employment opportunity. As expected, the community response was immediate and overwhelming and we couldn't be more grateful."*<sup>175</sup>



**Figure 53 Spouse Career Fair, Photo Credit: Lance Cpl. Jackeline M. Perez Rivera/Marine Corps**

The KCC-LT manages the three-step process featured on the new Greater Fort Knox website: [greaterfortknox.com](http://greaterfortknox.com). Beginning with a short questionnaire, the information gathered helps match participants with an experienced KCC-LT professional who assists with the job search and any required training at no cost to the spouse.<sup>176</sup>

*“Whether it’s training, career workshops, or help finding employment, our career center team provides a one-stop shop for any employment or training needs,”* per LTWDB’s Sherry Johnson. The LTWDB is the regional oversight board for the KCC-LT.<sup>177</sup>

Subsequently in the process, military spouses will be matched with a community connector to help them grow their professional network. This can often open the door to new, professional opportunities. KRDA facilitated the recruitment of the volunteer community connectors who are providing this supplementary support.<sup>178</sup>

### Teleworking

Teleworking is a growing employment opportunity and is especially an attractive option for military spouses. The LTWDB staff is working closely with Army Community Service (ACS) and Eastern Kentucky Concentrated Employment Program (EKCEP) staff about the possibility of expanding Teleworks USA to Fort Knox.

A background from their website:

*Teleworks USA is an innovative program that is bringing cutting-edge telework (work-from-home) employment opportunities to jobseekers, especially those in rural areas and small towns, allowing them to participate in the global economy without relocating.*

*Started as Kentucky Teleworks in 2011 by the Eastern Kentucky Concentrated Employment Program, Inc. (EKCEP) as a part of the American Recovery and Reinvestment Act (ARRA), Teleworks USA has created a virtual pipeline of employment to many communities, actively recruiting national and global*

*companies to bring legitimate work-from-home jobs to people through a computer and Internet-driven virtual workplace.*

*Teleworks USA is a social-enterprise initiative of the Eastern Kentucky Concentrated Employment Program (EKCEP), Inc. (www.ekcep.org) and is a cutting-edge program that has been connecting the people of Eastern Kentucky to digital economy employment with global and national remote companies since 2015.*

*These efforts have resulted in more than 3,400 Eastern Kentuckians going to work for global and national remote employers and over \$76M in new wages being brought into the region.*<sup>179</sup>

These programs are illustrative of the continued need to develop resources and have Fort Knox and the regional communities work together.

## IV Compatibility Mitigation Tools

### Introduction

This section will examine the use of various tools available to local bodies that assist in creating an environment for promoting compatible use. Some of these programs are intentional in their efforts to assist with compatible use; while others have the desired affect even though a different purpose may be the focus of a particular program.

Specific programs were discussed and evaluated on their potential value to this region as illustrated by analysis of the gathered data. Some of these are already in use locally and those cases will be highlighted. A presentation of other tools that aren't currently being used in the study area but based on results elsewhere could be adapted to the local needs.

The tools available have varied parameters. They are implemented at different levels of government or jurisdictional authority; have a range of defined levels of permanence, and degrees of acceptance from voluntary to regulatory in nature.

### Federal Programs

The regulatory nature of land use has spawned many programs within federal agencies that can be used to assist with compatible use. Environmental programs such as the Clean Water Act via EPA, the Endangered Species Act via the U.S. Fish and Wildlife Service and NOAA, or the US Dept of Agriculture's (USDA) land set aside programs

such as Natural Resource Conservation Service's (NRCS) Agricultural Conservation Easement Program (ACEP)

### REPI & ACUB

The primary direct program within Department of Defense (DoD) that exist for assisting with compatible use at the federal level is the Readiness and Environmental Protection Integration (REPI) program and its many components. From the program's website " *The REPI Program protects these military missions by helping remove or avoid land-use conflicts near installations and addressing regulatory restrictions that inhibit military activities.*"<sup>180</sup> The promotion of these programs thru public / private partnerships serves both to protect these missions and contribute to overall preservation in particular of natural habitats. Fort Knox has implemented this program with some success in the past. In a 2007 agreement the LTADD served as the cooperative partner with Fort Knox to protect lands in the Eastern Corridor Battle Space with the Army Compatible Use Program (ACUB). In conjunction with partners such as the Kentucky Lands Trust, Bernheim Arboretum and Research Forest, and the Kentucky State Nature Preserve, over 314 acres was permanently protected at the expenditure of just over \$700,000 of DoD and Partner funds through FY 2010. Through 2019, ACUB has expended \$926,490 of DoD and \$119,231 of Partner funds to protect 462 acres that contained known habitats of the endangered Gray and Indiana bat populations and assist in restricting light pollution and other physical encroachments.<sup>181</sup> See Map 45 Protected Lands.

The REPI program also has ties with the US Dept of Agriculture (USDA) that provide opportunities to leverage dollars across programs to enhance these partnerships. The most recent example being the 2018



Farm Bill which provides funding to assist lands that are protected from development yet maintain their agricultural use. USDA's primary tool is the Agricultural Conservation Easement Program (ACEP). There are currently over 1,033 acres of farmland in the ACEP program in the study area.<sup>182</sup>

### Military Planning Documents

The AR 200-1, *Environmental Protection and Enhancement* is another tool that is provided by the Department of Defense. This Army Regulation is an overall guide for use on Army facilities and lays out policies for the protection and enhancement about environmental issues. While covering everything from pest management to munitions use on ranges, for our purposes, it also provides a tool the surrounding communities could use with regards to their own policies and procedures. It outlines various statutes, regulations, and other policy factors that could be implemented by local communities. In particular, regarding noise, it provides guidance for acceptable uses for tracts of land that fall within certain zones. It defines these areas and provides suggestions. Other areas such as cultural resources, emergency preparedness, and environmental inventory could prove useful.

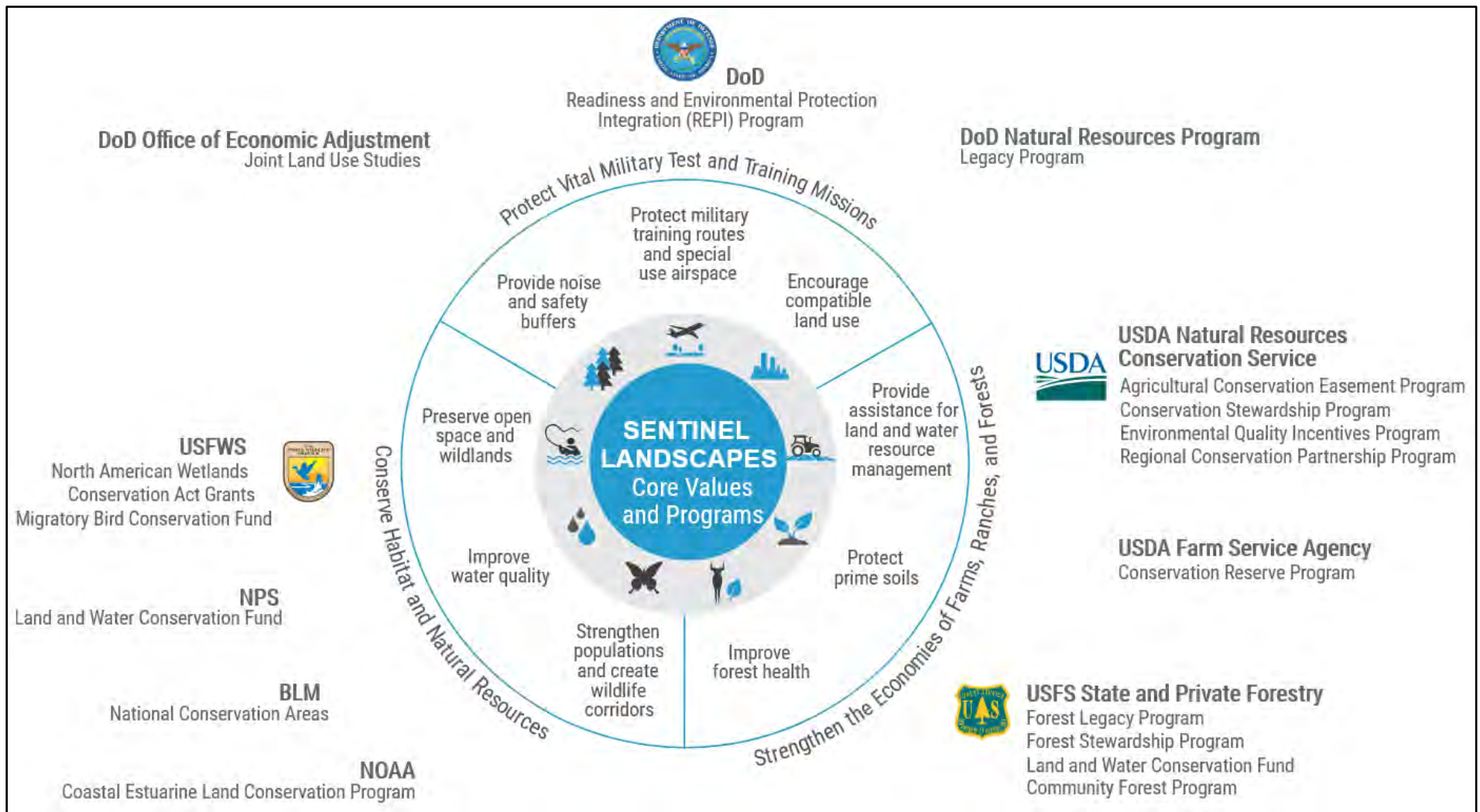
As part of Fort Knox's responsibility, they create plans to layout and mark goals. These include an Integrated Natural Resource Management Plan (INRMP) and an Integrated Cultural Resource Management Plan (ICRMP). As the names imply the Nature Resource plan focuses on ecomanagement of things such as water resources, outdoor recreation, and preservation of many types all while maintaining the military mission of the post. The Cultural Resource plan is similar in concept with focus on aspects such as archaeology,

historic buildings and landscapes, and Native American culture. Both these documents are updated annually and reevaluated every five years. They serve, however, as living documents with outlines of issues, actions, and goals that are in concert with the overlying mission of the installation.

### Sentinel Landscapes

A new program instituted in 2013 combines some of the many federal programs into a more understandable pathway for access. The Sentinel Landscapes Partnership leverages federal programs also working with state and local efforts to promote advantageous land use objectives. This program works by having an entity obtain the designation of being a Sentinel Landscape. These are granted biennially by the overarching Federal Coordinating Committee (FCC). A potential designee can be a combination of federal, state, local, and private groups with a military installation serving as part of this group. The underlying component of the program is promoting military readiness. The benefits of common purpose, communication, and funding sources can be combined to create a plan and focus area to help in creating a compatible landscape. This program will next be available in the winter of 2023 as the 2021 designations will be announced by December 2021. For FY 2019 over \$150 million was available to designees nationwide.<sup>183</sup>

The ability to combine resources and partnering provides a powerful tool to preserve and protect lands of many types. Figure 54 illustrates just the federal partners involved in this program.



**Figure 54 Sentinel Landscapes Federal Programs.** Source: [sentinellandscapes.org](http://sentinellandscapes.org)

*“In 2018, the National Defense Authorization Act (NDAA) introduced language that formally recognized the Sentinel Landscapes Partnership in statute. Under Section 317 of the NDAA, the Secretary of Agriculture and the Secretary of the Interior are encouraged to give any eligible*

*landowner or agricultural producers within a designated sentinel landscape, "priority consideration for participation in any easement, grant, or assistance program administered by that Secretary's department."”<sup>184</sup> Further information can be found at [sentinellandscapes.org](http://sentinellandscapes.org).*

## State Options

The Commonwealth of Kentucky does not currently have a state level administered program to encourage compatible use. This is an area that has a potential to allow development of such a plan. Two existing programs were reviewed to provide information and context for establishing such a program. Washington's *State Guidebook on Military and Community Compatibility* and Maryland's *JLUS Response Implementation Strategy*. Washington's plan includes guidance on creating a planning framework, the use of regulations and other planning tools and outlines of roles and assistance of state departments in assisting in the implementation and maintenance of these efforts. Maryland's was an outgrowth of the JLUS process and understanding the need for coordination on a state level to assist both the resident military components and their communities in implementing the compatible use guidance that arose from the studies. Both of these documents provide for the establishment of frameworks of stakeholders, mission identification and compatible use issues to further assist in their mitigation. Communications are key and the legislative and regulatory power that can be used for the continued success of military mission and the continues social and economic success of the communities involved.

Kentucky has a need to implement such a program. The impact of not only Fort Knox but also Fort Campbell, the Blue Grass Army Depot, and the large presence of both the National and Air National Guards and their training areas comprising over 194,000 acres in the state are important to maintain. The economic impact of \$8.2 billion in Defense spending in the state as of FY 2017 serves as a primary driver for this. The need to get legislative impetus behind this is further amplified by

the fact that the military is the largest single employer in the state with respect to ones that could physically relocate.

### PACE

A current tool that exists at the state level is the Purchase of Agricultural Conservation Easements (PACE) program. Founded in 1994, set up by KRS 262.900, et al and managed by the Department of Agriculture, it was designed to protect valuable farmland being lost to urbanization.



Figure 55 PACE, KY Dept. of Agriculture

The advantages of the program include the preservation of agricultural uses which tend to be highly compatible with military missions and continued ownership and use of the land and its economic output by the

landowner and the Agricultural resources protected in perpetuity.

Currently the program has some drawbacks due to land only being accepted into the program by donation of easements. This can be offset however, since the program is in direct partnership with both the DoD and USDA and does work with the ACUB program. Fort Campbell has had great success with this program, currently protecting over 1,500 acres around its boundary. The land around Fort Know, while not having the larger tract size and large agricultural crop presence, does contain areas with potential to use this program to good effect. There

are current easements totaling over 1,000 acres of farmland in the PACE program in Hardin and Nelson Counties.<sup>185</sup>

### Disclosures

A Real Estate Disclosure's main goal is to make a buyer aware of the current existence of such things as flood zones, various structural problems, water and sewer utilities, HOA memberships, lead paint, radon, and even knowledge of methamphetamine contamination. The awareness of military training in the vicinity of the property and the potential impacts of additional training in the in the future would seem to be an apt fit. The particular focus for noise, vibration, physical encroachment, overflights and other direct impacts to a property owner. In Kentucky, all disclosure forms are created at the state level and require approval of the Real Estate Commission for any changes and must be implemented via legislation. The Kentucky standard disclosure form is the 402 – *Seller's Disclosure of Property Conditions*. Even with a change in the state's standard disclosure form, sales of property without a realtor, sales of new homes with warranty, auctions or court supervised foreclosures do not have to use this form.<sup>186</sup> Providing mechanisms to assist buyers in understanding the area could assist in mitigating conflicts. Access to such things as locations of noise contours, future development plans, and other planning information as part of an interactive web-based interface could help make everyone more aware of the ongoing growth of their community.

See Appendix C – Real Estate Disclosures for more in-depth information and specific examples of language used.

Additional areas of focus that could be promoted and implemented at a state level include the emphasis of multi-jurisdictional planning, and promotion of water way protection programs.



## Local Options

A primary tool for local promotion of compatible use are the creation of land use policies and zoning regulations. This is primarily done through the use of Comprehensive Plans and are governed in Kentucky by KRS 100. All jurisdictions within the study area have some form of planning commission and zoning regulations. The status and some existing outcomes of some of their policies and implementations were addressed in Section I. The use of these comprehensive plans and zoning regulations to help create and maintain compatible use should be encouraged. They can play a key role in establishing a baseline and assist in making any changes also be aware of the needs of Fort Knox.

Of note is KRS 100.187, paragraph 5, regarding the contents of a comprehensive plan:

*(a) Provisions for the accommodation of all military installations greater than or equal in area to three hundred (300) acres that are:*

- 1. Contained wholly or partially within the planning unit's boundaries;*
- 2. Abutting the planning unit's boundaries; or*
- 3. Contained within or abutting any county that contains a planning unit.*

*(b) The goal of providing for the accommodation of these military installations shall be to minimize conflicts between the relevant military installations and the planning unit's residential population. These provisions shall be made after consultation with the relevant installation's command authorities to*

*determine the needs of the relevant military installation. These consultations shall include but not be limited to questions of installation expansion, environmental impact, issues of installation safety, and issues relating to air space usage, to include noise pollution, air pollution, and air safety concerns;...*

Zoning may address many things such as defined by KRS 100.201, paragraph 2. The following would have many applications towards promoting compatible use:

*"...land use and zoning regulations may be employed to provide for ..., and to prevent... the loss of life, health, or property from fire, flood, or other dangers. Land use and zoning regulations may also be employed to protect airports, highways, and other transportation facilities, public facilities, schools, public grounds, historical districts, central business districts, prime agricultural land, and other natural resources;...and to protect other specific areas of the planning unit which need special protection by the planning unit."*

This could take the form of language specifically addressing compatible use regarding requirements for:

- Awareness of noise buffers noted in development plans and subsequent subdivision plats.
- Require traffic studies to factor in access points and congestion.
- Lot size requirements to assist in lowering density.
- Creation of buffer areas for preservation of natural areas.
- Conversion of lands to public areas of compatible use.
- Outdoor lighting standards.
- Notification process for rezoning applications.

## Building Codes and Noise Attenuation

Kentucky's currently adopted Building Codes do not appear to specifically address the issue of Noise Attenuation or Abatement. The 2018 Kentucky Building Code, which was addressed in Section I, and the 2018 Kentucky Residential Code (both May 2020, 2<sup>nd</sup> Editions<sup>5</sup>) were reviewed and no mentions were found regarding noise attenuation or abatement. It is noted, as an example, that the City of Radcliff and Bullitt, Hardin, and Meade County's Comprehensive Plans list noise in relation to Fort Knox as a concern but there appears to be nothing in their respective ordinances or subdivision regulations that seem to work toward mitigation of this specific issue.

In Kentucky noise issues are routinely addressed by KYTC as part of the design of any new or reconstruction of highways. The current KYTC *Noise Analysis and Abatement Policy* addresses the need to coordinate with local officials regarding highway noise. It points out that:

*"...where local government exercises control over land development through planning and zoning ordinances, KYTC shall share predicted noise levels along highway corridors and techniques that can be used to minimize highway noise related impacts to adjacent properties." It further states that, "Noise abatement measures for properties developed ... should be considered by the local government or developer as permits and approvals for these land use changes are considered."*<sup>187</sup>

This would seem to imply that local officials, through zoning regulations, have the ability to implement noise attenuation policies.

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<sup>5</sup> Available online from the Kentucky Department of Housing, Buildings and Construction. [[https://dhbc.ky.gov/newstatic\\_info.aspx?static\\_id=297](https://dhbc.ky.gov/newstatic_info.aspx?static_id=297)].

The City of Hopkinsville, which is located less than ten miles north of Fort Campbell, has addresses noise concerns in its "Special Standards" section 158.406. It provides restrictions in an overlay zone that accounts for DNL Zones II & III. These are implemented through the creation of a Special Use District.

TABLE II Specific Development Restrictions Within SUD 41A			
Land Use Classification	APZ-2 (Allowable)	DNL Zone II (Allowable)	DNL Zone III (Allowable)
#1	NO	YES (DNL 45)	YES (DNL 45)
#2	NO	YES (DNL 45)	YES (DNL 45)
#3	NO	YES (DNL 45)	YES (DNL 45)
#4	YES	YES	YES
#5	YES/NO(1,2)	YES	YES
#6	YES/NO(1,2)	YES	YES
#7	YES/NO(1,2)	YES	YES
#8	YES	YES	YES
I-1/I-2	YES/NO(1,2)	YES	YES
RMH-1/RMH-2	NO	NO	NO
<b>Notes to table:</b>			
(1) Use is not allowable if it involves the lodging of people (transient lodging, hotels, motels, recreational vehicle parks, camp grounds).			
(2) Use is not allowable if it involves a large concentration of people. A large concentration of people is defined as a gathering of individuals in an area that would result in an average density of greater than 25 people per acre per hour during a 24-hour period, or a single event that would result in the gathering of 50 or more individuals per acre at any one time. Density averages shall be calculated per Ft. Campbell JLUS, Joint Land Use Study, dated January 1996.			
DNL < 45 Interior Day Night Noise Level of < 45dB. Noise attenuation measures incorporated into the construction of the building to bring the interior DNL to < (less than or equal to) 45dB.			

**Figure 56 Hopkinsville Noise Restrictions**

This district in turn allows the city to set standards for compatible use respecting these noise zones including buffer zones to reduce conflicts between land uses. Highlights include such things as requiring:

*“...for the location of outdoor activity areas, such as balconies and patios, on the side of the building which is sheltered from the aircraft flight path. In the designated DNL-II and DNL-III...”*

*“Sound attenuation features are built into the dwelling to bring the interior DNL of the living unit to 45 decibels or below.”*

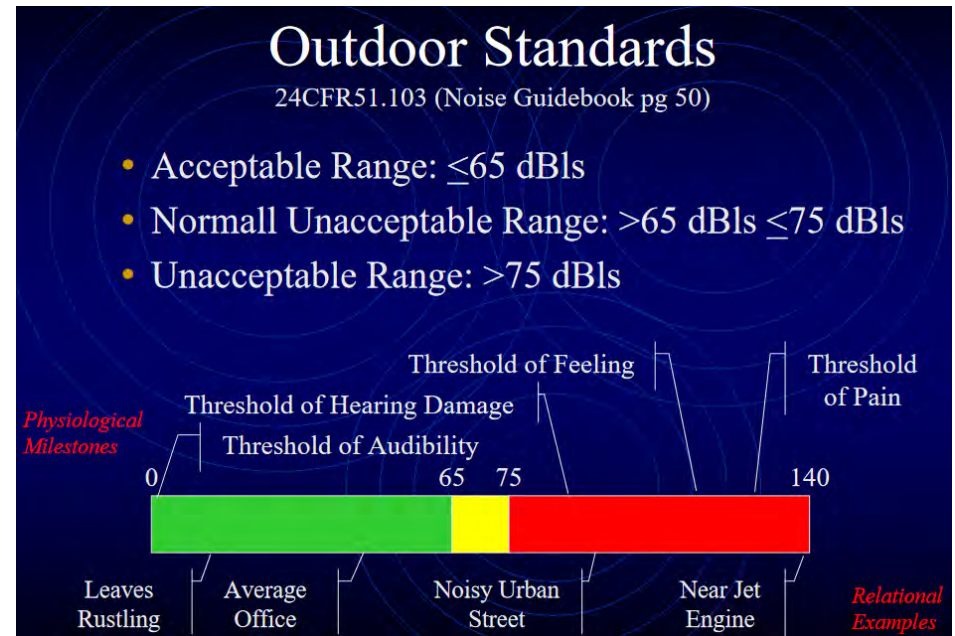
*“The contents and covenants of deeds identifies the property as being located near an airport and in a DNL-II or DNL-III zone, and the aircraft noise may affect normal livability, value and marketability of the property.”*

The full text of this section (F – H) is provided in Appendix B – Data Sources and Issues, because of its perceived value to implementation of compatible use.

The U.S. Office of Housing and Urban Development (HUD) in their noise training materials state that one of their “Noise Assessment Goals” is to:

*“Comply with Compatible Land Uses at Federal Airfields to not promote incompatible land uses within the influence of military and other federal air installations.”<sup>188</sup>*

HUD lays out policies and guidance in the “Noise Guidebook” that serves as a resource for identify noise issues, regulations, and attenuation concepts. HUD funds cannot be used for projects that are exposed to 75dB DNL or greater. If between 65 and 75dB with interior reductions and outdoor mitigation it is possible to implement.<sup>189</sup> This type of policy could be used as a base line for local policies.



**Figure 57 HUD Noise Guidebook Outdoor Standards<sup>190</sup>**

HUD also has guidance and checklist to evaluate and assist in determining if and how to proceed regarding noise issues. Their Noise Abatement and Control checklist is a useful tool for conducting an evaluation of plans to understand potential issues with projects. HUD also publishes a supplement to the *Noise Guidebook* that provides additional background and construction material factors on noise reduction capabilities based on its Sound Transmission Class (STC). The STC ratings are based on a one for one reduction of noise measured in decibels.

### Transfer Development Rights

This is legislated by KRS 100.208. Paragraph 1 lays out the outline:

*Any city, county, consolidated local government, or urban-county government which is part of a planning unit may provide, by ordinance, for:*

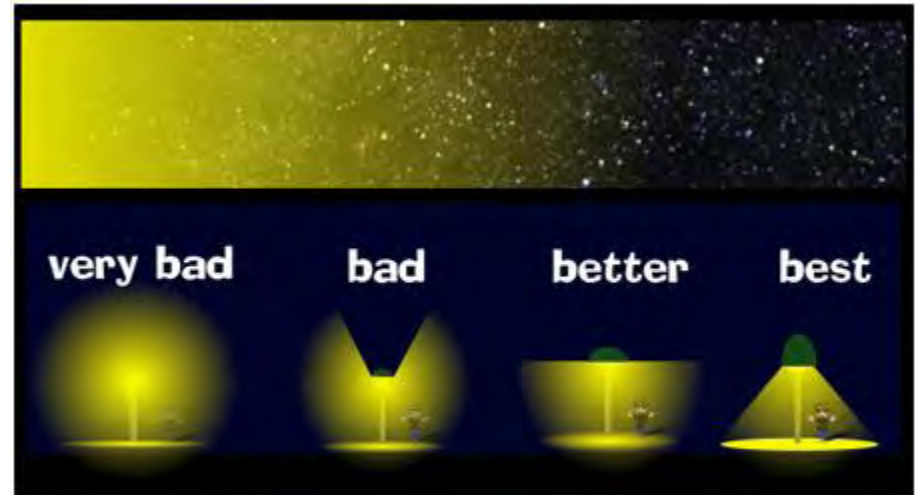
- (a) The voluntary transfer of the development rights permitted on one (1) parcel of land to another parcel of land;*
- (b) Restricting or prohibiting further development of the parcel from which development rights are transferred; and*
- (c) Increasing the density or intensity of development of the parcel to which such rights are transferred.*

The ability to trade growth from one area that needs specific protection to another that may not be a vulnerable can be an effective tool. Some aspects of this may require inter-local agreements between cities or cities and counties to be effective.

### Light Pollution

Regulating the types, style, and quantity of outdoor lighting can benefit by reducing the amount of light pollution and glare that exist. Outdoor lighting in most settings is desired to assist visually seeing things on the ground. Requiring lighting to be shielded from above does not preclude this.

An example ordinance for regulation outdoor lighting is provided by the International Dark-Sky Association. The IDA is a recognized authority



**Figure 58 Shielded Lighting.** Source: University of Florida, Extension Service.

on light pollution. They provide background and the causes, issues, and prevention of light pollution. This includes help for not only policy makers but also individual citizens. A model ordinance, which has information on establishing zones, definitions, and a basic template can be found at their website here: [www.darksky.org/our-work/lighting/public-policy/mlo/](http://www.darksky.org/our-work/lighting/public-policy/mlo/).

An interactive, light-pollution map is available at <https://www.lightpollutionmap.info> which uses VIIRS data overlaid on Microsoft Bing Map data. It may be helpful to understand the levels of light pollution in each place. As with the maps previously presented in Section III the issue of granularity or resolution of any precise location can be an issue.



The advent of LED's has allowed the additional ability to dim outdoor lighting when not needed. Reducing yet further energy costs and less light pollution. The "color" of the light source also plays a role. Reducing the blue end of the spectrum by using warmer lighting can also help with this.<sup>191</sup>

#### Military Overlay Districts (MOD)

Kentucky law does not appear to specifically address the possibility of the creation of Military Overlay Districts that could accommodate planned development and prevent rezoning within such a district. KRS 82.670, paragraph 1 provides for the creation of an overlay district in the concept of protecting: *"...the historical, cultural, architectural, aesthetic, or other distinctive characteristics of the district."* This could be an issue that could be raised legislatively as another tool to promote compatible use. In the interim, city planning units could investigate the potential use of overlay districts to protect areas *"...suitable for conservation"* such as *"...near a river or other body of water..."* as described in KRS 82.660, paragraph 1a.

Other potential zone or overlay concepts include:

Safety Zones to enable restrictions or codes to create clear areas where accident potential is greater.

Frequency Zones, areas of limited use to prevent spectrum conflicts.

Energy Zones to yield protections from wind or solar farms.

#### Land Use Recommendations

A potential aspect of any planning unit's comprehensive plan could be in inclusion of a Military Influence Planning District (MIPD). This can be

directly used to highlight the unique relationships that a local community has with Fort Knox. It can outline procedures to involve both parties. Promoting communication on issues such as land use, compatible use, conservation, and infrastructure development and needs.

#### **Urban Heat Islands**

Fort Knox and the surrounding communities can work together on this subject to deter some of the effects of urban heat if urban encroachment continues. The groups should encourage and promote smart growth that mix development and conservation strategies that will protect the natural environment and not inhibit community and economic development. This includes having a proper mix of commercial, residential, and recreational area; constructing eco-friendly buildings; making the communities walkable; and providing multiple means of transportation.<sup>192</sup> Managing urban heat islands without stifling an outside community's growth is the objective for the installation and its neighbors.

Another area of concern that plays directly into this is the issue of Stormwater. Due to increases in regulations from the EPA and the concerns raised by runoff many municipalities and other areas with dense population must adhere to stricter standards. Large areas of impermeable surfaces that contribute to heat islands also can create stormwater issues. Kentucky regulates these through MS4, municipal separate storm sewer system. Small MS4 have a population greater than 10,000 and are therefore permitted.<sup>193</sup> In turn the governing bodies must have a Kentucky Pollutant Discharge Elimination System (KPDES) permit. This will include the need to have a Stormwater

Pollution Prevention Plan (SWPPP).<sup>194</sup> These all tie into creating and maintaining a stormwater system and limiting runoff.

**Table 24 Stormwater KPDES Permit Holders**

STORMWATER KPDES PERMIT HOLDERS		
Bullitt County	Fiscal Court	MS4
Shepherdsville	Council	MS4
Hardin County	Fiscal Court	MS4
Elizabethtown	Council	MS4
Radcliff	Council	MS4
Vine Grove	Council	MS4
West Point	Council	MS4
Meade County		
Muldraugh	Council	MS4
Nelson County		

*Source: KYTC, MS4 Local Contacts List*

## Energy

To properly balance the use of renewable energy sources, Fort Knox and the surrounding communities must collaborate on any development of energy infrastructure. The construction of solar panels, wind turbines, and their supporting infrastructure being a prime example. This could include prior communication about any renewable energy development, encouraging solar developers to use glare analysis before construction, or informing the public on how aircraft trainings are conducted so they know how they could affect operations. Communication about any renewable energy development will assist in the safe and efficient training in Fort Knox and smart growth in surrounding communities. The need to include the military in the process locally would be encouraged. Because no specific requirements exist to do this, an additional opportunity here is

presented for such things as the MIPD component in each comprehensive plan. Due to the need for regulation of energy production at the state level. Involvement of the Public Service Commission to include the State’s Department of Military Affairs in this planning process would also seem to be an additional level of protection and understanding for all parties.

## Small Area Plans & Studies

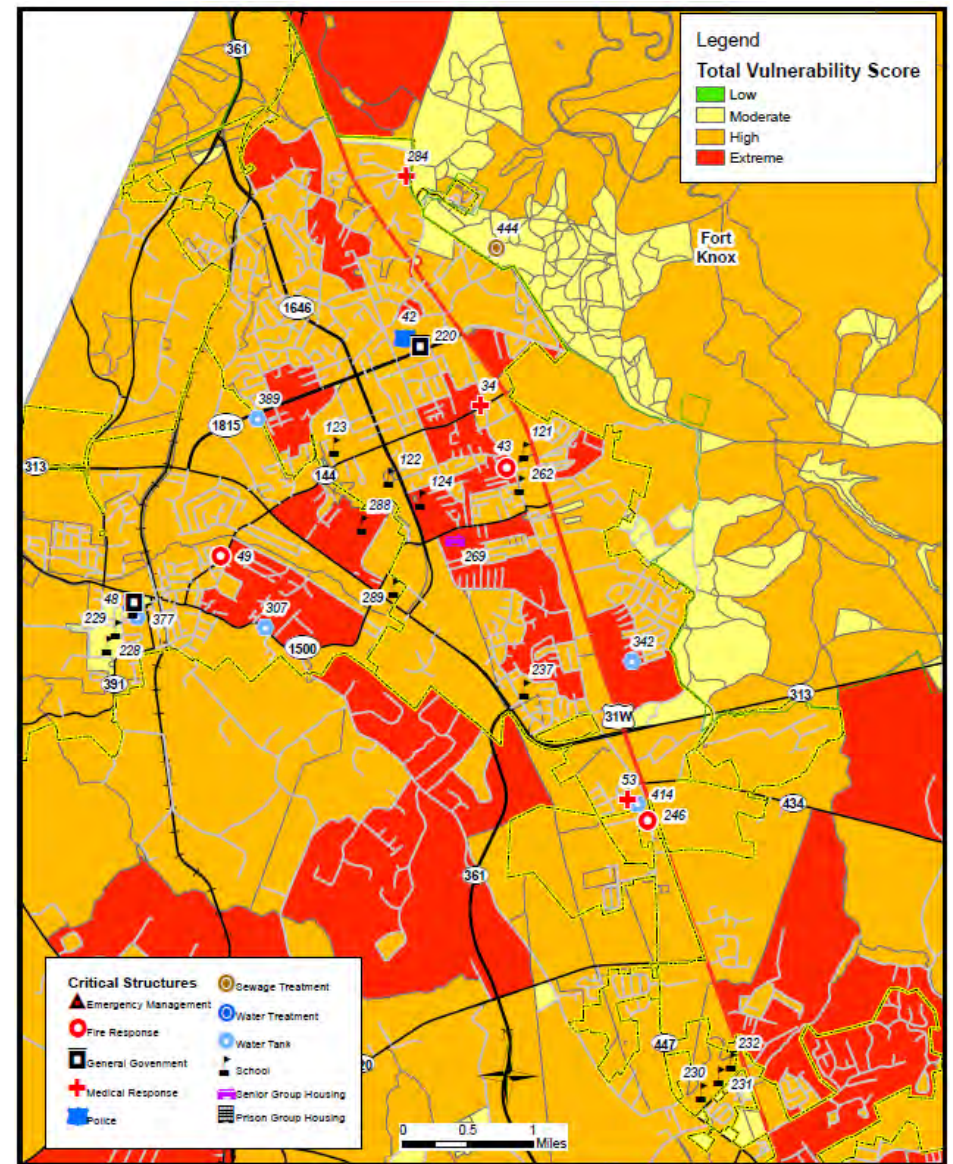
Several locations were areas of focus in Sections I & III. This included areas subject to ongoing development pressures or potential future pressures. A need to “dig deeper” into these focus areas to mitigate conflicts should be undertaken. Understandings of current zoning suitability, infrastructure costs, conservation issues, or untended growth are some types of issues that should be investigated. New roads create growth, increased densities create congestion, and the need for additional infrastructure with greater costs are a factor that should be considered.

## Compatible Land Use, Risk Assessment and Analysis

For planning purposes, an understand of what areas are most susceptible to incompatible land use would be of great benefit. The ability to look at cross sections of factors such as existing land use, zoning, noise zones, vertical obstructions, hazard exposure, proximity to adjacent issues, population density, infrastructure access, government regulatory authority, geomorphology, or even endangered or invasive species adds a level of understanding. Today, however, it is possible to review all these data simultaneously and evaluate as a whole system. The use of spatial analysis techniques, data mining, and calibrating assessment criteria on a scoring system can allow a clear picture of the situation to be viewed and understood. Creating a set of

risk scoring factors and assigning these values across the study area could assist in future land use planning and allow metrics to be established to enhance the decision-making process. Discerning that the risk of any given land use can affect both the mission of Fort Knox and the living environment of the surrounding communities, the use of such tools can only aid in adapting better solutions for a more balanced outcome.

LTADD has done this type of planning with the creation of their regional Hazard Mitigation Plan with some success. See Figure 59 showing the City of Radcliff. Assisting to evaluate the return on investment of mitigation dollars from funding sources and conveying the risk of property exposure to individual and groups of hazards. Included in this type of analysis were additional socio-economic factors that can add insights along with other factors such and at-risk facilities. These types of analysis can also aid as predictors of growth and establish areas of focus for further study.



**Figure 59 Sample Map of Natural Hazards Risk Assessment. Source: Lincoln Trail Region - Hazard Mitigation Plan 2015 Update.**

## Communication & Outreach

The need to continue with a designated body to discuss ongoing issues would appear to be an obvious need. While all parties involved, both inside and outside the fence, do cross paths by virtue of various boards, organizations, or committees, a more formal arrangement could be established.

The need to put in place policies that formally make the installation aware of proposed changes to the comprehensive plan, zoning regulations, new development plans, infrastructure expansions, etc. This could be done in the comprehensive plan, perhaps via the MIPD concept, and done through Memorandums of Understanding or Agreement (MOU -A) to facilitate these actions.

To mitigate the harm from activities not directly regulated by these groups, the installation and the communities should communicate and coordinate on any upcoming development or activities planned by either side. This will give each side the chance to voice concerns over issues that could be easily avoided given some prior knowledge. For example, a community event could be going on in a location near the installation the same day the army is planning drills that include explosions that will temporarily affect air quality all the way at the event. Coordination by both sides could bring a swift resolution to the potential issues.

Communications also need to be pushed out from Fort Knox. Unawareness of the mission, need for compatible use, or timing of some activities do sometimes become incognizant to the communities at large. Several instances of reports by local media regarding upticks

in noise levels or increases in traffic were noted during this study. The ability for topics to slip through however remain persistent.

Communication topics can include such recommendations regarding raising public awareness. This paragraph from a Corps of Engineers study regarding noise is an excellent example.

*The finding on the importance of the noise source demonstrates the value of community outreach, such as installation Armed Forces Day events and Public Affairs press releases. The role of noise sensitivity suggests that extra effort should be made to educate noise-sensitive people in advance of their moving into areas close to ranges. The most direct way to provide such education is to make the installation noise contour maps available to the general public through local planning agencies.<sup>195</sup>*

Similar solutions are made regarding ambient light issues. In another Corps of Engineer study one recommendation was to:

*Proactively work with local communities and planning agencies to implement regulations or ordinances that will ensure the installation training standards can be met.<sup>196</sup>*

Additional topics that tend to this approach include updates on noise levels, issues and regulations regarding airspace, drones, and installation access.

Access to the ICRMP, INRMP, or other studies should have any elements that are publicly available be made easily accessible. If this cannot be done through official websites due to traffic or other considerations perhaps these elements could be hosted elsewhere.



These types of planning documents are comparable to the communities' comprehensive plans and all could serve to help provide better understanding.

The Fort Knox Community Information Exchange (CIE) could perhaps be expanded, or a derivative created to help focus more on the inter-relations between the post and community. If done, marketing the availability of such a "program" would be needed. The posting of video replays of such an event could be helpful. Many local governments also broadcast their meetings on local cable and yet another chance to get the word out.

## Regional Partners

The region has long supported Fort Knox and understands the vital role it plays in the community. From the booming growth of World War II, through the Cold War era to the hot war in Vietnam. The changes brought by the end of Soviet Communism in the early 1990's and the Middle East conflicts that followed, there is an underlying understanding that Fort Knox is integral to the area's success. This has been reflected recently by the adaption and support by the communities during the turbulence of the 2005 BRAC and the departure of the storied Armor School.



**Figure 60** *Armor on the Square.* Source: *The Elizabethtown News*, c. 1943.

## **Knox Regional Development Alliance**

KRDA is a non-profit corporation founded in 2006 that works to promote the mission of Fort Knox. From their articles of incorporation, they look to work with the military to:

*“To educate and build a consensus with our business, industrial, professional, governmental and civilian communities in and around Fort Knox...”*

The overall goal to support and increase the missions in support of economic development.<sup>197</sup>

They work directly with Fort Knox, economic development authorities, business leaders, education institutions, workforce advocates, and others towards these goals. They are an active partner in all things that work toward the success of Fort Knox.

## **Area Development Districts**

The study area is covered by two separate regional planning agencies. Bullitt County falls with the service area of the Kentuckiana Regional Planning & Development Agency (KIPDA). KIPDA also has Metro-Louisville, which is Jefferson County and counties of Henry, Oldham, Spencer, Shelby, and Trimble in Kentucky. It also serves Clark and Floyd Counties in Indiana. The Lincoln Trail Area Development District (LTADD) is comprised of eight counties, three of which: Hardin, Meade, and Nelson form the core of the CUP study area around Fort Knox. LTADD also serves Breckinridge, Grayson, LaRue, Marion, and Washington Counties. These ADDs are two of 15 regional planning agencies in Kentucky. Established by statute in the 1960's, the ADDs serves to assist and guide regional planning services. The ADDs are

involved in transportation, water, land use planning and grant management across their regions. Components also include Workforce Development and training and employment services as part of the Kentucky Career Center network. The Area Agency on Aging, which coordinates services to seniors, also resides within the ADDs.

LTADD serves as a facilitator due to its regional planning approach and ties to both the communities and Fort Knox. In addition to local elected officials and community leaders, Fort Knox is also represented on the Board of Directors by the representative of Fort Knox's Commanding General, currently the Deputy Garrison Commander. This board meets monthly to review regional issues and programs that involve many of the areas covered under the auspices of compatible use.

### **Metropolitan Planning Organizations**

MPOs were created under the 1973 Federal Surface Transportation Assistance Act. The Louisville Urban Area Metropolitan Planning Organization in 1973 consist of Bullitt, Jefferson, and Oldham Counties in Kentucky and Clark and Floyd Counties in Indiana. The Radcliff-Elizabethtown MPO (REMPO) was established in 2003. MPOs are created once the planning areas population threshold exceeds 50,000. Louisville MPO was at this level in 1973 and REMPO, composed of Hardin and Meade Counties, was establish at 64,504 persons per the 2000 Census. The core functions of the MPO are the development and maintenance of a Long-Range Transportation Plan (LRTP) and a Transportation Improvement Program (TIP). The MPO is also responsible, as necessary, for dealing with issues such as air quality, freight movement, public participation, environmental justice, safety, and environmental concerns for its planning area.

Louisville MPO is managed by KIPDA and REMPO resides under the auspices of LTADD. Their Board of Directors are comprised of the County Judge/Executives and the Mayors of their respective incorporated cities and representatives of Kentucky's Secretary of Transportation. REMPO also includes representatives of the Fort Knox Commanding General.

### **Economic & Industrial Foundations**

Other key regional partners are the area's economic development agencies. They play an important role in guiding the region forward with respect to business opportunities and job creation.

**Table 25 Economic Development Agencies**

<b>STUDY AREA ECONOMIC DEVELOPMENT AGENCIES</b>	
Bullitt County	Bullitt County Economic Development Authority
Hardin County	Elizabethtown/Hardin County Industrial Foundation
Meade County	Meade County - Brandenburg Economic Development
Nelson County	Nelson County Economic Development Agency

These agencies have the ability to create and manage concepts with regard to industrial and commercial development. They create marketing plans to attract business. This in turn can drive infrastructure expansion which must be done with compatible use in mind. Having these groups integrated into any planning for compatible use is vital.

## V Implementation Strategy

*The recommendations included in this section of the Fort Knox CUP, if implemented, will assist in supporting the long-term sustainability of the operational and training missions at Fort Knox as the region's communities continue to thrive.*

### Summary

This section categorizes and organizes the recommended strategies that have been developed through collaboration with the stakeholders, to include local units of government, Fort Knox and other federal partners, state agencies, environmental and natural resource agencies, the public, and other stakeholders in the region. Since the Fort Knox CUP was developed through this joint planning effort, the recommendations represent a consensus plan and a realistic and coordinated approach to compatibility planning between Fort Knox and its surrounding communities.

The CUP recommendations incorporate a variety of actions that promote communication, education, compatible land use planning, and resource planning. With the implementation of this plan, existing and potential compatibility issues arising from the civilian/military boundary can be significantly mitigated and possibly even eliminated. The recommended strategies function as the core of the CUP document and are the direct result of the planning process.

It is important to note that the CUP is not an enforceable document, but rather a set of recommended strategies which should be implemented by the CUP stakeholders to address current and potential future compatibility issues.

To achieve the goals of the CUP, it is crucial that each entity involved in the planning process strongly consider implementing the recommendations that are applicable to their particular jurisdiction. The implementation of these policies is voluntary, and each community will determine how it will respond to these recommendations based on their individual needs and local compatibility factors.

The key to successfully implementing the recommendations of this plan will be balancing the different needs of all the involved stakeholders. Due to the geographic location of Fort Knox, there are numerous stakeholders involved in this process. The study area has four county and eight city government jurisdictions., over 117, 429 individual parcels of land, 8,658 within one mile of the installation boundary. property holders, and a population of over 270,000 people.



To produce a sensible plan, several guidelines were used as the basis for developing the recommended strategies. They include:

- Recommended strategies must not result in a taking of property value, meaning they do not render the property undevelopable or unable to achieve economic gain by removing all development rights of the property, as defined by state law. The use of eminent domain, defined as a government entity taking private property, with compensation, for public use, is not included in any of the recommended strategies.
- In some cases, the recommended strategies can only be implemented with new enabling legislation.
- To minimize regulation, many of the strategies are only recommended within the specific geographic area for which the issue they address may occur e.g., properties conterminous to the post or within a certain distance, instead of implementation throughout the entire CUP study area.
- Like other planning processes that include numerous stakeholders, the challenge is to create a solution or strategy that meets the needs of all parties. In lieu of eliminating strategies that do not have 100 percent buy-in from all stakeholders, it was determined that the solution/ strategy may result in the creation of multiple strategies that address the same issue but tailored to individual jurisdictional circumstances.
- Since this CUP is meant to be a “living document” and state and federal regulations are subject to change, prior to

implementation of a recommendation included in the CUP, the implementing jurisdiction or party should ensure there is no conflict between the strategy and any existing local, state, or federal law.

A wide range of recommendations were developed for consideration by local governments and other stakeholders in the CUP study area. The recommendations can involve either individual or multiple parties to implement.

The recommendations are a result of the findings and inputs of the participants involved in the study.

Recommendation	Category	Timeframe	Priority	Responsible Party	ROI	Issues
Creation of a state level guidebook dealing with economic development, preservation, and compatible use concepts as they relate to military installations. Use of Washington's <i>State Guidebook on Military and Community Compatibility</i> and Maryland's <i>JLUS Response Implementation Strategy</i> as reference documents. Contents could include sample documents to assist local officials with implementing strategies to protect and preserve military installations.	Statewide	Short	High	Kentucky Dept. of Military Affairs in conjunction with appropriate state agencies and regional planning elements of Area Development Districts.	High	Future BRAC rounds, funding, coordination with military partners. Involvement of state legislature. Would need annual updates. Research effort involved with associated cost.
Establish an consortium to apply for Sentinel Landscape status. Critical to access available funding sources through coordination.	Regional	Short	High	Regional and Local Partners in conjunction with Fort Knox.	High	Long term planning effort requires impetus for future rewards. In preparation for next round of application to become a designee. Jan. 2023. Research effort involved with associated cost.
In conjunction look to REPI (ACUB, et al) program in the interim if more immediate results are possible to facilitate creation of additional buffer lands. Update the ACUB Priority Areas to reflect current planning.	Regional	Short	High	Fort Knox in conjunction with regional partners	High	Annual applications to Service Headquarters July - September timeframe.
Access to Fort Knox Management Plans and related data such as noise contours that can assist local planners in updating their comprehensive plans and ordinances to promote compatible use.	Regional	Short	Medium	Fort Knox in conjunction with LTADD to host documents.	Medium	Documents must be sanitized for any restricted content. Updates must be made as they occur.
Coordinate with KY Dept. of Agriculture, local Natural Resources Conservation Service offices, and the KY State Conservationist to promote and facilitate use of the dollars available for USDA ACEP and KY's PACE programs for preservation of agricultural lands.	Regional	Long	Medium	Fort Knox in conjunction with regional partners	Medium	Customize marketing to land holdings of particular interest to maximize success potential.
Review options to highlight military training issues on real estate disclosure forms. Noise, dust, overflights, etc.	Statewide	Long	Medium	Kentucky Dept. of Military Affairs and Kentucky Real Estate Commission in conjunction regional partners.	Medium	Concerns of opposition from Chambers of Commerce and Realtor organizations. Political process required.

Recommendation	Category	Timeframe	Priority	Responsible Party	ROI	Issues
Modify Comprehensive Plans to acknowledge the concepts of Compatible Use and cooperation with Fort Knox on future land use planning. Perhaps using the concept of the Military Influence Planning District (MIPD).	Local	Short	High	Local Planning Organizations working with Fort Knox.	High	Need to work with local planners during regular five year update process to educate and make samples available.
Create Zoning ordinances reflecting the need to attenuate noise, restrict types of outdoor lighting,	Local	Medium	High	Local Planning Organizations working with Fort Knox.	Medium	Need to create toolbox of sample templates to assist planners in adoption.
Creation of overlay zones or districts around Fort Knox to promote compatible uses.	Local	Medium	High	Local Planning Organizations working with Fort Knox.	High	Education required regarding types, uses, and implementation methods.
Update subdivision regulations to promote noise and light abatement to minimize the impacts of each.	Local	Medium	High	Local Planning Organizations working with Fort Knox.	Medium	Need to create toolbox of sample templates to assist planners in adoption.
Form coalition group to meet on regular basis to review issues with respect to compatible use. Develop a unified approach to enhancing communication and land use coordination between Fort Knox and local governments in the region. This group would provide oversight for the implementation of the CUP.	Regional	Short	High	Fort Knox in conjunction with regional partners	High	Create MOU or agreements to have representation and participation. Standalone or under umbrella of other existing organization. Communication effort needs ongoing interaction between parties.
Update zoning or other applicable ordinances to reflect ability for Transfer Development Rights, create programs and polices to promote this alternate where appropriate.	Local	Medium	Low	Local Planning Organizations	Medium	Education required regarding types, uses, and implementation methods.
Creation of "Dark Skies" ordinances to mitigate light pollution.	Local	Medium	Low	Local Planning Organizations	Medium	Need to create toolbox of sample templates to assist planners in adoption.
Conduct review of existing plans of areas within the one-mile buffer for compatible use. Modify as possible to mitigate conflicts.	Local	Medium	High	Local Planning Organizations	Medium	Need to work with local planners during regular five year update process to educate and make samples available.

Recommendation	Category	Timeframe	Priority	Responsible Party	ROI	Issues
Reevaluate Future Land Use Maps with regards to compatible use. Modify to bring in line with these concepts.	Local	Medium	High	Local Planning Organizations	Medium	Need to work with local planners during regular five year update process to educate and make samples available.
Establish MOU's between Planning Organizations and Fort Knox to provide points of contact and direct notification of development plans, rezonings, ordinance changes and comprehensive plan updates within the study area buffer zones. This would include tower siting and energy projects in addition to traditional industrial, commercial, or residential development.	Local	Short	High	Local Planning Organizations in conjunction with Fort Knox.	High	Communication effort needs ongoing interaction between parties.
Implement buffer zones similar the KY 313 Corridor Buffer to lessen density of development in the one-mile buffer zone. Corridors to review include portions of KY highways in Bullitt (44, 61, 251, 434), Hardin (361), Meade (1238, 1500, 1638, 1816, 1882), and Nelson (61).	Local	Short	High	Local Planning Organizations in conjunction with Fort Knox.	High	Need to create toolbox of sample templates to assist planners in adoption.
Create an Air Installation Compatible Use Zone and/or Air Safety Zone as part of comprehensive plan and zoning ordinances. To account for overflight and approach zones.	Local	Medium	Low	Muldraugh, Radcliff.	Medium	The increase use of due to the new DAGIR may also want to be considered by Bullitt & Hardin Counties and Lebanon Junction.
Create a Frequency MOU between Fort Knox and local jurisdictions to define potential issues with frequency interference.	Local	Medium	Low	Fort Knox and Local Governments.	Low	Need to create toolbox of sample templates to assist planners in adoption.
Work with local builders and developers to understand and include materials with STC ratings sufficient to provide noise attenuation in areas of increased risk of exposure.	Regional	Long	Medium	Planning Organizations.	Low	Education issue. Need interaction between developers and planning agencies.
Create or adopt standardized GIS mapping standards for consistency across datasets with respect to parcels, zoning, land use, structure points, and boundary records. This would include spatial accuracy, topology, scale, and attribution fields.	Regional	Long	Medium	Local Governments and regional planning agencies.	Medium	Some standards exist that are adoptable, some agencies would defer to state control. e.g. Property Valuation Administrators to Kentucky Revenue Cabinet.



Recommendation	Category	Timeframe	Priority	Responsible Party	ROI	Issues
Create standardize compliant and response forms and a clearing house to compile data in order to track and facilitate appropriate entity to respond to issue. This is with respect to noise, encroachment, overflights, pollution, or other factors.	Regional	Long	High	Fort Knox in coordination with Local Governments.	Medium	Communication effort needs ongoing interaction between parties.
Revisit or create new inter-local agreements regarding emergency response to natural or man-made hazards. Need to include notification and training procedures.	Regional	Medium	High	Fort Knox in coordination with Local Governments.	Medium	Communication effort needs ongoing interaction between parties. Work as part of FEMA Hazard Mitigation and Resiliency Efforts. Research effort involved with associated cost.
Create a One-Stop online website for information regarding Compatible Use. To including ongoing meeting information, data (to include geospatial) and record sources, polices and procedures, best practice documents, contact information.	Regional	Medium	High	Fort Knox in coordination with Local Governments and regional planning agencies.	High	Communication effort needs ongoing interaction between parties. Standup and maintenance effort involved with associated cost.
Create online building permit tracking database to facilitate understanding of growth and potential issues.	Local	Long	Low	Regional Planning Agency in coordination with Local Planning Organizations.	Low	Communication effort needs ongoing interaction between parties.
Create education components with regard to the use of lasers and drones. Publish through website, local media, and make available to education facilities.	Regional	Medium	Low	Regional Planning Agency in conjunction with Fort Knox	Low	Communication effort needs ongoing interaction between parties.
Perform risk analysis and assessment on the one and five-mile buffers to determine areas most at risk for incompatible use and land most favorable for conservation easements or other types of mitigation efforts.	Regional	Medium	Medium	Regional Planning Agency in coordination with Local Planning Organizations.	Medium	Research effort involved with associated cost.
Evaluate annexations with compatible use as a factor. Understanding the long term cost of infrastructure extension, maintenance, or stress.	Local	Ongoing	Medium	Local Planning Organizations in conjunction with Fort Knox.	High	Communication and education effort.

Recommendation	Category	Timeframe	Priority	Responsible Party	ROI	Issues
Expand or create separate Fort Knox Community Information Exchange to topics and issues that "cross the fence".	Regional	Ongoing	Medium	Fort Knox in coordination with Local Governments and Local Media.	Low	Communication effort needs ongoing interaction between parties.
Conduct a current housing market analysis within the CUP Study Area to determine the current market threshold for housing and price points.	Regional	Medium	Low	Regional Planning Agency in cooperation with Real Estate Developers and Builders.	Low	Research effort involved with associated cost.
Add notice to construction permitting process to make applicants aware of proximity to active military installation and the various issues (noise, dust, etc.) that might entail.	Local	Short	Low	Local Planning Organizations in conjunction with Fort Knox.	Low	Need to create toolbox of sample templates to assist planners in adoption.

## Appendix A: Public Outreach

### News and Opinion Articles in Local Media

#### Press Releases - Samples

#### Initial Public Meetings and Survey Results and Analysis

#### Draft Study - Survey Results and Analysis

#### Fast Facts Information Handouts

*What is MissionKnox?*

*Compatibility Issues*

*The Importance of Fort Knox*

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### News Story

10 Nov. 2019, Mary Alford, *Sustainability between Fort Knox, area communities being researched*, The News-Enterprise, [https://www.thenewsenterprise.com/news/local/sustainability-between-fort-knox-area-communities-beingresearched/article\_1789bf1f-78c6-5b46-ba7a-3fea6c6d8c88.html].

12 Nov. 2019, *Meeting Nov. 13 to discuss Fort Knox growth*, The Pioneer News

25 Nov. 2019, Thomas Barr, *Fort Knox looking for feedback from the community*, The Pioneer News,

### APPENDICES

5 Dec. 2019, Chad Hobbs, *Mission Knox and Compatible Use Plan meeting*, The Meade County Messenger.

7 Oct. 2021, Gina Clear, *Effort helps communities, Fort Knox find common ground*, The News-Enterprise, [https://www.thenewsenterprise.com/news/local/effort-helps-communities-fort-knox-find-common-ground/article\_4f63cd01-48d5-52ef-b65e-8c884e35a8ce.html]. This story was also linked on oldcc.gov, 12 Oct. 2021.

7 Oct. 2021, *Lincoln Trail Development District Releases Mission Knox Draft Study*, The Meade County Messenger.

### Opinion

27 Nov. 2019, Editorial Board, *New mission underway*, The News-Enterprise, [http://www.thenewsenterprise.com/opinion/editorials/new-mission-underway/article\_c13ef293-f15b-574c-a4a6-a16b8cb1e646.html].

5 Nov. 2020, Jim Iacocca, *Compatible Use Planning Makes for Good Neighbors*, Knox Regional Development Alliance, [https://growknox.org/good-neighbors/].

22 Oct. 2021, Editorial Board, *Compatibility makes for good neighbors*, The News-Enterprise, [https://www.thenewsenterprise.com/opinion/editorials/compatibility-makes-for-good-neighbors/article\_6948043f-bac9-53ab-b9e3-9bc640d63947.html]

**For Immediate Release**

**Contact:** Krista Levee  
270-769-2393  
[krista@ltadd.org](mailto:krista@ltadd.org)

**Lincoln Trail Area Development District to conduct  
Mission Knox Study**

*Study aims to ensure regional and military sustainability*

**ELIZABETHTOWN, KY**– The Lincoln Trail Area Development District (LTADD) is conducting a Compatible Use Plan (CUP) study that aims to ensure local and regional sustainability between Fort Knox and its civilian neighboring communities. The CUP process is a collaborative effort between the Fort Knox Military Installation, local and state government, private citizens and other interested stakeholders.

The study area intersects several counties and municipalities in the region including the counties of Bullitt, Hardin, Meade and Nelson. "It's great that Fort Knox includes the communities in drafting a plan for future growth," said Jerry Summers, Bullitt County Judge-Executive. The study is intended to evaluate military issues that interfere with daily civilian life and to evaluate civilian development that might hinder the mission of Fort Knox.

The study will include several public participation meetings. "This is a great opportunity to provide input," said Col. CJ King, Fort Knox Garrison Commander. "It'll help provide a better understanding of considerations to bear in mind and chart a way ahead that ultimately serves to benefit the military mission and community at-large." There will be two geographical locations to provide a broader opportunity for attendance. The materials presented will be the same. The first public meetings will occur in November. Choose the date and location most convenient for you...

**Thursday, November 7, 2019**

5:00 PM – 7:00 PM  
Colvin Community Center  
230 Freedoms Way  
Radcliff, KY 40160

**Wednesday, November 13, 2019**

5:00 PM – 7:00PM  
Shepherdsville City Hall  
634 Conestoga Parkway  
Shepherdsville, KY 40165

If residents are unable to attend, an online public survey will be open and available during the month of November for residents to provide input. To learn more about Mission Knox and the Compatible Use Plan study, including meeting times and locations, please visit [www.missionknox.org](http://www.missionknox.org) or visit the Mission Knox Facebook page.

Upon request, any persons requiring special needs assistance should contact Colvin Community Center at 270-351-4079 for the Radcliff location or Shepherdsville City Hall at 502-543-2923 at least three business days prior to the meeting. The TTY number for the hearing impaired is 1-800-648-6056 or dial 711.



## **For Immediate Release**

**Contact:** Krista Levee  
270-769-2393  
[krista@ltadd.org](mailto:krista@ltadd.org)

The Compatible Use Program is a federally funded program administered by the Department of Defense (DoD) and Office of Economic Adjustment (OEA) to promote collaboration and cooperation among the Military, surrounding jurisdictions, community stakeholders, and states.

# # #

### **ABOUT LINCOLN TRAIL AREA DEVELOPMENT DISTRICT**

The Lincoln Trail Area Development District (LTADD) is one of Kentucky's fifteen Area Development Districts created by KRS 147A in 1972, by the Kentucky General Assembly. The LTADD serves the communities of Breckinridge, Grayson, Hardin, LaRue, Marion, Meade, Nelson, and Washington counties.

**For Immediate Release**  
**October 30, 2019**

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The study area intersects several counties and municipalities in the region including the counties of Bullitt, Hardin, Meade and Nelson. "Fort Knox and our neighboring communities have a long history of cooperation. This study will continue to build on that foundation as we seek compatible growth for our region," said Harry Berry, Hardin County Judge-Executive. The study is intended to evaluate military issues that interfere with daily civilian life and to evaluate civilian development that might hinder the mission of Fort Knox. "Fort Knox is a vital part of the economy in Hardin and surrounding counties," added State Senator Dennis Parrett. "Having a Compatible Use Plan in place with our Lincoln Trail Area Development District serves to strengthen that relationship."

The study will include several public participation meetings. "This is a great opportunity to provide input," said Col. CJ King, Fort Knox Garrison Commander. "It'll help provide a better understanding of considerations to bear in mind and chart a way ahead that ultimately serves to benefit the military mission and community at-large." There will be two geographical locations to provide a broader opportunity for attendance. The materials presented will be the same. The first public meetings will occur in November. Choose the date and location most convenient for you...

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## **Lincoln Trail Area Development District to conduct Mission Knox Study**

*Study aims to ensure regional and military sustainability*

**ELIZABETHTOWN, KY**– The Lincoln Trail Area Development District (LTADD) is conducting a Compatible Use Plan (CUP) study that aims to ensure local and regional sustainability between Fort Knox and its civilian neighboring communities. The CUP process is a collaborative effort between the Fort Knox Military Installation, local and state government, private citizens and other interested stakeholders.

The study area intersects several counties and municipalities in the region including the counties of Bullitt, Hardin, Meade and Nelson. “This study is not anti-development, anti-growth,” said Gerry Lynn, Meade County Judge-Executive. “It’s just ensuring that as development growth occurs, it’s compatible on both sides.” The study is intended to evaluate military issues that interfere with daily civilian life and to evaluate civilian development that might hinder the missions of Fort Knox. “I commend all of the parties involved for recognizing the need to build and maintain a symbiotic relationship with Fort Knox and municipalities and counties within the region,” added State Senator Stephen Meredith. “Each play an important role in assuring the success of each other. Being pro-active in establishing a united plan for the future will yield dividends for everyone.”

The study will include several public participation meetings. "This is a great opportunity to provide input," said Col. CJ King, Fort Knox Garrison Commander. "It'll help provide a better understanding of considerations to bear in mind and chart a way ahead that ultimately serves to benefit the military mission and community at-large." There will be two geographical locations to provide a broader opportunity for attendance. The materials presented will be the same. The first public meetings will occur in November. Choose the date and location most convenient for you...

### **Thursday, November 7, 2019**

5:00 PM – 7:00 PM  
Colvin Community Center  
230 Freedoms Way  
Radcliff, KY 40160

### **Wednesday, November 13, 2019**

5:00 PM – 7:00PM  
Shepherdsville City Hall  
634 Conestoga Parkway  
Shepherdsville, KY 40165

If residents are unable to attend, an online public survey will be open and available during the month of November for residents to provide input. To learn more about Mission Knox and the Compatible Use Plan study, including meeting times and locations, please visit [www.missionknox.org](http://www.missionknox.org) or visit the Mission Knox Facebook page.



**For Immediate Release  
October 28, 2019**

**Contact:** Krista Levee  
270-769-2393  
[krista@ltadd.org](mailto:krista@ltadd.org)

Upon request, any persons requiring special needs assistance should contact Colvin Community Center at 270-351-4079 for the Radcliff location or Shepherdsville City Hall at 502-543-2923 at least three business days prior to the meeting. The TTY number for the hearing impaired is 1-800-648-6056 or dial 711.

The Compatible Use Program is a federally funded program administered by the Department of Defense (DoD) and Office of Economic Adjustment (OEA) to promote collaboration and cooperation among the Military, surrounding jurisdictions, community stakeholders, and states.

# # #

**ABOUT LINCOLN TRAIL AREA DEVELOPMENT DISTRICT**

The Lincoln Trail Area Development District (LTADD) is one of Kentucky's fifteen Area Development Districts created by KRS 147A in 1972, by the Kentucky General Assembly. The LTADD serves the communities of Breckinridge, Grayson, Hardin, LaRue, Marion, Meade, Nelson, and Washington counties.

**For Immediate Release**  
**October 30, 2019**

**Contact:** Krista Levee  
270-769-2393  
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The study area intersects several counties and municipalities in the region including the counties of Bullitt, Hardin, Meade and Nelson. “Garrison Commanders for decades have engaged local officials as part of their overall planning process and this has been beneficial to both the military base and our community,” noted Dean Watts, Nelson County Judge-Executive. The study is intended to evaluate military issues that interfere with daily civilian life and to evaluate civilian development that might hinder the missions of Fort Knox. “Fort Knox is an important economic driver for our County, our region, and Nelson County,” added State Senator Jimmy Higdon. “These meetings will provide our local citizens an opportunity to thank Fort Knox officials for their commitment to our troops, veterans, and civilian employees plus voice support or concerns about the future of Fort Knox.”

The study will include several public participation meetings. "This is a great opportunity to provide input," said Col. CJ King, Fort Knox Garrison Commander. "It'll help provide a better understanding of considerations to bear in mind and chart a way ahead that ultimately serves to benefit the military mission and community at-large." There will be two geographical locations to provide a broader opportunity for attendance. The materials presented will be the same. The first public meetings will occur in November. Choose the date and location most convenient for you...

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**For Immediate Release:**

**Contact:**

Krista Levee

270-769-2393

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## **Lincoln Trail Area Development District Releases Mission Knox Study Draft**

*Study aims to ensure regional collaboration and military sustainability*

**ELIZABETHTOWN, KY (October 4, 2021)** – The Lincoln Trail Area Development District (LTADD) seeks public feedback on its DRAFT Compatible Use Plan (CUP) that aims to ensure local and regional sustainability between Fort Knox and its neighboring communities. The CUP process is a collaborative effort between the Fort Knox Military Installation, local and state governments, private citizens, and other interested stakeholders, which began in the fall of 2019.

The study area intersects several counties and municipalities in the region which include the counties of Bullitt, Hardin, Meade and Nelson. The study evaluates military issues that interfere with daily civilian life and evaluates new development that might hinder the missions of Fort Knox.

The Draft of the *Compatible Use Plan Study* is now available for review and comment. An online public survey is open during the month of October for all to provide input. To learn more about Mission Knox, view the Draft CUP study, and provide feedback through the survey please visit [www.missionknox.org](http://www.missionknox.org) or visit the Mission Knox Facebook page.

The Compatible Use Plan is a federally funded program administered by the Department of Defense (DoD) and Office of Local Defense Community Cooperation (OLDCC) to promote collaboration and cooperation among the Military, surrounding jurisdictions, community stakeholders, and states.

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# **FORT KNOX CUP PUBLIC INVOLVEMENT**

## **Phase 1 – Initial Public Meetings and Survey Results & Analysis.**

9 January 2020



Prepared by Lincoln Trail Area Development District

This document was prepared with financial support from the Office of Economic Adjustment, Department of Defense. The content does not necessarily reflect the views of the Office of Economic Adjustment.

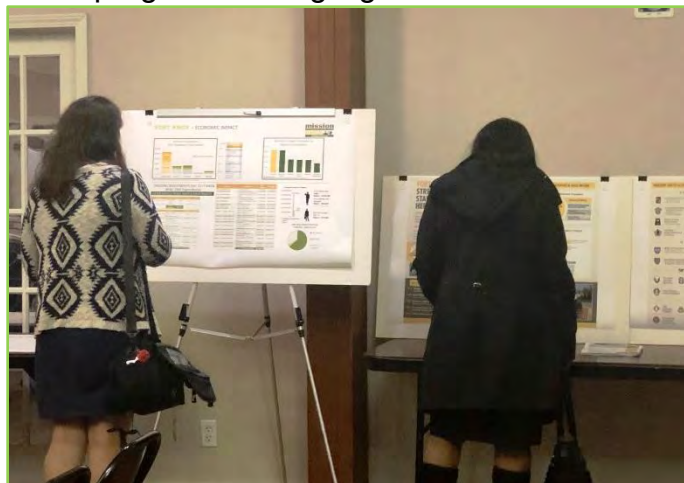
## FORT KNOX CUP PUBLIC INVOLVEMENT

### Phase I – Initial Public Meetings and Survey Results & Analysis.

#### Background

In support of the public outreach effort detailed in our Public Participation Plan, an initial sequence of public meetings were held in November at three geographically dispersed locations around the Fort Knox Military Reservation: Brandenburg, Radcliff and Shepherdsville. In addition, a public survey was conducted in conjunction with these meetings. The survey period was opened from November 1<sup>st</sup> to 30<sup>th</sup>. The purpose of this outreach was not only to involve the public in the process but to also begin to acquire their “buy-in” of the need for the Compatible Use Plan (CUP) and the forthcoming implementation plan that results. The additional benefit of the resulting data from the meeting interactions and the survey results should prove valuable in the ongoing data collection effort; providing insights to the CUP staff, the committees and assisting with the creation of the implementation plan.

The public meetings followed a standard format: Visual display material including maps, charts, and other related background information in a poster format; a looped video program that highlighted Fort Knox’s mission and training activities; and a



presentation by staff providing background on Fort Knox and the purpose of the study to create the CUP. In the time frame available before and after the presentation, staff interacted with the attendees to answer questions and provide information about the CUP process. A “sticker” exercise was also available for the attendees to rank their priority issues regarding selected compatibility issues between

themselves, their communities and Fort Knox. Handouts of the “Fast Facts” sheets, information explaining where to find and take the online survey and a brochure describing Fort Knox were also available for dissemination.

The survey consisted of sixteen questions and was available online with links from the CUP webpage, Facebook page or from QR code on a handout. It was also available in a hardcopy format at the public meetings.



## Public Meeting Results

The public meetings were conducted as illustrated below:

Location	Date	Times	Attendees
Radcliff's Colvin Community Center	Nov. 7	5:00 - 7:00 pm	10
Shepherdsville City Hall	Nov. 13	5:00 - 6:30 pm	13
Brandenburg, Meade County Courthouse	Nov. 25	5:00 - 6:30 pm	22

Prior to each meeting, an announcement was posted on the CUP webpage and Facebook page. A media release was provided to local newspapers and radio stations. The conduct of the meetings allowed attendees to enter the meeting area, review the provided materials and video and ask questions or express concerns to the staff. During



this timeframe they were also encouraged to participate in the “sticker” exercise regarding various compatibility issues. The presentation itself was done at the midpoint of the meeting when it was felt that attendance was at its maximum. The

presentation took approximately 15 to 20 minutes and the attendees were encouraged to ask questions or express opinions during and after the presentation. Following the presentation some attendees had additional questions but the audience typically tended to leave the meeting.

The interaction with the public benefitted the study by bringing their concerns and issues to our attention. The staff complied the various verbal input received and these were combined with the free text replies from the survey. These will be summarized following the Survey Analysis section.



## Survey Results & Analysis

The survey consisted of sixteen questions. The questions were built from a variety of concerns that we had been previously made aware of or had historic levels of concern. We also referenced previous similar surveys for insights. The online “Survey Monkey” software format was used with the survey period being 30 days. As mentioned, hardcopy versions of the survey were available at the public meetings and three of these were collected and input into the system by staff.

The questions touched on a variety of topics and while some were cross-overs they broke down into the following focus areas. Seven involved the respondents background and some demographic information. Three were related to communication methods or needs. Two inquired about economic opinions and four were directly related to compatibility issues. The questions and their parameters are included in Appendix A of this report.

The survey collected 80 individual responses during the open period. While fully aware that the sample size is miniscule compared to the population of the study area, it does provide some insights regarding people’s general

*Study Area	2010 Population
1 Mile	19,985
5 Mile	93,753
10 Mile	251,400

understanding and opinion of Ft Knox and its relations with the surrounding communities. The addition of the related opinion “sticker” exercise that was conducted at each of the three public meetings did add some level of consistency to the results even with the understanding that many of the same individuals may have engaged in both activities.

In looking at the survey entry dates (chart next page), a correlation appeared to exist between the first and third public meeting, none is apparent from the second. The peak of 15 responses on November 21<sup>st</sup> may be related to a Facebook post that alluded to a concern regarding the taking of property by Fort Knox. The geographic distribution of the surveys from the 21<sup>st</sup> was across three counties and not focused in a single location. The survey period also contained Election Day, two Federal Holidays and nine weekend days but no relationship to these parameters could be determined. The surveys were accessed from three available methods.

Web link, 40

Facebook, 33

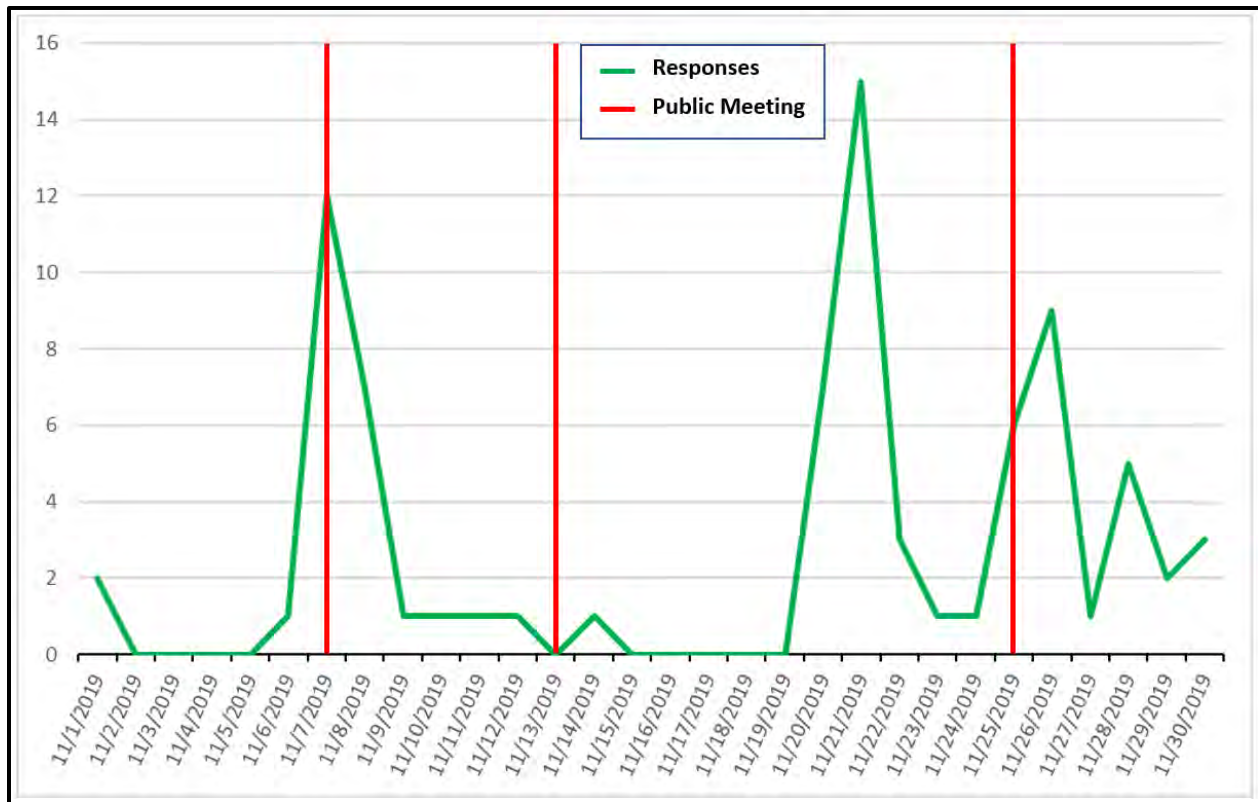
Public Meetings, 7

Note that the surveys submitted as hardcopy and entered by staff were tagged as web link entries by the survey software.



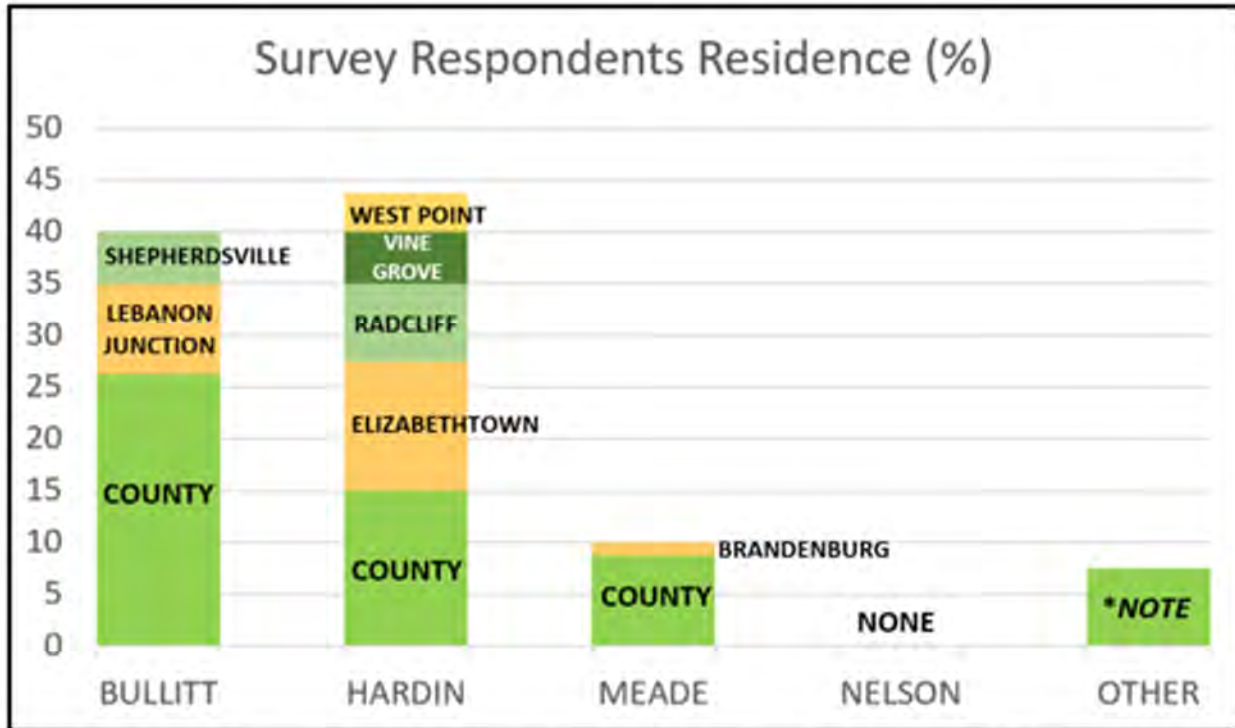
## Fort Knox CUP – Public Involvement Phase 1 Analysis

The Surveys were completed in the following time-frame:

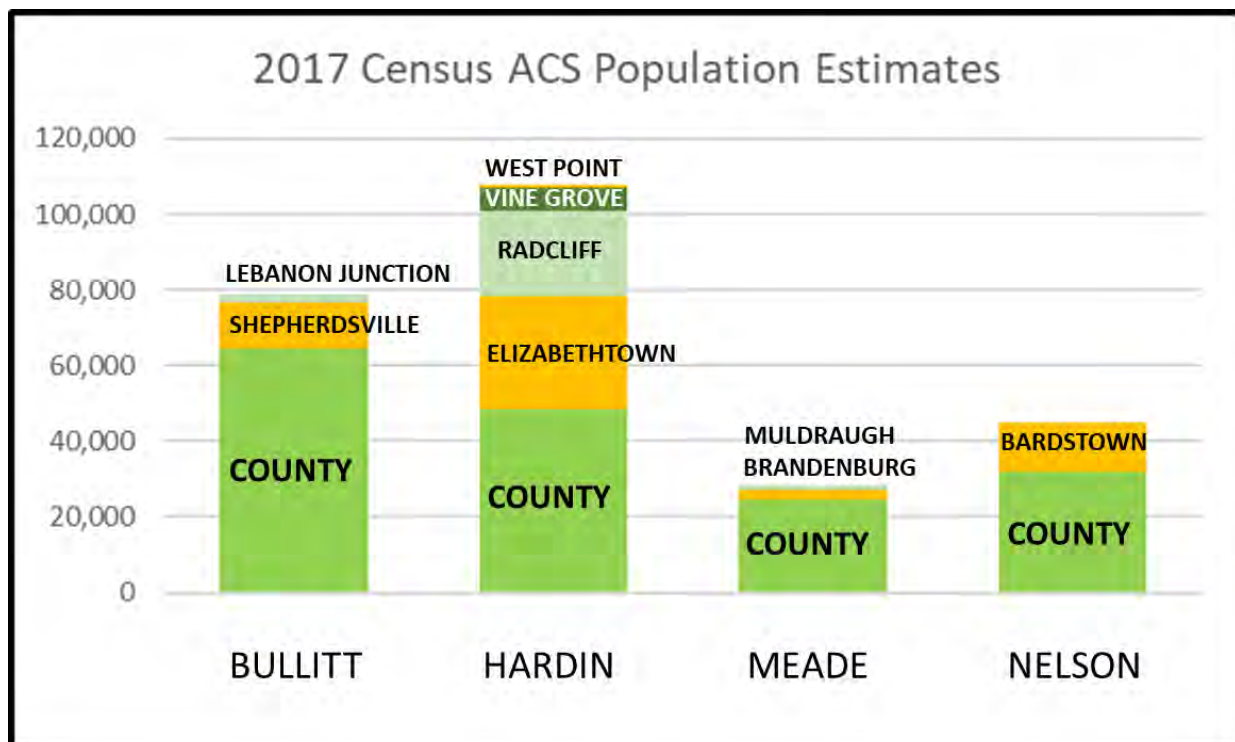


## DEMOGRAPHICS

A breakdown of the survey respondents and the overall study area is presented below. Question 1 established a basic geography for the survey respondents. In reviewing the 2017 Census American Community Survey (ACS) data the overall population across



\* Out of state (Military)1; Unincorporated community, 2 Bullitt, 1 Hardin; Other Counties: Jefferson-1, LaRue-3, Taylor-1.

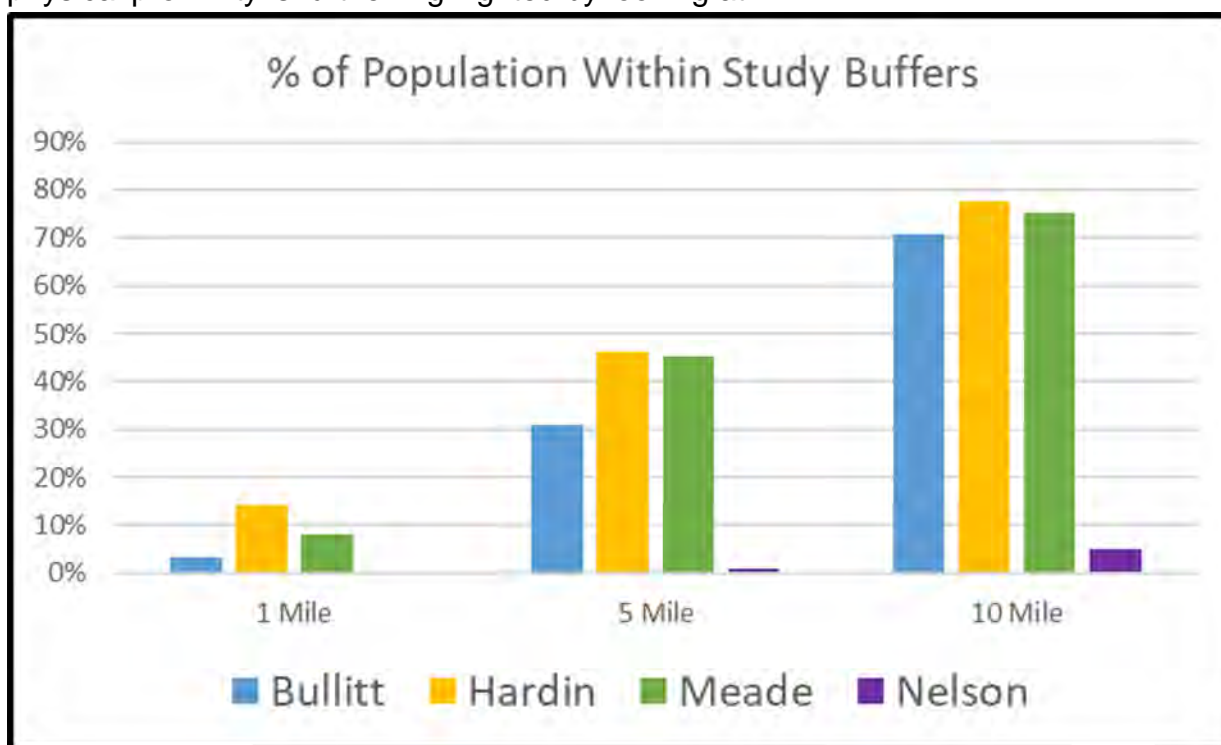


## Fort Knox CUP – Public Involvement Phase 1 Analysis

the three buffer rings of the study area show the population density in proximity to Fort Knox. In the entire four-county study area, 7.7% of the total population live within one mile of Fort Knox. Zooming out reveals that 62.5% of the total population reside

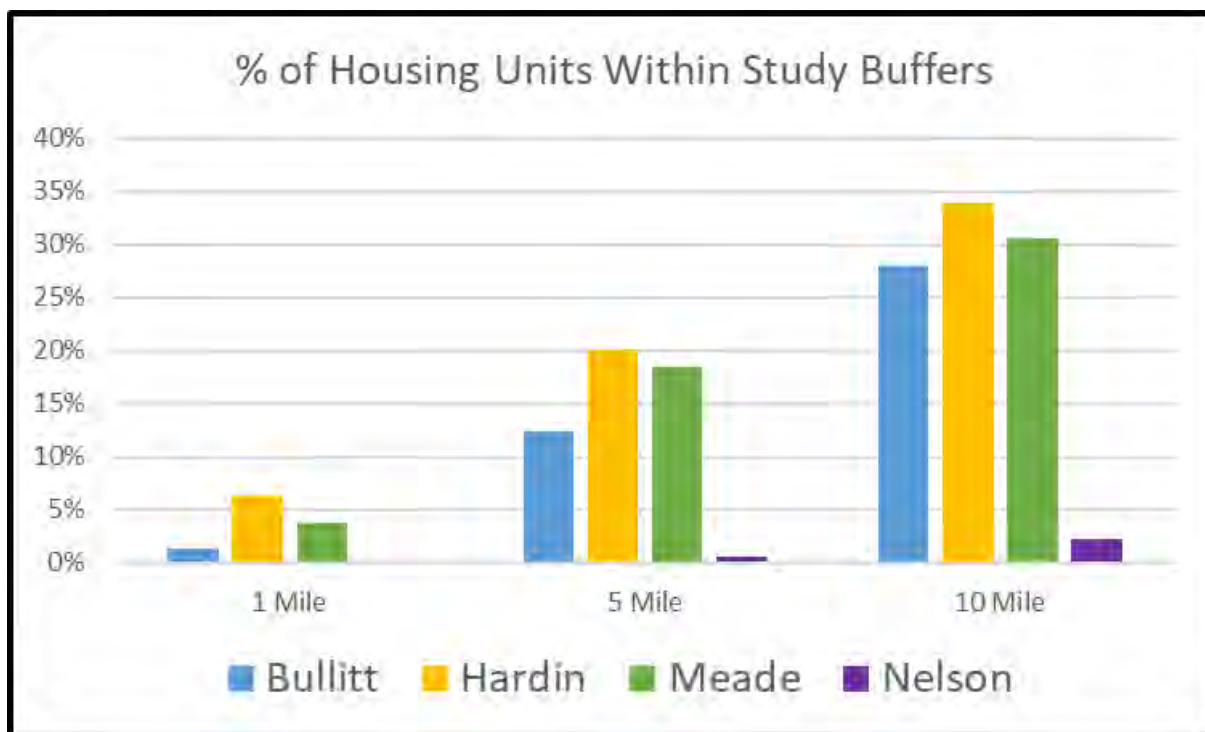
Population by County	Buffer Rings			Total Population in County
	1 Mile	5 Mile	10 Mile	
Bullitt	2,536	24,189	55,574	78,622
Hardin	15,126	49,653	83,392	107,699
Meade	2,323	12,859	21,374	28,452
Nelson	0	477	2,228	45,131
Study Area	19,985	87,178	162,568	259,904

in the 10 Mile buffer of Fort Knox; this jumps to 75% if Nelson County is excluded. The physical proximity is further highlighted by looking at

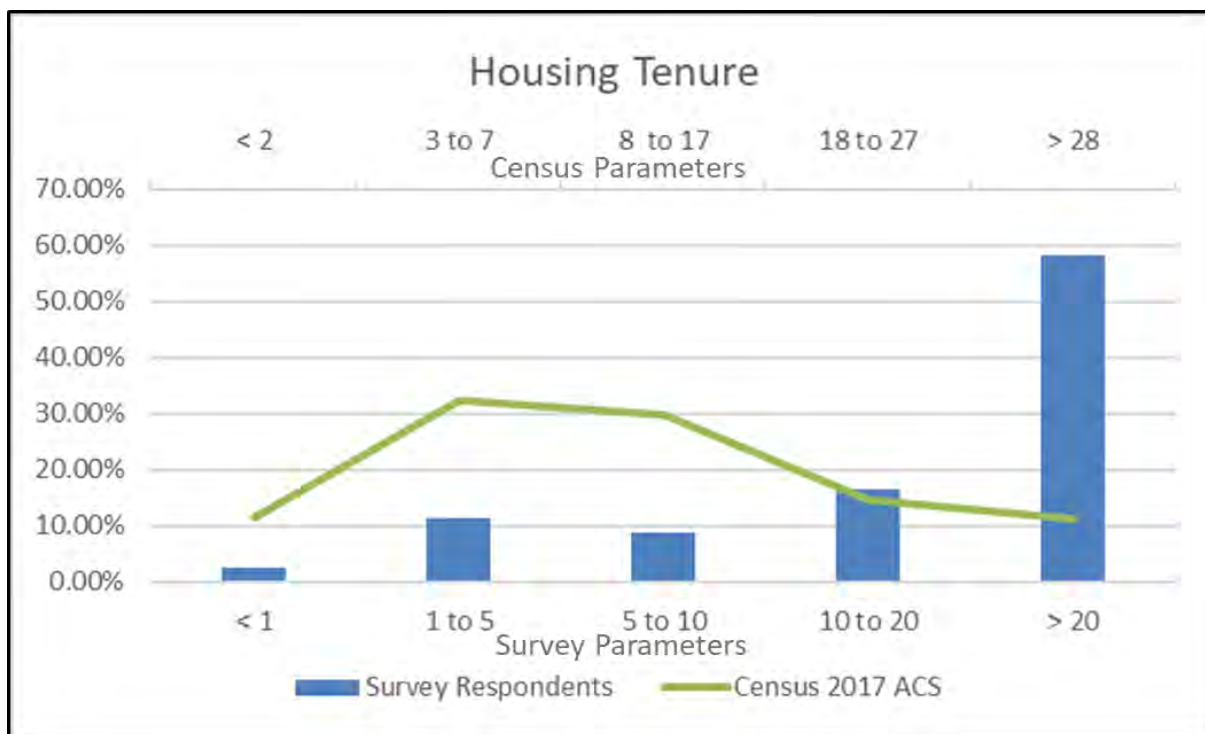


Housing Units by County	Buffer Rings			Total Housing Units - Owner	Total Housing Units - Renter
	1 Mile	5 Mile	10 Mile		
Bullitt	1,039	9,635	21,853	65,071	13,226
Hardin	6,620	21,117	35,475	66,268	38,634
Meade	1,060	5,207	8,620	20,125	8,094
Nelson	0	220	966	35,381	9,182
Study Area	8,719	36,179	66,914	186,845	69,136

residential structures. 3.4% of all housing lies within the one-mile buffer and 26% within 10 miles of Fort Knox.



Question 2 inquired about tenure in the Fort Knox environ in general. Although the structure of the ACS data and survey data contained different scales so a direct correlation is not possible; in looking at the overall population and tenure

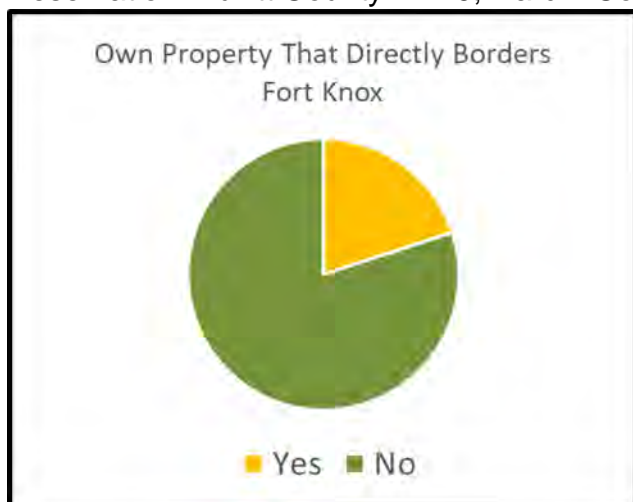




## Fort Knox CUP – Public Involvement Phase 1 Analysis

of the region; the 2017 5-year ACS shows that 26.8% of residents in the study area counties have a tenure of greater than 18 years. This is less than half of the 58.2% of respondents who claimed 20 or greater years of residence. It is presumed that respondents, because of their long duration, had a greater knowledge framework and interest in Fort Knox's activities thus had more reason to participate in the survey.

There are approximately 609 parcels that lie adjacent to the Fort Knox Military Reservation. Bullitt County – 119; Hardin County – 324 to include 156 in Radcliff and 21



in West Point; Meade County – 165 including 89 in Muldraugh. The 1 Mile Buffer area contains approximately 7,410 parcels; thus the adjacent landowners comprise 8.2% of the parcels within the 1 Mile Buffer. In question 3, a factor of 20% of survey respondents with a “Yes” answer suggests, as expected, an active interest by landowners who have Fort Knox as a direct neighbor.

The integration of the surrounding community with Fort Knox is highlighted by the dependency of each upon the other with regard to employer and employee. Question 4

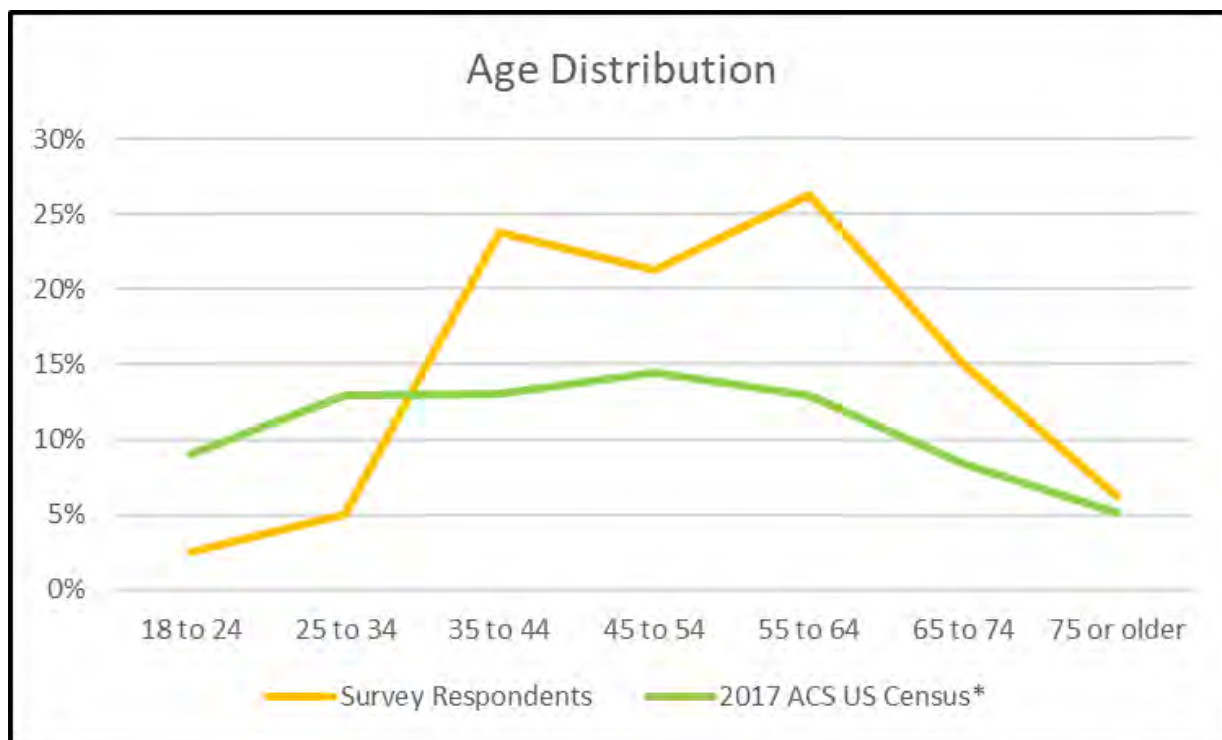


asks to this status and finds 61% of respondents have a connection through employment. Census data also illustrates a relationship with 10.2% of the population of the four-county study area having prior military service and 11.4% with TriCare health insurance coverage. While the numbers by county are not yet available; with a work force of over 21,000 it can be assumed that a large portion of this number live in the four-county study area.

## Fort Knox CUP – Public Involvement Phase 1 Analysis

Geography	Total Population	Military Service	TriCare Insurance
Bullitt	78,622	5,271	1,703
Hardin	107,699	14,596	21,655
Meade	28,452	3,830	5,022
Nelson	45,131	2,940	1,347
Total Study Area	259,904	26,637	29,727
	2017 5yr ACS	2018 1yr ACS	2017 5yr ACS

The age of the survey respondent was asked in Question 5. It was found to basically trend with the overall with the Census breakout for the study area with the age of the respondents being higher overall.

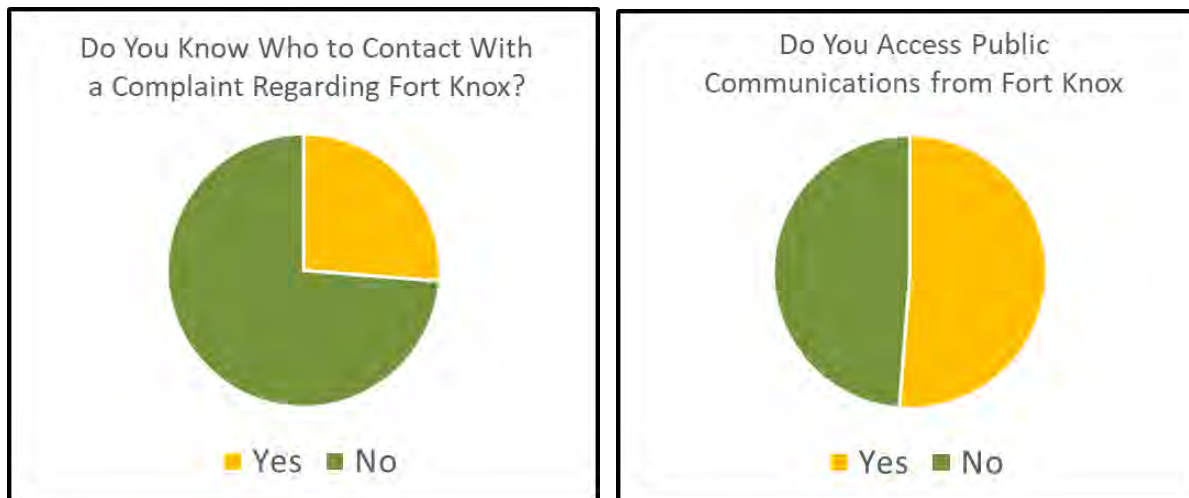


To assist with validation of the survey, any affiliation with the CUP process was identified by Questions 6 & 7. Approximately 9% of respondents had some manner of involvement. However, 36% of these respondents listed being at a public meeting as their involvement. Just 6% of the total “involved” because they were on an affiliated committee, elected official or government staff person. The technical methodology of the survey software seemed to cause some issue with Question 7 as it should have had a “Not involved” response choice relative to Question 6, but that response was not an available option. This forced the respondent to choose an answer if they did not know to just skip that question (which was intended).

## Fort Knox CUP – Public Involvement Phase 1 Analysis

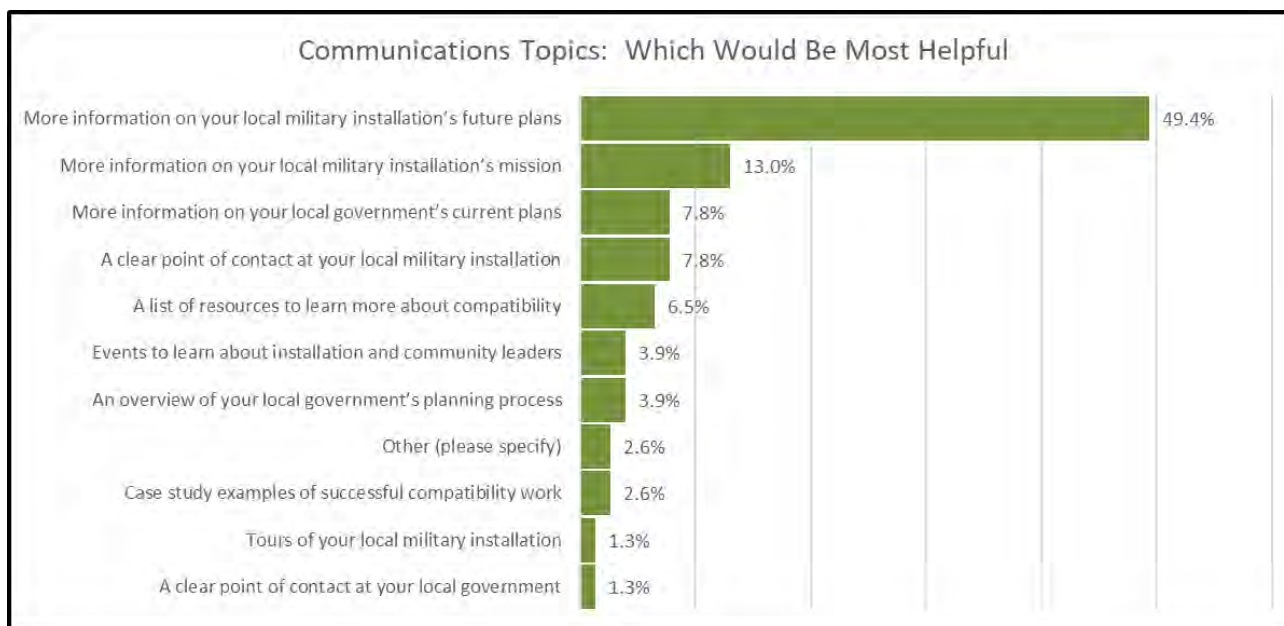
### COMMUNICATION

Questions 8 & 9 inquired of knowledge regarding communicating with or receiving information from Fort Knox. While not an inclusive question, based on the results and



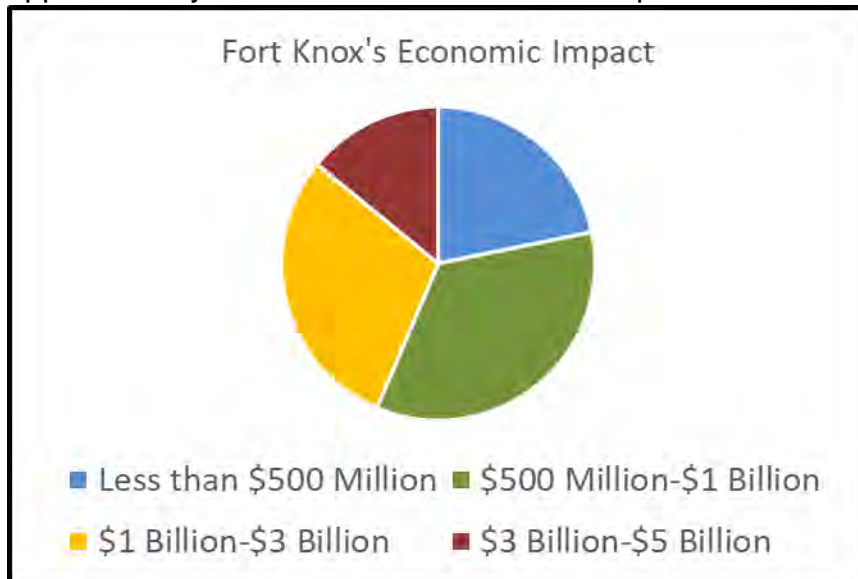
subsequent discussions with the Technical Advisory Committee, communications between Fort Knox, the surrounding residents and government entities is in need of review and improvement. This has been designated an area to do further research into and will be an element in the subsequent implementation plan.

Question 16 took this a step further to ask what topics would be most desired from a content standpoint. The respondents obviously had a strong interest in Fort Knox plans with 49% choosing that factor. Review shows interest in what happens there and what their local governments are doing in this regard.



## ECONOMICS

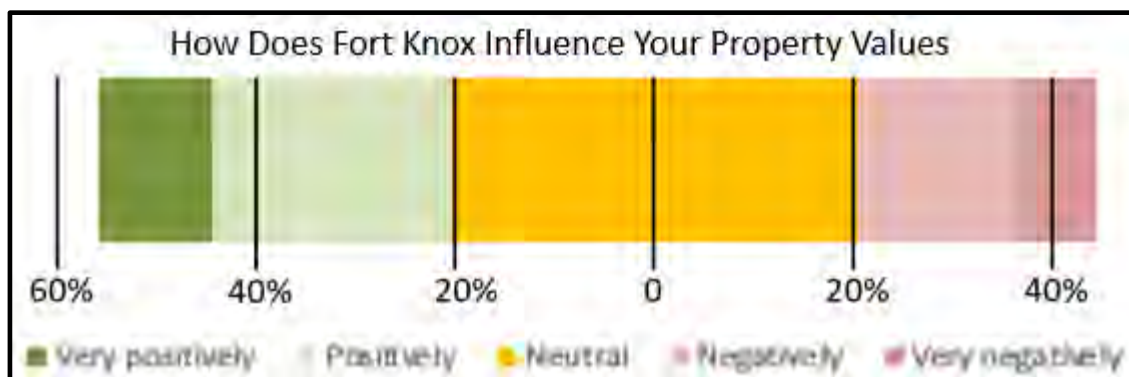
Question 10 was an attempt to gauge the public awareness of Fort Knox's economic impact to the region and the state as a whole. With the actual annual impact being approximately \$2.6 Billion almost 30% of responders answered in the correct range.



56% guessed low and 14% higher. The overall position of Fort Knox as a premier employer in the state is a point that has been surprising to many in our discussions to date. It is a point that needs to be highlighted as a primary reason for the local community and units of government to work with Fort Knox in addressing mutually

beneficial compatibility solutions that can assist in maintaining and promoting Fort Knox's mission.

Question 15 was an opinion question regarding property values and the perceived



Parcels by County <sup>1</sup>	Buffer Rings			Total Parcels <sup>2</sup>
	1 Mile	5 Mile	10 Mile	
Bullitt	1,616	10,668	23,816	32,563
Hardin	5,793	22,702	37,323	47,434
Meade	1,289	7,308	11,843	15,096
Nelson	0	325	1,711	22,336

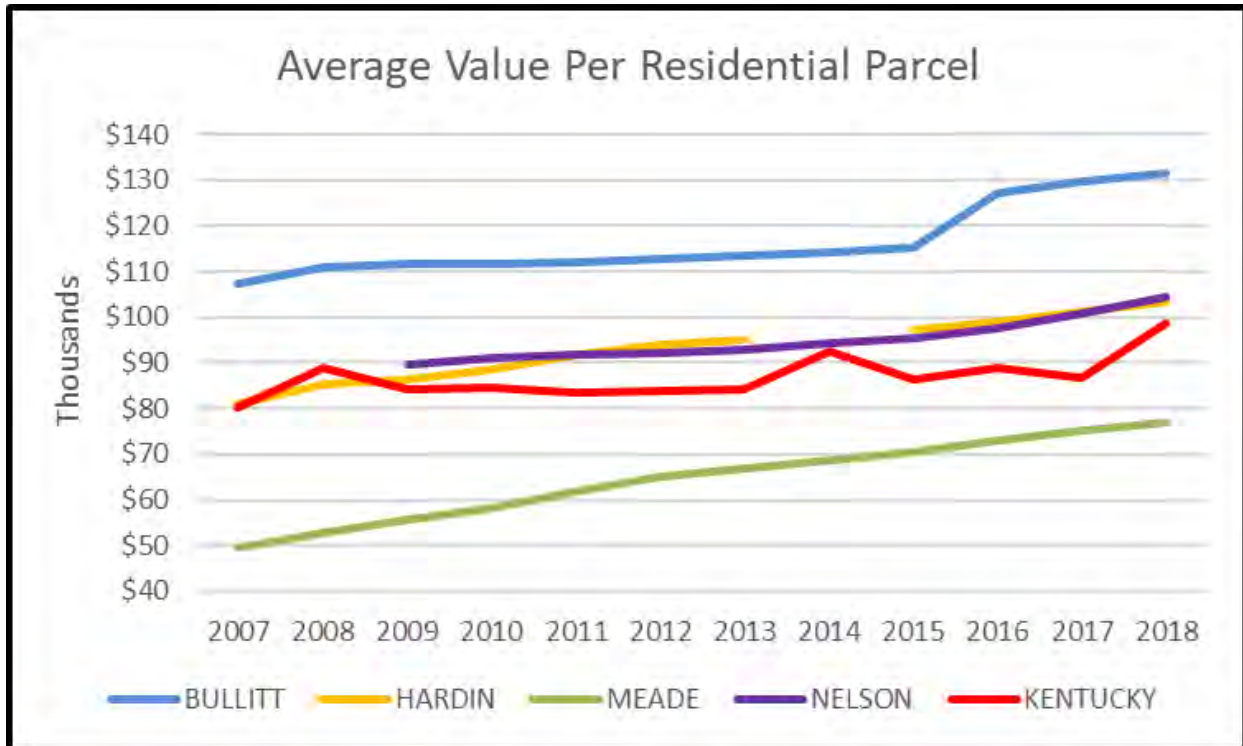
<sup>1</sup> - Based on centroid selection method.

<sup>2</sup> - Based on 2018 Revenue Cabinet



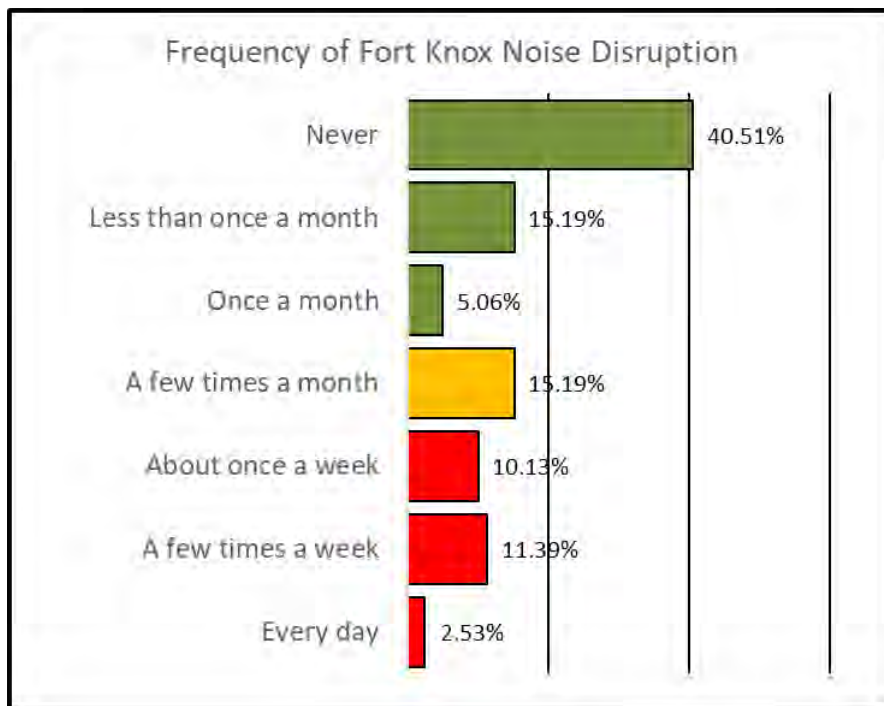
## Fort Knox CUP – Public Involvement Phase 1 Analysis

impact of Fort Knox. Overall 76% of respondents felt they were positive or neutral with 24% claiming a negative influence. While numbers are not available to validate these opinions directly without a detailed investigation, overall property values in the four-county study area do mirror with the state's overall values. Data from the Kentucky Revenue Cabinet show an overall upward trend of values by available data from 2007-2018 tax years.



## COMPATIBILITY

Based on existing ancillary data, noise became a primary issue of focus regarding compatibility. Question 11 examined the respondents concern with noise and its effect on their “normal” routine. Based on some preconceptions, the results proved surprising. From “Once a month” to “Never” combined to 61%. “Every day” to “About once a week” was 24%. This would seem to be far less a factor than presumed to be to the overall



population. The respondents who do report high level negative affects however must be considered and further investigations are supported.

Question 12 listed specific compatibility issues for consideration regarding their level of concern. The overall two greatest concerns, which were on over one-third of the responses, were

“Mission reduction impacts to the economy” and “Potential development of land near the military installation”. In analyzing these results, we grouped it into three areas of concern. Noise & Safety, overall Development, and Economics. Although many these topics and the “Other” responses also fit into these general categories, there are frequent cases where they cross at least two of the categories. The breakout is as follows:

### Noise & Safety

These issues could be regarded as two sides of the same coin. They affect the mission of Fort Knox and the residents that live both on and off the post. 16% are concerned about development issues that in turn affect flight missions such as obstructions and light pollution. 24% are concerned about noise conflicts between the military and the populace. Specific quotes regarding this issue that came from the survey regarding noise are: “Walls cracking when using large weapons, hasn't been happening much recently though” and “The noise causing the value of my property to decrease”. Safety concerns were related by anecdotes of mercury and other types of water pollution.

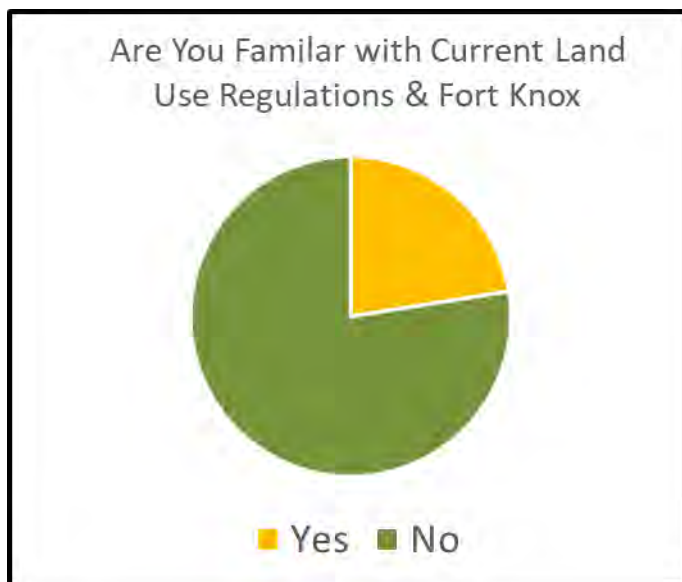
### Development

The pattern of development is also a concern for those residents both on and off the reservation. Some respondents are concerned about loss of natural habitat, others by traffic congestion and infrastructure development. The type of development plays a key role. While some are concerned with the cost of housing increasing due to scarcity others worry that too much residential will curtail the mission and the need for housing in the first place. A quote from the survey, “Growth of any kind of Fort Knox would be a huge benefit to the surrounding community”

### Economics

Mission reduction impacts to the economy was a choice on 34% of the responses. The fluctuations of population and expansion of the mission, both at 26%, were also concerns because of their economic affect. The noise concerns raised earlier are also seen to be an economic issue because of their potential effect on property values.

An additional concern was revealed with this question related back to the previous section on communication. There were several respondents who were specifically concerned about an expansion of Fort Knox taking their land or homes. This was felt to be a misrepresentation of the study area map from our website that propagated through social media. Also, this issue arose just prior to and at the Meade County public meeting. The staff heard several comments along the lines that the federal government was going to be taking homes and expanding the post. This issue will have to be continually addressed as we proceed with this planning and subsequent implementation plan.



Question 13 attempted to obtain the public's knowledge regarding existing land use policies in place by local governments related to Fort Knox. Over three-fourths were not aware of any. The primary policy that was highlighted during the public meetings was the successful Highway 313 Corridor that creates a buffer corridor in an area adjacent to the Fort Knox boundary by limiting residential development through minimum lot sizes.

## Fort Knox CUP – Public Involvement Phase 1 Analysis

Potential policy solutions preferences were the basis of Question 14. The two most prominent, both chosen by at least 50% of respondents, were “Real Estate Disclosures” and “More communication and educational programs”. “Land Buffer Zones” at 44% was the third most favored solution. The “Purchase of Properties” was fourth at 40%. “Zoning Restrictions” with 32% was the only other choice close to at least one-third of responses with the remaining choices falling somewhat behind these.

### The Sticker Exercise

This was an interactive exercise that took place during each of the public meetings. A list of fourteen compatibility issues / opportunities was presented across three large displays with the participant given fourteen stickers to place on each issue to rank their

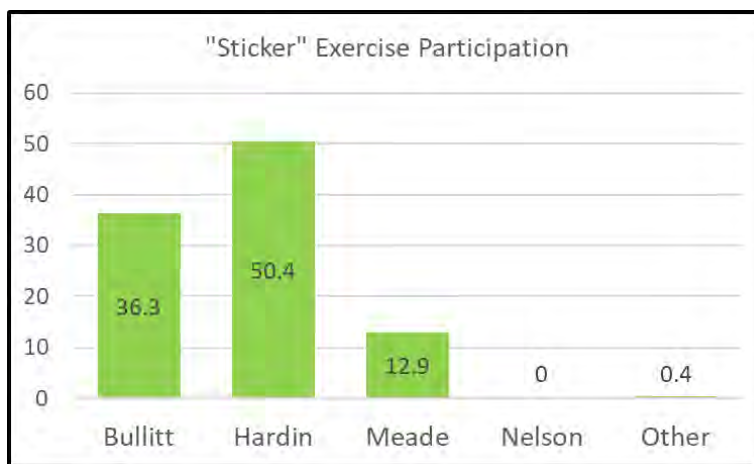


importance from Very Important, Important, Somewhat Important, Not Important and No Opinion.

A total of nineteen participated in the activity across the three public meetings. The participation rate mirrored the survey responses based on geography. The themes of the questions were very similar to Questions 12 and 14 in

exploring opinions regarding compatibility. The issues were listed as brief statements such as “Noise”, “Security” or “Light & Glare” with a brief paragraph explaining each subject in more detail. To evaluate the data a Likert-type scale was used and assigned point values to each ranking:

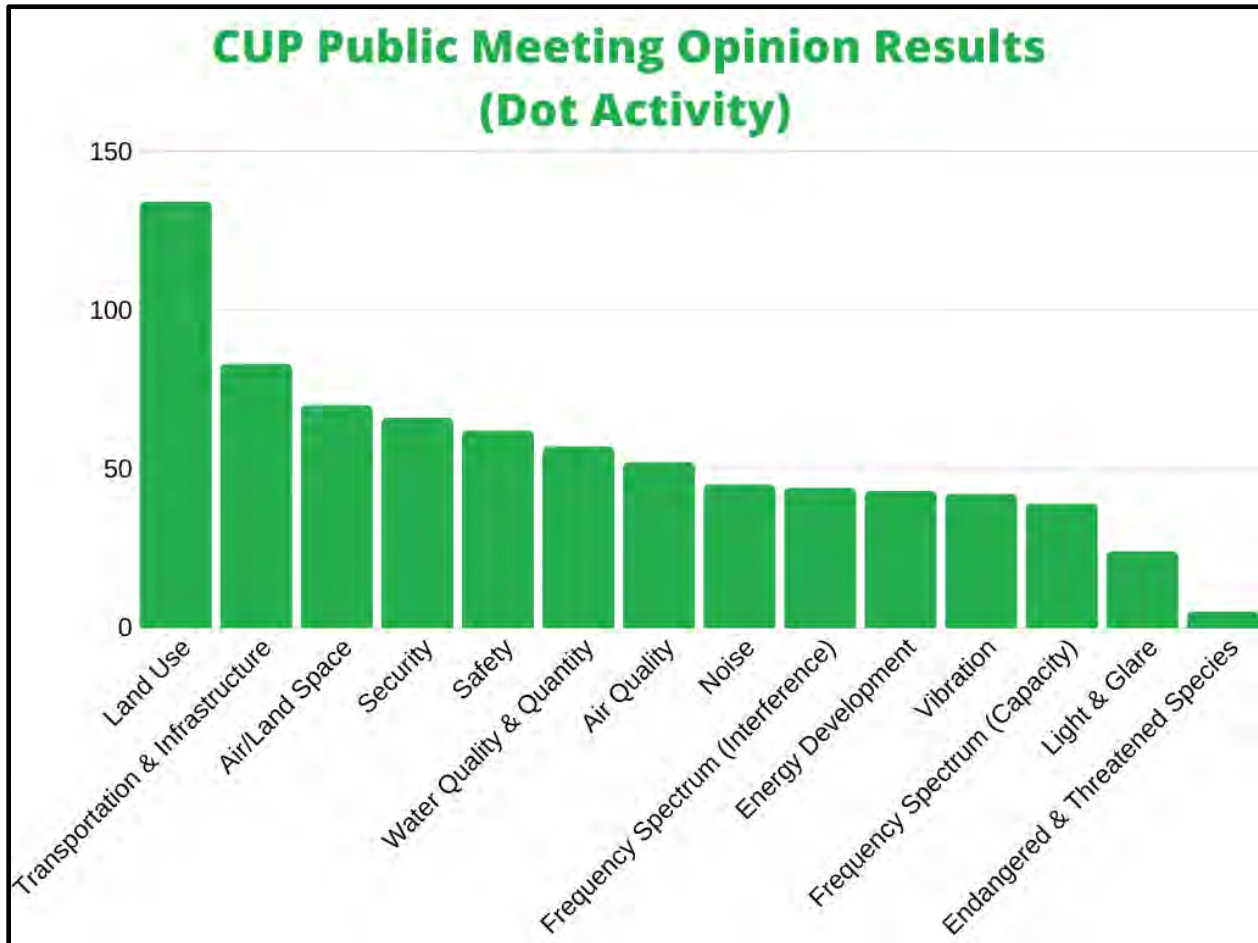
Very Important -4  
Important – 3  
Somewhat Important -2  
Not Important, No Opinion -0





## Fort Knox CUP – Public Involvement Phase 1 Analysis

The highest ranked issue was “Land Use” which came in at more than one-third greater than the next highest - “Transportation & Infrastructure”. The concern for land use reflects back to other survey inputs and is the primary concern of the CUP study.



### Public Meeting Comments

Part of the reason for the public meetings was to generate interaction between the CUP staff and the public. This allowed each to educate and learn from the other. It provided opportunities that will allow us to validate presumed issues and establish additional areas interest to focus on in the development of the plan. The compiled discussions were combined into five categories for easy reference.

#### Area 1 - Land Being Taken

As previously mentioned, this issue appears to have primarily risen from social media misunderstanding of the CUP process. A sample of statements are:

*“Government (Ft Knox) is going to take all the land within one mile of boundary”*

*“Saw map on ky.gov that showed property to be taken”*

*“Loss of privately owned land and homes”*

*“LOSS OF MY FAMILY’S HOME AND PROPERTY [sic]”*

## Fort Knox CUP – Public Involvement Phase 1 Analysis

*“Taking my land because of the mile wide boundary expansion.”*

We were also made aware that a Magistrate contacted a US Representative’s office concerned about Fort Knox taking land.

Again, this highlighted the need for communication about the process and the need to get ahead of issues as they occur. It was mentioned that a map showing the “one-mile” land condemnation was on the internet but we were unable to locate said map and believe it was just a further miscommunication about what the CUP is.

### Area 2 – Noise

We have documented history of noise complaints regarding Fort Knox, so this wasn’t surprising, and the input was validating. Sample statements are:

*“I was at a meeting and a Colonel said they can’t fly over your house, farm, property”*

*“Tanks are gone but still noise.”*

*“The noise causing the value of my property to decrease “*

*“Walls cracking when using large weapons, hasn’t been happening much recently though.”*

*“Property value drop due to noise”*

Noise is an obvious area that we will continue to study. It is expected to have an increase in intensity with the development of the new DAGIR range and education and communication about this activity is warranted.

### Area 3 – Transportation / Access

This is another area where we expected concerns to be raised. Infrastructure development in general around a military installation is a double-edged sword; allowing both ease of access but also unwanted growth. Residential growth in particular, which tends to not compatible with the mission activities. Opinions given included:

*“Can we get access for trails across the post boundary.”*

*“Can access the neighborhoods adjacent to 31W”*

*“Wilson Road Gate to be opened.”*

*“Want Salt River to be a ‘water trail’”*

*“Want [direct] access to post from Bullitt County”*

## Fort Knox CUP – Public Involvement Phase 1 Analysis

Growth patterns, transportation plans and potential development activities will all be reviewed as part of the study with appropriate implementation ideas presented to reach common goals.

### Area 4 – Unclassified

These are statement that were made that didn't adapt to other areas or had only single occurrences. They included:

*“They have added Mercury and others to our water many in the area have diabetes and thyroid issues or even cancer I believe these issues are caused from ft Knox ground water and surface water politions [sic]”*  
*“Gang and drug activities”*

These concerns will be monitored for similar inputs. Research will be conducted to try and understand better the source of these concerns and attempt to document for inclusion.

### Area 5 – Positive Relationships

We had many discussions with many residents who were eager to support the missions of Fort Knox. Many had served in the military, had family currently serving or do or did work on the post. They were outspoken in their support and willing to work with Fort Knox.

*“I've loved the vibration noise since '75 - "sounds of freedom"”*  
*“Growth of any kind of Fort Knox would be a huge benefit to the surrounding community.”*  
*“I / my son was/is military we support, happy to deal with noise [issues]”*

The continued involvement of all the public and local officials bodes well for the success of this study, the creation of the CUP and its implementation.

## **Appendix A – Survey Questions**

Q1. Which best describes where you live?

Bullitt County  
Lebanon Junction  
Shepherdsville  
Hardin County  
Elizabethtown  
Radcliff  
Vine Grove  
West Point  
Meade County  
Brandenburg  
Muldraugh  
Nelson County  
Other (please specify)

Q2. How long have you lived in the region (defined as anywhere in Bullitt, Hardin, Meade, or Nelson counties)?

Less than 1 year  
Between 1 and 5 years  
Between 5 and 10 years  
Between 10 and 20 years  
More than 20 years  
I do not live in the region.

Q3. Do you own property that directly borders the Fort Knox Military Installation? Y/N

Q4. Have you or any family members ever worked at the Fort Knox Military Installation (Civilian or Military)? Y/N

Q5. What is your age?

Less than 18  
18 to 24  
25 to 34  
35 to 44  
45 to 54  
55 to 64  
65 to 74  
75 or older



## Fort Knox CUP – Public Involvement Phase 1 Analysis

Q6. Other than taking this survey, are you directly involved in the Fort Knox Compatible Use Plan process? Y/N

Q7. If you answered yes to the previous question, how are you involved?

- Committee Member
- An Elected Official
- A Local Government Staff Member
- Public Meeting Attendee
- Other (please specify)

Q8. Do you know who to contact if you have a complaint regarding Fort Knox issues? Y/N

Q9. Do you access any ongoing public communications from Fort Knox (Radio, Newspaper, Television, Social Media)? Y/N

Q10. How much of an economic impact do you think Fort Knox has on the region?

- Less than \$500 Million
- \$500 Million-\$1 Billion
- \$1 Billion-\$3 Billion
- \$3 Billion-\$5 Billion

Q11. How often does noise or vibration from Fort Knox disrupt your normal routine?

- Every day
- A few times a week
- About once a week
- A few times a month
- Once a month
- Less than once a month
- Never

Fort Knox CUP – Public Involvement Phase 1 Analysis

Q12. What compatibility issues are of greatest concern to you? (Select your top three)

Development projects and potential risks to low-altitude flight safety (physical obstruction, navigation interference, or light pollution)

Civilian-Military noise conflicts

Potential development of land near the military installation

Competing demands for infrastructure and community facilities (includes water, wastewater, school, and power facilities, etc.)

Loss of natural and working landscapes (includes endangered species/habitat management)

Transportation/traffic congestion around military installations

Mission expansion impacts to future land availability/affordability

Mission reduction impacts to the economy

Military installation population change impacts to housing availability/affordability

Other (please specify)

Q13. Are you familiar with any current land use regulations governing land use between Fort Knox and the Public? Y/N

Q14. Of potential policy solutions, which do you think would be most useful? Check ALL that apply.

Real Estate Disclosures

Land Buffer Zones

Deed Restrictions

Noise Attenuation Building Codes

Height Restrictions

Frequency/Spectrum Restrictions

Zoning Restrictions

Purchase of Development Rights

Purchase of Properties

More communication and educational programs

Q15. Do you believe your property values are positively or negatively influenced by Fort Knox?

Very positively

Positively

Neutral

Negatively

Very negatively

Q16. Which of the following would you find most helpful?

- A clear point of contact at your local government
- Tours of your local military installation
- Case study examples of successful compatibility work
- Other (please specify)
- An overview of your local government's planning process
- Events to learn about installation and community leaders
- A list of resources to learn more about compatibility
- A clear point of contact at your local military installation
- More information on your local government's current plans
- More information on your local military installation's mission
- More information on your local military installation's future plans

# FORT KNOX CUP PUBLIC INVOLVEMENT

## Phase 2 –Survey Results & Analysis.

15 November 2021



Prepared by Lincoln Trail Area Development District

This study was prepared under contract with the Lincoln Trail Area Development District, with financial support from the Office of Local Defense Community Cooperation, Department of Defense.

The content reflects the views of the Lincoln Trail Area Development District and the primary partners involved in the creation of this study and does not necessarily reflect the views of the

Office of Local Defense Community Cooperation



## FORT KNOX CUP PUBLIC INVOLVEMENT

### Phase 2 – Public Involvement and Survey Results & Analysis.

#### Background

In support of the public outreach effort detailed in our Public Participation Plan, the initial sequence of public meetings was to be followed by two additional sets of meetings. The resulting Covid pandemic derailed the ability to conduct meetings in public. Subsequently we relied on our social media platforms and the local media outlets to maintain public awareness of the study process and the final CUP documents.

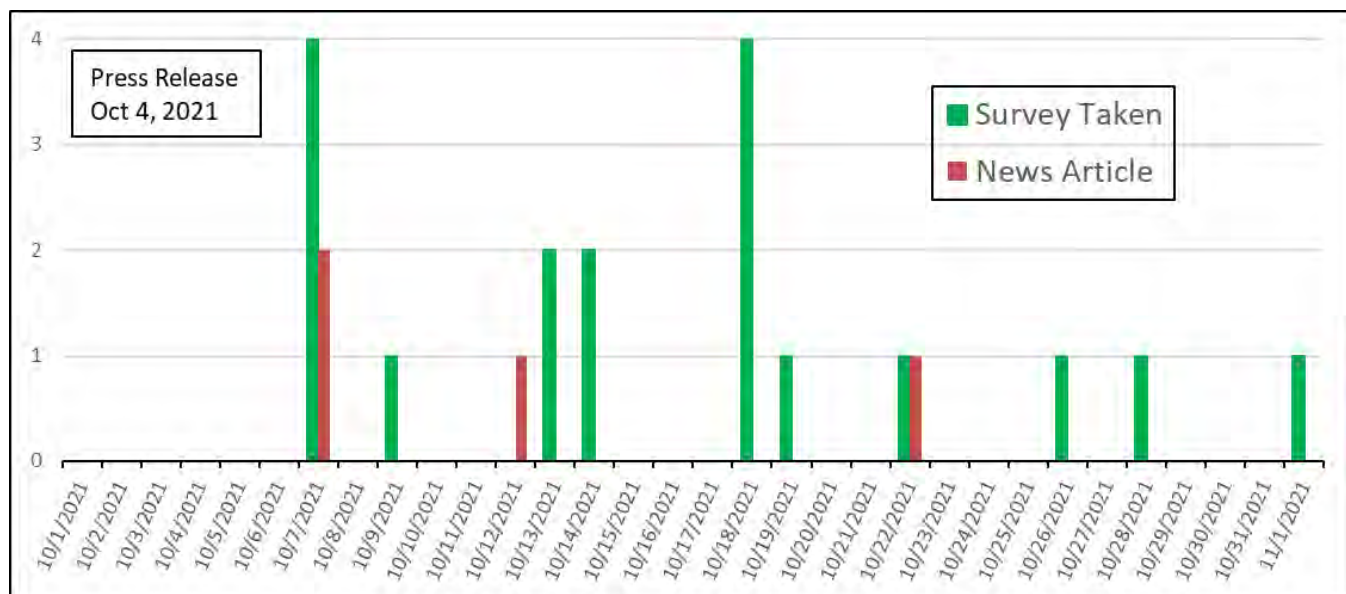
We did proceed with a second survey during the month of October 2021 to obtain additional feedback on our draft plan and any other concerns that should be addressed.

The survey consisted of thirty-one questions and an available open response. It was available online with links from the CUP webpage and Facebook. We also sent out press releases to the various media in the study area.

#### Survey Results & Analysis

The questions were focused on obtaining feedback to the draft study. We did however ask about other issues that had arisen during the study process. This included items such as Fort Knox's impact on real estate, noise, mission awareness, safety, communication, land use policy, building codes, and various types of acceptable ordinances. The online "Survey Monkey" software format was used with the survey period being 32 days.

The survey collected only 18 individual responses during the open period. Again, as with the first survey, we were aware that the sample size is miniscule compared to the population of the



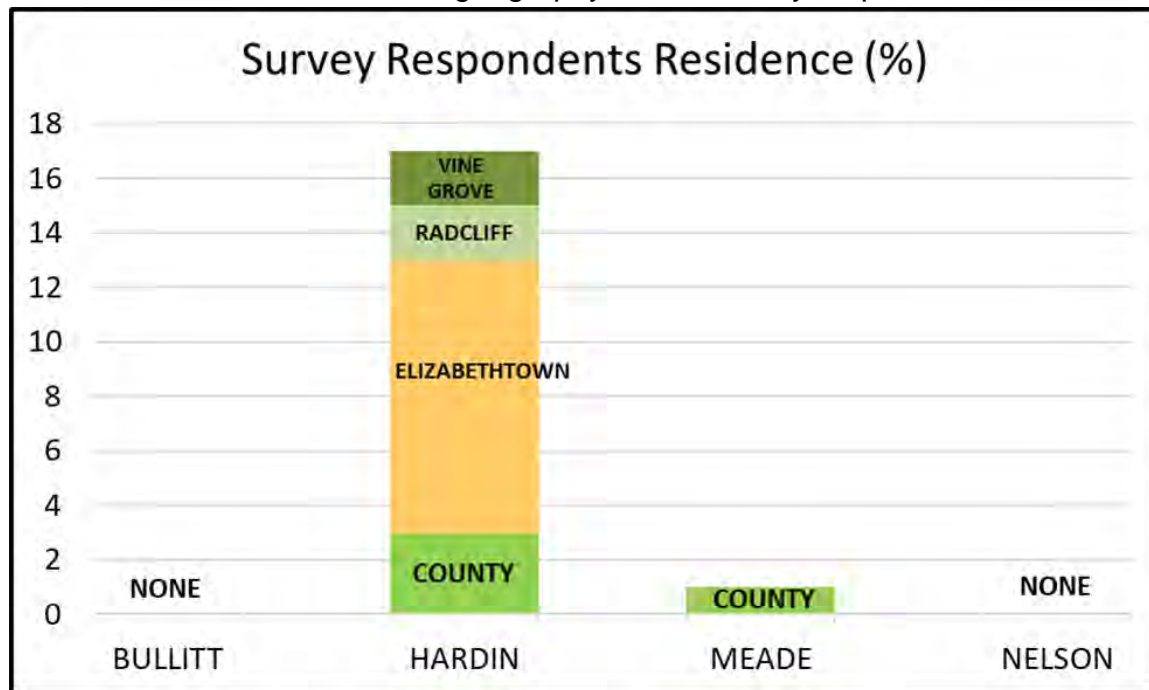
## Fort Knox CUP – Public Involvement Survey 2 Analysis

study area. The feedback did, however, allow for some additional refinement of the plan itself and helped to lay the groundwork for implementation activities in the future.

In the summary of the question responses following, any totals that do not add up to 18 means there were no additional responses given beyond the ones mentioned.

### DEMOGRAPHICS

A breakdown of the survey respondents and the overall study area is presented below. Question 1 established a basic geography for the survey respondents.



Question 2 inquired about tenure in the Fort Knox environ in general. Responses:

Between 1-5 years – 2

Between 10-20 years – 15

The integration of the surrounding community with Fort Knox is highlighted by the dependency of each upon the other in employer and employee relationship. Question 3 asks to this status and finds 76% of respondents have a connection through employment or service. A similar question in survey one yielded positive results of 61%.



## CUP STUDY

Questions then focused on the CUP Study itself and their awareness of the study, its process, and any results that have been made available.

Question 4, Have you read the Draft of the Compatible Use Plan (CUP) Study?

11 respondents had, 6 had not.

Question 5, If yes, do you feel that the CUP Study addressed all issues that you may be aware of?

9 respondents said YES, no other responses.

Question 6, If no, please list any topics that you feel were not addressed by the Study.

This had one response:

*“Economic impact. People are moving here from other facilities/areas with more money & buy, which makes the real estate prices higher. This has both pros & cons. They drive the prices up, then leave.”*

Housing is an item that is addressed in the plan. Both the need on and off post and the issue of rising costs. This issue is specifically addressed in Question 9 also.

## FORT KNOX'S IMPACT

Questions 7 – 9 involved Fort Knox apparent or perceived impact.

Question 7, Do you believe that Fort Knox has a positive impact on the surrounding communities and the quality of life within the community?

14 responded YES, 1 UNKNOWN.

Question 8, Do you consider Fort Knox and its operations to be a significant or insignificant economic contributor to the local/regional economy?

15 responded “Significant”, no other responses.

In the first survey 56% guessed low when asked about the dollar financial impact of Fort Knox.

Question 9, What is your impression of the impact of Fort Knox on the local real estate values?

9 Very Positive, 3, Positive, 2 Neutral, 1, No Opinion, no other responses.

## Fort Knox CUP – Public Involvement Survey 2 Analysis

The “Neutral” response was provided by the person who raised the housing cost issue in Question 6. In the first survey we asked, “How does Fort Knox influence your property values?” 76% felt they were positive or neutral with 24% claiming negative.

### LAND USE ISSUES

The next series of questions concerned land use conflicts such as noise or safety.

Question 10, Are you aware of any current or future land use conflicts occurring around Fort Knox?

10 NO, 3 YES

One “Yes” was followed up with “Residential & Commercial development”

Question 11, The Yano Range area in the southeast corner of Fort Knox is currently under redevelopment. It has been out of service for a few years. It will reopen as the Digital Air Ground Integration Range (DAGIR). This will increase the level of training at the post dramatically. The new range will allow for multiple air and ground units to operate and fire weapons simultaneously. This will be only the second of this type of range in the U.S., and only one east of the Rockies. It will be used by units from all across the country for training. Were you aware of the upcoming activation of the DAGIR equipped firing range at Fort Knox?

9 YES, 6 NO

Question 12, Were you aware of the potential increase in noise and overflights in conjunction with the DAGIR?

9 YES, 6 NO

Question 13, Do you reside within one mile of the Fort Knox Military installation?

1 YES, 14 NO

In the first survey we had inquired about living directly adjacent to the installation and 20% of the respondents stated they did. The presumption always has been the closer you are to something the more you believe it affects your daily life.

Question 14, If you answered YES to the previous question, how often does noise or overflights from Fort Knox disrupt your normal routine?

4 Never, 2 Monthly, no other responses.

Question 15, Do you believe that current or future missions at Fort Knox will affect your property value in a positive, negative, or neutral manner?

8 Positive, 5 Neutral, 2 I do not know, no other responses.



## Fort Knox CUP – Public Involvement Survey 2 Analysis

Question 16, Do you ever feel unsafe due to your proximity to Fort Knox?

15 Never, no other responses.

Question 17, Do you have concerns about military installations operations with regard to noise, vibrations, traffic, or other issues around Fort Knox? Please select all that apply.

3 Noise, 4 Traffic, 3 Vibration, 1 Dust, 6 None, 1 Other.

The other was filled it as:

*“I have some low flying airplanes over my home but I am not concerned, they noise doesnt bother me”*

In the first survey we asked about noise impact in particular. The results were 49% Never and an additional 15% less than once a month. Impact of once a week or more was reported at 24%.

### COMMUNICATIONS

Question 18, If you had a question or concern about Fort Knox, do you know who to contact?

5 YES, 7 NO, 3 I have never needed to contact Fort Knox.

In the first survey we asked, “Do you know who to contact with a compliant regarding Fort Knox?” 74% did not.

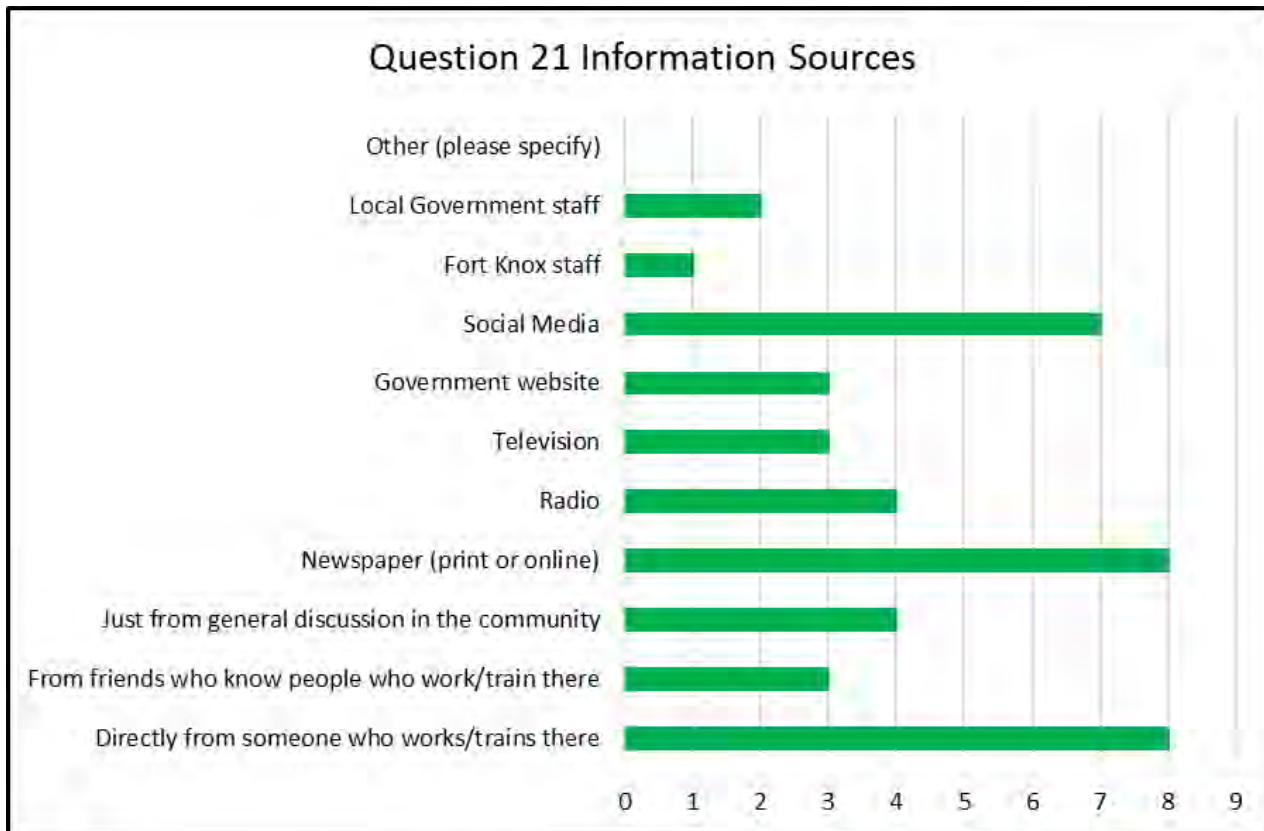
Question 19, How would you characterize communication between Fort Knox and the community?

5 Good, 6 Fair, 2 Poor, 2 Unsure/ No Opinion

Question 20, Do you feel you are informed regarding any activities at Fort Knox that may affect you personally?

3 Very informed, 7 Moderately informed, 4 Barely informed, 1 Not Applicable

Question 21, What information sources do you use to learn more about activities at Fort Knox that may affect you? Please choose the top 3 from the list.



Question 22, Are you familiar with the types of training and/or military operations conducted at Fort Knox?

6 YES, 8 Somewhat, 1 NO

Question 23, Do you feel that you need more information regarding Fort Knox operations and how they may affect you?

11 YES, 4 NO

#### REGULATIONS & ORDINANCES

Question 24, Would you support building codes for new construction that reduces or mitigates noise entering homes around Fort Knox?

10 YES, 4 NO

Question 25, Would you consider land use regulations an effective tool in preventing land use conflict between Fort Knox and the surrounding communities? These would be items such as zoning, building codes, real estate disclosures, etc.

14 YES, 1 NO

## Fort Knox CUP – Public Involvement Survey 2 Analysis

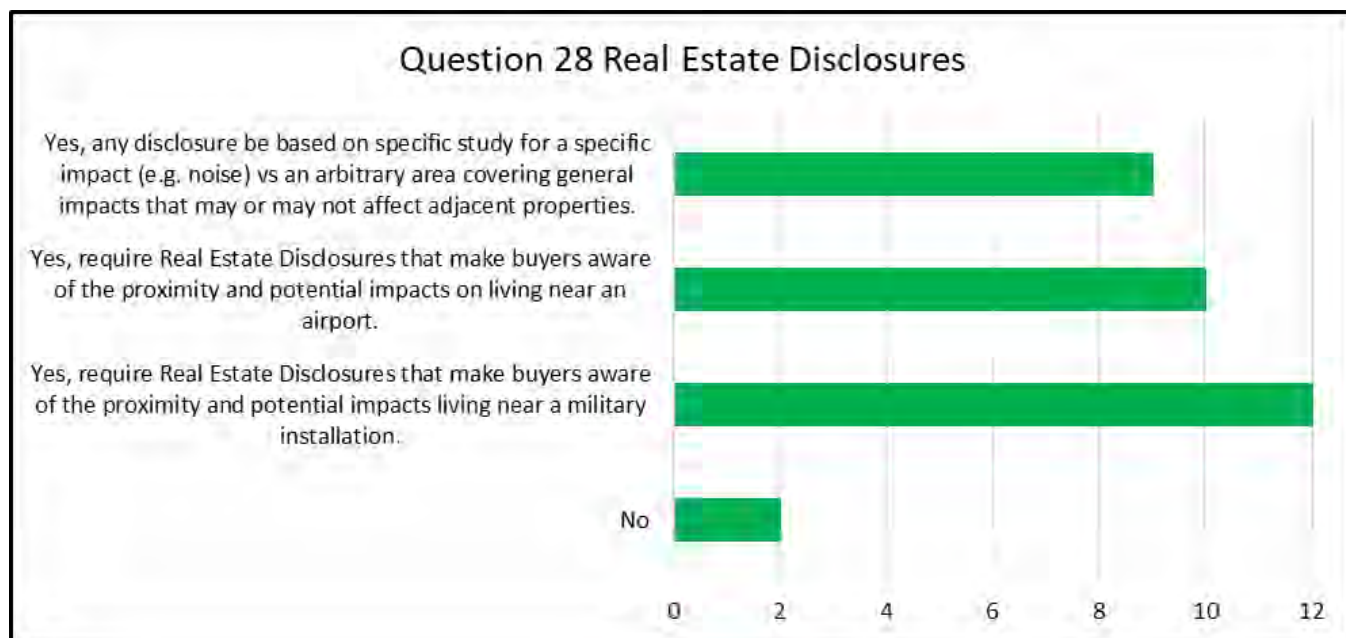
Question 26, In 1995, Hardin County established the KY 313 Buffer Corridor adjacent to Fort Knox. This limits new subdivisions to lot sizes of 10 acres or greater. This was instituted to limit dense residential development adjacent to the installation. Would you support additional buffer zones near Fort Knox to restrict the type and density of development to promote compatible use?

10 YES, 1 NO, 4 Unsure

Question 27, Would you support an ongoing committee, comprised of local elected officials and Fort Knox leadership, that would meet regularly to discuss issues related to development plans and community relationships?

15 YES

Question 28, In Kentucky, the Public Protection Cabinet provides the disclosure form 402 - Seller's Disclosure of Property Conditions. It is modified only through legislative action. Some requirements on the form are federally mandated such as issues involving lead paint. Others, such as asbestos, are state regulations. Radon, flood plains, physical condition of the home, home-owners associations, and water/sewer capabilities are other common examples. An unusually extreme but necessary example if the home ever contained a meth lab is also a required disclosure on Kentucky's form. Many states have rules in place that require disclosure for being near a military installation or airfield and the potential issues that could arise. This form does not apply to all transactions, only ones that may involve a realtor and some selected other cases. Court ordered foreclosures and sales by owner directly are examples that are not covered by this form. Would you be supportive of State regulated disclosures relating to compatible use and military installations? Select all that apply.



## Fort Knox CUP – Public Involvement Survey 2 Analysis

Of note, in the first survey when we asked about potential policy solutions to mitigate conflicts regarding land use and Fort Knox, 50% of respondents listed real estate disclosures as most useful, with buffer zones at 43%.

Question 29, Would you be in favor of ordinances that required noise suppression construction materials be used in new construction within a defined distance of Fort Knox?

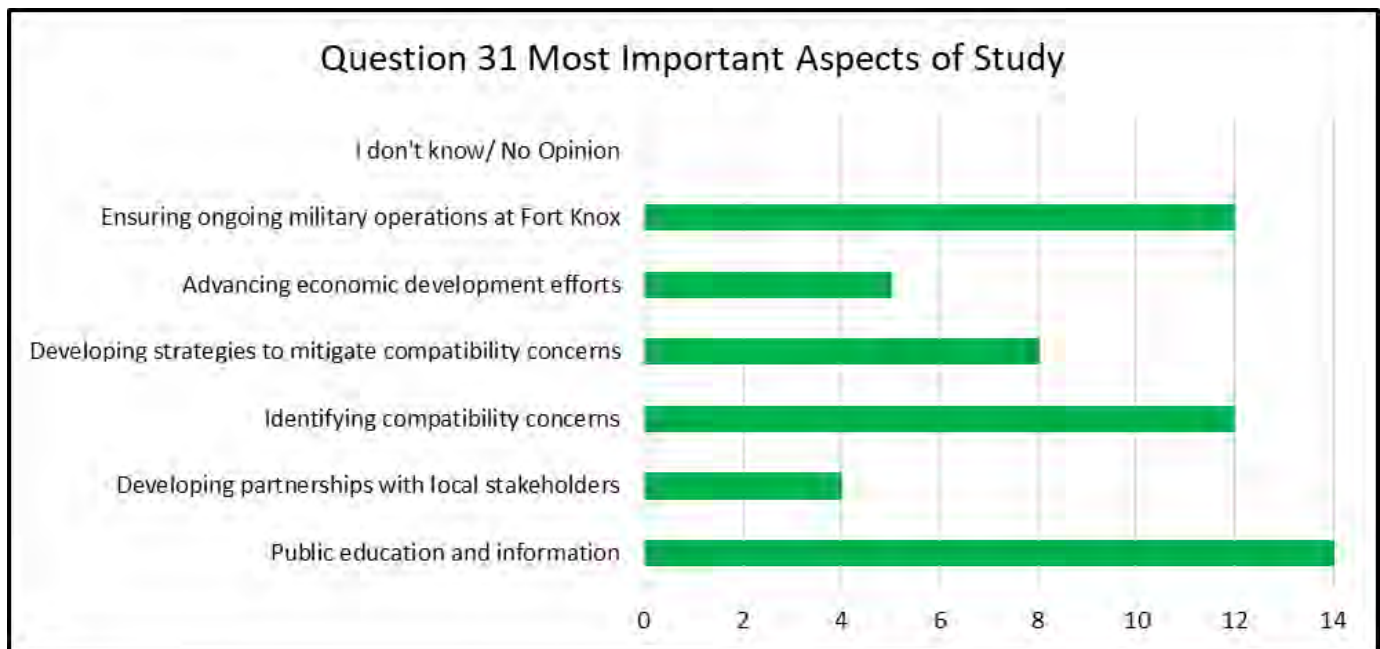
11 YES, 4 NO

Question 30, Would you be in favor of ordinances that required ambient light suppression designs be used in new construction within a defined distance of Fort Knox?

11 YES, 4 NO

In the first survey 78% of respondents stated they were not familiar with and current land use regulations regarding Fort Knox.

Question 31, From your perspective, what are the most important aspects of this study effort process? Select all that apply.



Question 32, Please add any other comments that you wish to share with the planning team:

This only drew one response.

*“For me its very simple; If you live near a base or military installment, then you should know what to expect. If you don't like it - don't buy nearby and/or move farther out of range. Regarding noise & vibrations, etc: If you buy near base, you should be aware of the issues that come with living near a base. If you don't like it, don't buy near a base. I for one, like when the planes fly*



*over my house low. It is not all day every day, its now and then. Not a big deal, I know I live near a base and we are retired military - goes with the territory. I however do support light suppression and land conservation &/or buffers. You have/had a lot of contractors, par-timers, temporary workers (both military and other) that come here, but do not live here full time. A place for them to stay would be helpful. Camp Carlson is nice, but when they are "living" there its not as enjoyable as a recreational facility. Maybe build another facility or expand the current one for a specific place for part timers, contractors, temporary living for people working on Knox. This may be something that can utilize buffer zones. "*

## SUMMARY

While the number of total respondents was disappointing, the information provided is valuable. Going forward the work between the communities and Fort Know to mitigate conflicts has become a local issue that is discussed. Using these insights should help with steering the implementation ideas toward efforts that will provide the most value.



## WHAT IS THE FT KNOX COMPATIBLE USE PLAN (CUP)?

The Compatible Use Program is a federally funded program administered by the Department of Defense (DoD) and Office of Economic Adjustment (OEA) to promote collaboration and cooperation among the Military, surrounding jurisdictions, community stakeholders, and states. This proactive collaborative process promotes open dialogue to encourage cooperative land use planning between Fort Knox and surrounding jurisdictions to guide future civilian growth and development to be compatible with the training and operational missions of Fort Knox. By mitigating incompatible civilian development and identifying strategies to reduce the operational impacts on adjacent lands, including environmental impacts of military operations, success can be achieved by all.

## DEVELOPING THE PLAN

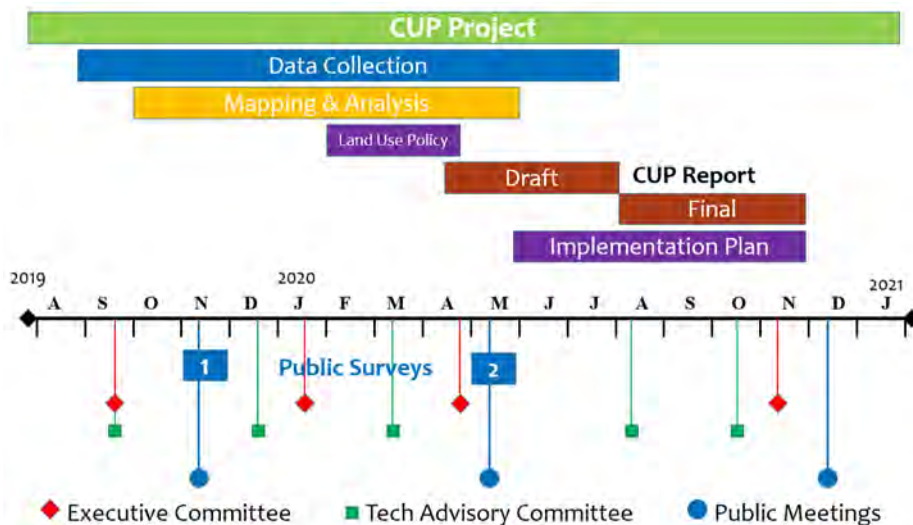
Lincoln Trail Area Development District (LTADD), a regional planning organization, is the project sponsor and coordinator for the Fort Knox Compatible Use Plan (CUP) as the project study area intersects several counties and municipalities within its region.

## SCOPE & TIMELINE

By December 2020, the study will produce a report and implementation plan to preserve military readiness and defense capabilities, while supporting continued community economic development and land uses compatible with military operations.

Work over the 18-month study period includes:

- The formation of Executive and Technical Advisory Committees.
- Engaging public discussion through public meetings and surveys.
- A detailed land use assessment for the area surrounding Fort Knox.
- Analysis of compatibility challenges within the study area.
- Recommendations and strategies to promote compatible land use between the installation and surrounding communities.



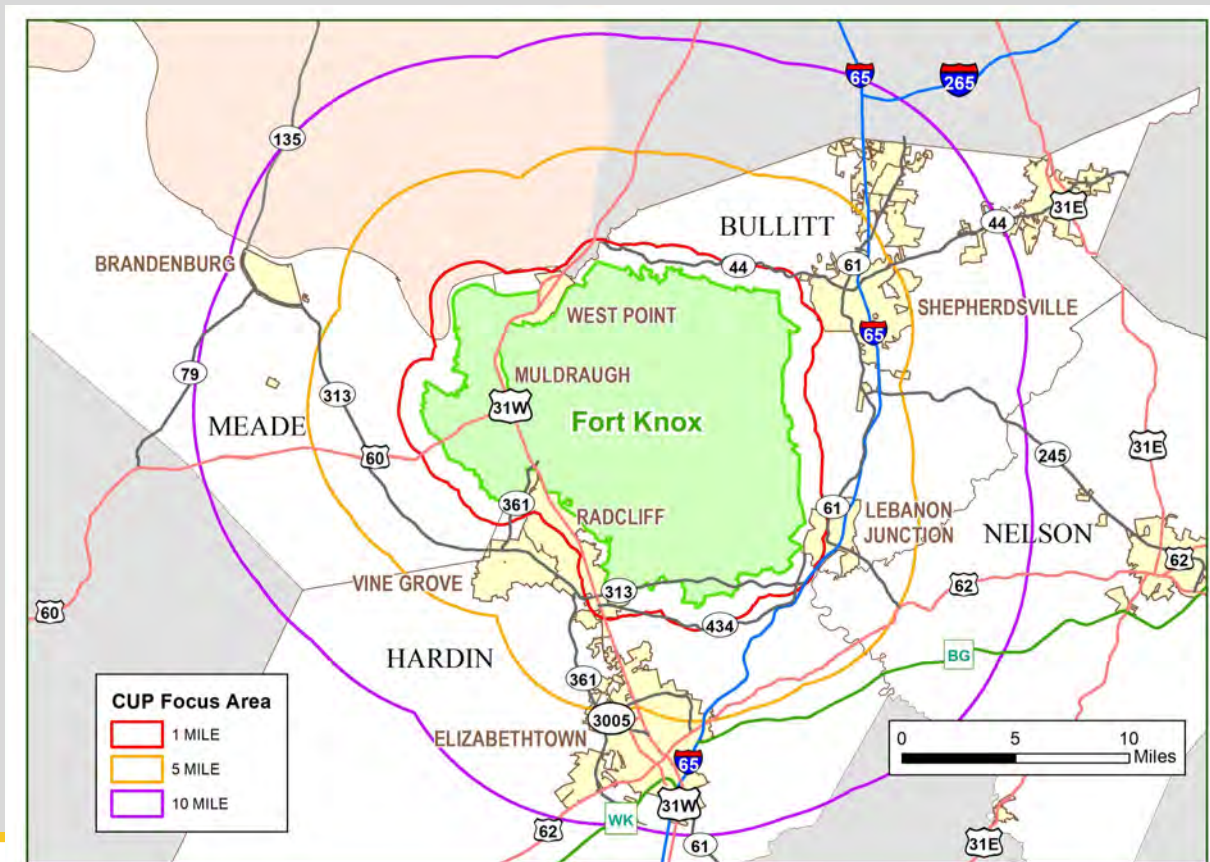
## THE GOAL

The goal of CUP is to provide a detailed dataset of existing or potential issues or policies that may create conflicts between military missions and the populations and governments of surrounding communities and the post. The study will use the gathered data to analyze these policies and issues and provide specific policy suggestions for implementation to address concerns. This creates a documented framework and procedure for identifying new issues and promoting ongoing discussions and policy modifications amongst the stakeholders.



## THE STUDY AREA

The larger study area encompasses parts of four counties adjacent to Fort Knox: Bullitt, Hardin, Meade and Nelson Counties which includes the cities of Brandenburg, Elizabethtown, Lebanon Junction, Muldraugh, Radcliff, Shepherdsville, Vine Grove and West Point.



## COMMITTEE STRUCTURE

Two committees (comprised of city, county, military and other stakeholders) will guide the development of CUP.

- **Executive Committee (EC)** – will consist of local elected officials representing jurisdictions in the study area, federal and state agency officials, and military leadership. The EC is responsible for leading the direction of the CUP and monitoring the implementation and adoption of policies and strategies.
- **Technical Advisory Committee (TAC)** – includes representatives and planners from local, regional, state and federal agencies, environmental organizations and the local development community. These representatives possess the technical knowledge and familiarity of their localities to guide and assist in the development of strategies and policies.



For more information on MissionKnox, visit the project website at [www.missionknox.org](http://www.missionknox.org) or call Lincoln Trail Area Development District at 270-769-2393.



# FAST FACTS:

## Compatibility Issues

*Potential encroachment and compatibility factors will be studied to create a sustainable balance between community and military needs and interests, therefore promoting environments where all coexist successfully.*

**AIR/ LAND SPACE** of an adequate size and quality are necessary for the military to accomplish training and operational missions. Competition for these shared resources can impact future growth of community and military uses.



**NOISE**  
Exposure to high noise levels can have a significant impact on human activity, health, and safety, as well as wildlife, livestock, and pets. Training operations that involve aircraft, ground vehicles, and weaponry can create noise impacts that extend beyond military installations.



**VIBRATION** may result from explosions, noise, mechanical operations, or other changes in the environment created by community or military activities.



**ENERGY DEVELOPMENT**  
of alternative energy sources such as solar, wind or biofuel could raise issues related to glare, vertical obstruction or water quality/quantity.

**LAND USE**  
Protects the public's health, safety and welfare by ensuring the use of one property does not negatively impact the use of another. The CUP study will examine local jurisdictions' comprehensive plans and zoning ordinances with military installation master plans to ensure compatibility.



**ENDANGERED & THREATENED SPECIES**  
can be pushed out of habitat areas by development, thus increasing their numbers on installations. The presence of threatened or endangered species may require special development considerations and should be included early in planning processes for installations and communities.

### COMMUNICATION & COORDINATION

The lack of interface between entities can cause confusion and frustration when issues arise. Encouraging dialogue and ongoing collaboration develops environments where each can successfully coexist.



**LIGHT & GLARE**  
from commercial, industrial, recreational, and residential uses can interfere with both community and military activities, impacting the use of military night-vision devices and air operations or negatively affecting the community.





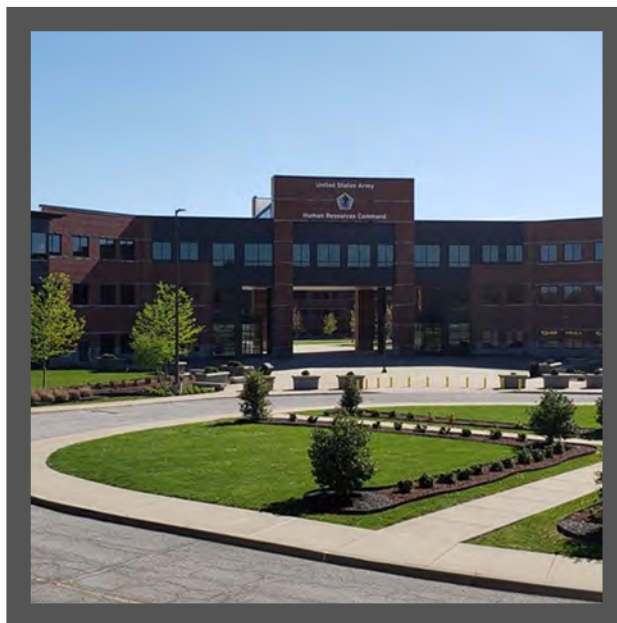


**SAFETY** zones include areas where development needs to be more restrictive due to the high risks to public safety, such as weapons ranges and flight corridors.

**SECURITY** related to Anti-Terrorism/Force Protection is of primary concern as Fort Knox is home to the military's Human Resource Command.



Safety of installation personnel, facilities, and information from outside threat is vital, and impacts off-installation uses.



### TRANSPORTATION & INFRASTRUCTURE



Issues cover the provision or development of infrastructure such as roads, sewer, water, etc., in the proximity of the installation. Expanded infrastructure can enhance operations of the installation but also encourage growth in other areas that might not be compatible. Transportation capacity and congestion are factors to consider as population increases in the surrounding communities and on the installation.



### AIR QUALITY

from a compatibility perspective includes pollutants that limit visibility and fails to reach air quality standards that may limit future changes in operation at the installation or in the surrounding communities. Examples include: fire from artillery exercises, ground disturbance from military operations or industrial activities.



### VERTICAL OBSTRUCTION

Tall structures such as buildings, construction cranes, wind turbines and cell towers within the vicinity of Fort Knox can be hazardous and encroach into navigable air space or line of sight radar transmissions.



### FREQUENCY SPECTRUM

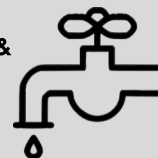
**CAPACITY** is critical for maintaining existing and future missions and communications on installations. Advances in consumer electronics have increased use of the frequency spectrum and can impact military operations.

### INTERFERENCE

Interrupting electronic signals or the inability to distribute and receive a particular frequency because of similar frequency competition.

### WATER QUALITY & QUANTITY

concerns include the guarantee that adequate water supplies of good quality are available for use by the surrounding communities and the military installation as the area develops. This also takes into consideration growth for agricultural and industrial use along with stormwater issues.



For more information on MissionKnox, visit the project website at [www.missionknox.org](http://www.missionknox.org) or call Lincoln Trail Area Development District at 270-769-2393.



# mission

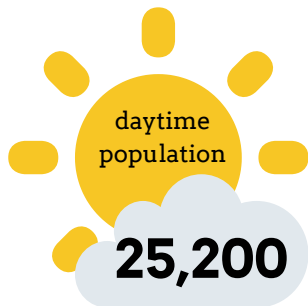
## KNOX



missionknox.org



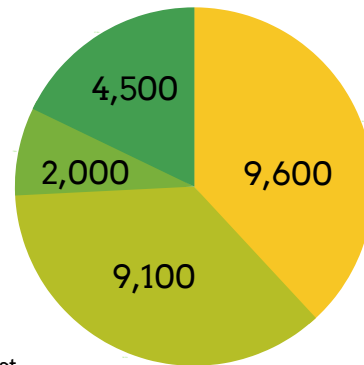
## FAST FACTS: The Importance of Fort Knox



### FORT KNOX

#### Population Breakdown

- Active-duty military
- DOD civilian employees, contractors & others
- Reserve component military
- Dependents of active-duty military living on post



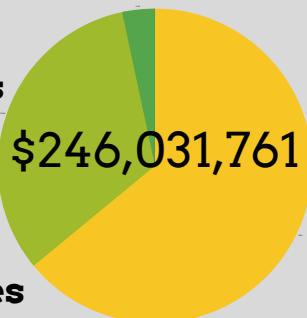
### 15th largest city in Kentucky

- \$2.6 Billion - Installation Expenditures (including payroll)
- \$750 Million - In Payroll
- \$732 Million - Fort Knox's Mission & Installation Contracting Command (MICC) obligates largest annual dollar amount of contracts

Source: U.S. Arm Fort Knox



### Community Investments due to Fort Knox BRAC 2005 Expenditures



- Highways \$157,536,761
- Water & Sewer \$80,236,270
- Schools \$8,258,730

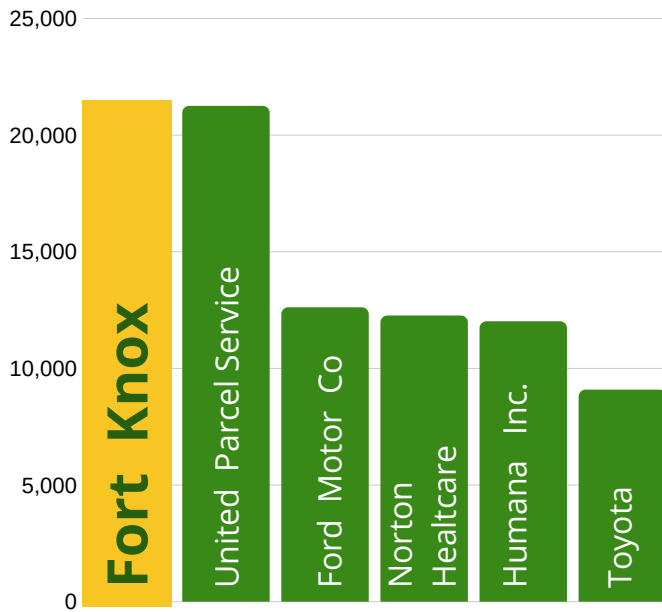
### World-Class & Energy Efficient



World-Class ranges and over 100,000 acres of training areas equipped with state-of-the-art Military Operation on Urban Terrain (MOUT) site to 360 live-fire river range makes Fort Knox the ideal location for combat units.

The Army's energy conservation starts at Fort Knox. Commonly referred to as the best energy program in the Department of Defense, with 50 Energy Star-rated buildings and over 6.7 million square feet of administrative space cooled and heated by geothermal and solar energy.

# The **IMPACT** of Fort Knox



*Excludes Education and Retail*

*Sources: KY Cabinet for Economic Development, Dun & Bradstreet, Greater Louisville Economic Development*

## Kentucky's Largest Employers by Number of Employees

Fort Knox	21,473
United Parcel Service	21,233
Ford Motor Co	12,600
Norton Healthcare	12,247
Humana Inc.	12,000
Toyota Motor Manufacturing	9,069

## Top 5 Employers by County

### Bullitt County

3,300 - Amazon  
1,800 - Bullitt BoE  
1,100 - LSC Communications  
825 - Louisville Seating  
800 - Geek Squad

### Hardin County

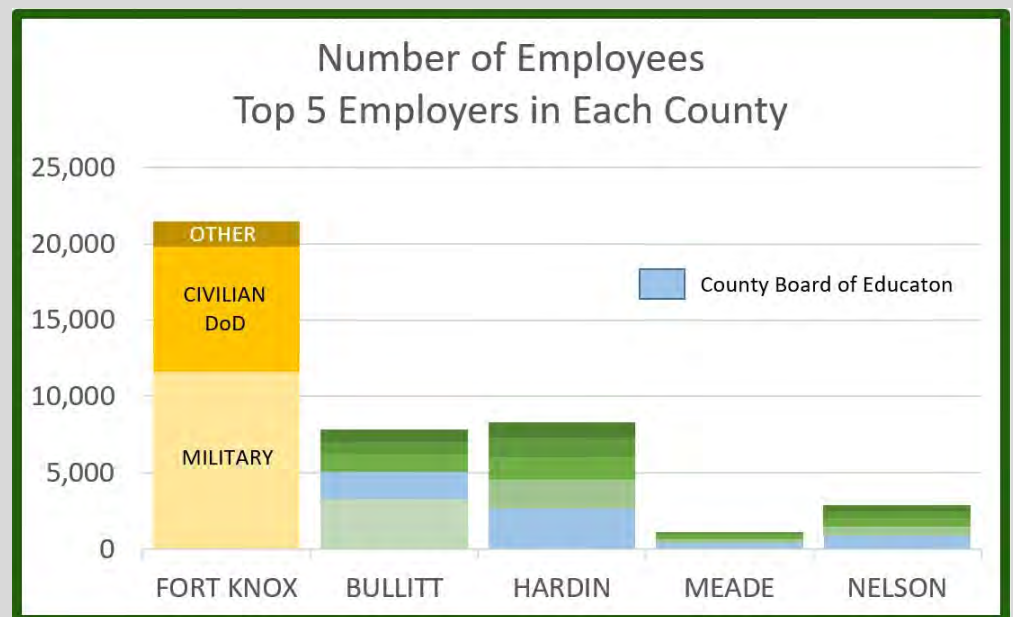
2,650 - Hardin BoE  
1,875 - Metalsa  
1,470 - Hardin Memorial Hospital  
1,300 - Akebono  
1,005 - Baptist Healthcare

### Meade County

412 - Meade BoE  
250 - Lusk Group  
242 - Monument Chemical  
130 - Meade County Fiscal Court  
114 - Meade RECC

### Nelson County

896 - Nelson BoE  
593 - American Fuji Seal  
537 - Tower Automotive  
473 - Sazerac Distillers  
413 - Heaven Hill



*Sources: KY Cabinet for Economic Development, Dun & Bradstreet, Bullitt County Board of Education*



For more information on MissionKnox, visit the project website at [www.missionknox.org](http://www.missionknox.org) or call Lincoln Trail Area Development District at 270-769-2393.

*This document was prepared with financial support from the Office of Economic Adjustment, Department of Defense. The content does not necessarily reflect the views of the Office of Economic Adjustment.*

## Appendix B – Data Sources and Issues

### Census Block Data

A brief understanding of how the Census geography changes between Census is needed with regard to interpreting the data presented. Over time the boundary and number of individual Census blocks can change. This can result in issues with comparison of data at this level of detail. Because our study area buffers do not necessarily correspond to the delineations of individual blocks, the number of blocks within each buffer zone will change over time. See Table 26. The increase of

granularity of the block increases the validity of the data counts that are extracted by the intersections of the buffer zones with the block level data. Thus the 2020 data count can be presumed to be more accurate than the 1990 due the increase of the blocks that cover the same geography of a particular county. Between 1990 and 2020, the increase in the total number of Census blocks for the combined one and five-mile buffer was 15%. The selection method used for this study involved including a Census block when its centroid lay within a particular buffer zone.

**Table 26 US Census Blocks in Buffer Zones**

DECENNIAL CENSUS "BLOCKS" BY BUFFER ZONE								
(city totals are included in county totals)	1990		2000		2010		2020	
	1 MILE	5 MILE	1 MILE	5 MILE	1 MILE	5 MILE	1 MILE	5 MILE
Bullitt County	108	337	98	375	94	493	70	415
Lebanon Junction	15	21	21	36	23	58	20	42
Shepherdsville		63		114		178		171
Hardin County	339	522	277	482	434	750	367	673
Elizabethtown		32		95		168		157
Radcliff	117	79	139	125	209	174	198	161
Vine Grove		72		93		113		112
West Point	62		79		95		77	
Meade County	44	162	64	130	127	191	101	146
Brandenburg								
Muldraugh	6		46		64		57	
Nelson County		25		17		34		26
Jefferson County	7	115	8	113	10	137	9	98
<b>Total Study Area</b>	<b>498</b>	<b>1,161</b>	<b>447</b>	<b>1,117</b>	<b>665</b>	<b>1,605</b>	<b>547</b>	<b>1,358</b>

Source: U.S. Census, Decennial Census. Selection method block polygon centroid withing buffer zone.



## Building Permits

The data for building permits was primarily sourced from the permitting agencies in each jurisdiction.

**Table 27 Building Permit Sources**

RESIDENTIAL BUILDING PERMITS	PRIMARY SOURCE DATA RANGE			
	FROM	TO	NOTE	
Bullitt County	1/1/2010	12/31/2019	1/28/2020	32 thru Jan 2020
Hardin County	1/1/20009	12/31/2019		
Elizabethtown	1/1/2010	12/31/2019	1/22/2020	8 thru Jan 2020
Radcliff	1/1/2017	12/31/2019		
Vine Grove	1/1/20009	12/31/2019		
West Point	nda	nda		
Meade County	7/1/2010	6/30/2020		
Brandenburg	nda	nda		
Muldraugh	1/1/2010	12/31/2019		
Nelson County	1/1/20009	12/31/2019		

Bullitt County Joint Planning Commission, export from their permit tracking database. Includes all incorporated cities and unincorporated county.

Hardin County Planning & Development, export from their permit tracking database.

Elizabethtown Planning Commission, export of constructing permit file.

Radcliff Planning Commission, export of new building data file. Some data was extracted from available media accounts as follows.

## The News-Enterprise

Jan. 14, 2018,  
[https://www.thenewsenterprise.com/news/local/local-construction-sees-uptick-in-2017/article\\_46aa844e-ac3a-5c7a-8448-3c74b1042ab4.html](https://www.thenewsenterprise.com/news/local/local-construction-sees-uptick-in-2017/article_46aa844e-ac3a-5c7a-8448-3c74b1042ab4.html)

July 22, 2011,  
[https://www.thenewsenterprise.com/news/local/housing-market-leveling-off-after-banner-year/article\\_36a84046-149c-502f-9e51-f1d7ea067e45.html](https://www.thenewsenterprise.com/news/local/housing-market-leveling-off-after-banner-year/article_36a84046-149c-502f-9e51-f1d7ea067e45.html)

Feb. 24, 2014,  
[https://www.thenewsenterprise.com/news/local/local-construction-healthy-in-2013/article\\_55298520-b394-58ac-a187-e9567a062b45.html](https://www.thenewsenterprise.com/news/local/local-construction-healthy-in-2013/article_55298520-b394-58ac-a187-e9567a062b45.html)

Vine Grove Planning & Zoning Commission, export of building permit file.

West Point Planning & Zoning Commission, no data available.

Meade County Planning Commission, export from permit info file.

Brandenburg Planning & Zoning Commission, no data available.

Muldraugh Planning & Zoning Commission, building permit list provided.

Nelson County Joint Planning Commission, compiled from annual reports.

## Noise and Encroachment Complaints

The data used to map and analyze in Section IV, Compatibility Issues was obtained from the Fort Knox Garrison Command/Public Affairs Office (PAO). It is a collection of complaints filed through the PAO from the years 2007 – 2019. It contained the location the issue occurred, the complaint itself and the resulting action of the PAO. It is not to be considered a complete list of all complaints since many other units on post are also contacted by the public with these types of issues. This is a concern that is addressed in the implementation plan; to create a collection form and clearing house for these issues, regardless of how they are received.

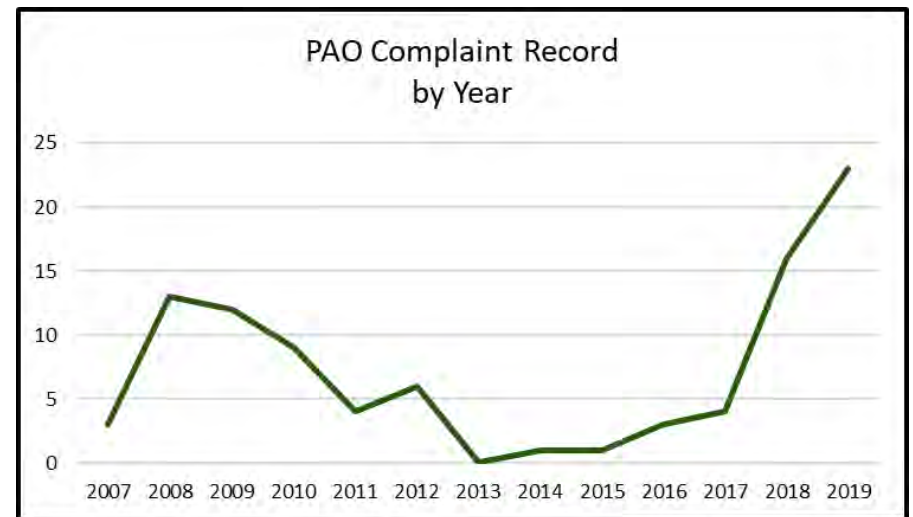
The data is reported to be more comprehensive in the last three years of the collection. There are 96 complaints recorded over the 13 years of data. Of those, 95 were applicable and 87 were geolocated with some certainty. Of remaining 8, where the location could not be determined with specificity, 7 were noise and 1 vibration. Two of those were in Bullitt County.

The time-frame charts presented here are for information purposes only and any determination of trends from these would be considered a stretch. The consideration of air temperature and leaf canopy could provide some seasonal variation but that would have to be validated through training records to match with specific complaints. The location and type of the complaints are, however, felt to be data that is of value in consideration of any implementation strategies.

The complaints and responses take many forms. They were all reviewed to attempt to provide some insight regarding people's concerns. The information recorded the type of complaint, an address

location, a textual description, and the response. In some cases, particularly if damage was an issue, the complaint was referred to Claims 4-6913. Because of the nature of the complaints, many have a combination of issues. Helicopters are both too low and too noisy for example. In reviewing the data, a best attempt was made to isolate the primary concern for each individual complaint and the "Type" of complaint reflects this analysis. The following are a sample of the types of issues raised and the concerns expressed via direct quotes from either emails or the comments as documented by the PAO processing the complaint. An additional item of interest is that the form also charted if it was a "Repeat Caller". The original dataset contained 27 - Yes, 61 - No, and the remaining 8 no record.

**Chart 19 PAO Noise Complaint by Year**



### Noise/Vibration

*"Noise lasted for three days, shakes entire house, cracks in walls. She is not in good health and can't sleep anyway. In the*

mornings the noise returns around 0900 & 1100. It is very, very loud. Cannot afford to move. It gets really scary.”

“Said yesterday afternoon noise started and went on into the evening up until 1:30 in the morning. Kept her family up and her dog barked all night.”

**Chart 20 PAO Noise Complaint by Month**



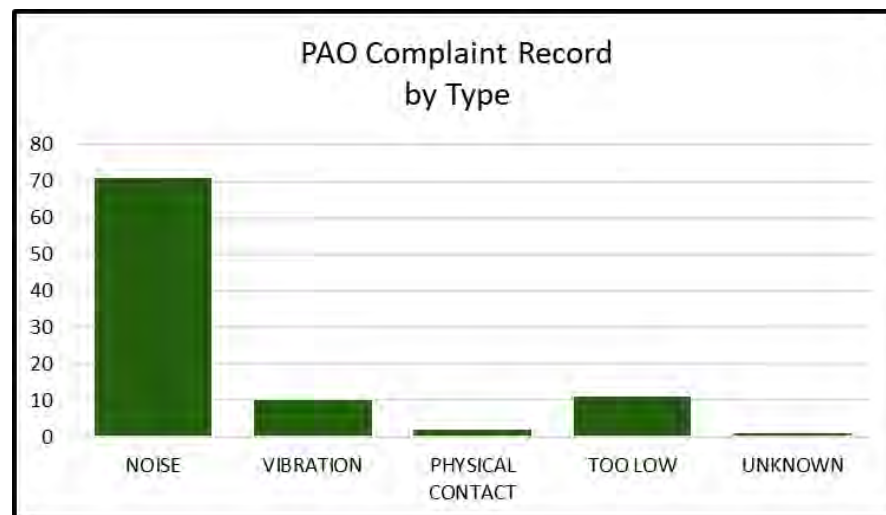
“Him and his wife have lived in this location for 1 1/2 yrs. When they looked at the house they were aware of the proximity to Ft Knox but were assured by the realtor that Ft. Knox was not going to be a training base and most of the training exercises would leave but they have not seen a decrease in the activity. The house shook all weekend. He thinks the noise is getting lousder [sic] and the whole house shudders now.”

## Physical Contact/Too Low

“I have called many times about you being over the BUFFER ZONE BROKEN GLASS PICTURES FALLING OFF WALL Going to court house file complaints...”

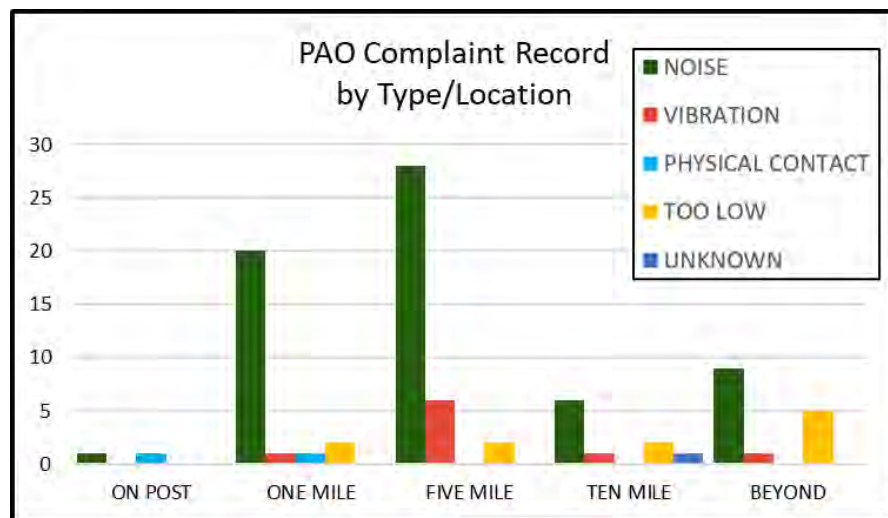
“Speed limit is 25 mph through subdivision. Military [sic] vehicles are speeding through every day, early morning until about 1400. They are coming from Yano, he said, and he'll call State Police to catch them if they don't stop.”

**Chart 21 PAO Noise Complaint by Type**



“On wednesday [sic] night 23 Oct at around 1 a.m. helicopters were flying very low above our house. They were below 100 feet and they rattled my house. Fort Knox has 109,000 acres, why do they have to fly over residential areas.”

Chart 22 PAO Noise Complaint by Type & Location



*“Tues. night (10/22) at around 11 p.m. helicopters were flying about 200 ft. above our house. There is no need to fly over a subdivision that low, that late at night. I understand at 3 in the afternoon, but not at night. That is what the restricted airspace on Fort Knox is for.”*

An issue raised are people’s concept that there is a “buffer” or “zone” that is being violated. This buffer has been expressed as both an area and an altitude. This is a consideration for the communication aspect in the Implementation Strategy, Section VI.

In support of “Table 15 Risk of Noise Complaints by Level of Noise” in Section II, Fort Knox, the legend is included following. Note “NLR” is Noise Level Reduction. Bold, underlined portions highlighted for emphasis by LTADD.

1 Although local conditions regarding the **need for housing may require noise-sensitive land uses in Noise Zone II, on or off post, this type of land use is strongly 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 noise-sensitive land use would not be met if development were prohibited in Noise Zone II.

2 **Where the community determines that these uses must be allowed, measures to achieve an outdoor to indoor noise level reduction (NLR) of at least 25 dB to 30 dB in Noise Zone II, from small arms and aviation noise, should be incorporated into building codes and be in individual approvals.** The NLR for communities subject to large caliber weapons and weapons system noise is lacking scientific studies to accomplish the recommended NLR. For this reason it is strongly discouraged that noise-sensitive land uses be allowed in Noise Zone II from large caliber weapons.

3 Normal permanent construction can be expected to provide a NLR of 20 dB, for aircraft and small arms, thus the reduction requirements are often stated as 5, 10 or 15 dB over standard construction and normally assume mechanical ventilation, upgraded Sound Transmission Class (STC) ratings in windows and doors and closed windows year round. Additional consideration should be given to modifying NLR levels based on peak noise levels or vibrations.

4 NLR criteria will not eliminate outdoor noise problems. However, building location and site planning, and design and use of berms and barriers, can help mitigate outdoor noise exposure NLR particularly from ground level aircraft sources. Barriers are generally not effective in noise reduction for large arms such as artillery and armor, large explosions, or from high-level aircraft sources.<sup>198</sup>



## Land Use and Zoning Data

The data used

### BULLITT COUNTY

#### Bullitt County Joint Planning Commission

*Bullitt County Comprehensive Plan*, 2015.

Bullitt County Zoning Map, March 7, 2013.

<https://bullittcountyky.us/documents/zoning-maps/>

*Bullitt County Future Land Use Map*, 2020

-GIS Layers

Bullitt County Land Use with zoning, c.2006. Data may only be current to 2002 per BCJPC.

Land Use 2019\_KYTC4\_version, from ArcGIS Online, 2/5/2019 downloaded Oct 20, 2020.

### HARDIN COUNTY

#### Hardin County Planning and Development Commission

*Planning for Growth – Comprehensive Development Guide 2019*

-GIS Layers

Master Zone, Dec 4, 2019, Contains polygon groupings based on the 28 planning areas in the county as defined by the 2019 comprehensive plan.

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Hardin Parcel Zoning Layer, c. 2011, Zoning as assigned at the parcel level. Note some issues as described in Section I – Region and Community Profiles would apply to this data also as a PVA base layer of prior date is presumed to be the source of these polygons.

#### Radcliff Planning Commission

*City of Radcliff Comprehensive Plan*, August 1, 2019

While dated 2019 most of the data and analysis included is only current through 2003 with a few mentions to 2013. Many events have occurred in the interim that have not be reviewed such as BRAC infrastructure developments and mission and infrastructure changes at Fort Knox.

*City of Radcliff Zoning Map*, March 5, 2014

-GIS Layers

ZONE, c. 2013, Zoning as assigned at the parcel level. Note some issues as described in Section I – Region and Community Profiles would apply to this data also as a PVA base layer of prior date is presumed to be the source of these polygons. There have been some annexations since the date of this layer. These include several areas that fall within the one-mile buffer in the northwest portion of the city and along KY 434 in the southeastern area.

#### West Point Planning & Zoning Commission

*Code of Ordinances, Title XV: Land Usage*, 2005

City of West Point, *Comprehensive Plan*, July 2004

*Zoning Map*, West Point, Kentucky, 2010. Based on 2008 Zoning data.

-GIS Layers

Zoning, c. 2005 with updates in 2008. Based on parcel level polygons. Created by LTADD for Comprehensive Plan update and subsequent zoning maps.

## MEADE COUNTY

### Meade County Planning Commission

*Meade County Comprehensive Plan*, 2013

*Meade County Subdivision Regulations*, 1999, Amendments thru 31 May, 2011.

-GIS Layers

Zoning, 10 Oct. 2019. Created and maintained by the Commission.

### Muldraugh Planning & Zoning Commission

*Comprehensive Plan for Muldraugh, Kentucky*, 2013

*Code of Ordinances, Title XV: Land Usage*, 2015

-GIS Layers

Muldraugh Land Use & Zoning, 2014. Digitized from USDA/NAIP/FSA imagery, 2012 by LTDD and verified by city.

## NELSON COUNTY

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### Joint City-County Planning Commission

Annual Reports – 2009-2020 (support source for building permit data).

Following online @ <https://ncpz.com/ordinances>

*Nelson County 2035: A Comprehensive Plan for the Cities of Bardstown, Bloomfield, Fairfield, and New Haven and Nelson County*. (re-adopted October 25, 2016).

*Zoning Regulations for All of Nelson County*, Considered current 2021.

*Subdivision Regulations*, Considered current 2021.

-GIS Layers

Nelson Existing & Future Land Use, 2019. Based on parcel level data. Created by LTADD in 2005 and maintained by LTADD and/or JCCPC to date.

## City of Hopkinsville, Ky. – Special Use District

### Section 158.406 Special Standards

Source:

[https://codelibrary.amlegal.com/codes/hopkinsville/latest/hopkinsville\\_ky/0-0-0-14408](https://codelibrary.amlegal.com/codes/hopkinsville/latest/hopkinsville_ky/0-0-0-14408)

(F) Additional restrictions within SUD 41A. An overlay zone is created and shall be designated on the official zoning map as follows:

- (1) APZ, Accident Potential Zone;
- (2) DNL-II, Day-Night Noise Level Zone II; and
- (3) DNL-III, Day-Night Noise Level Zone III.

(G) Table. The table below lists the specific restrictions with the overlay zones of the SUD 41A.

TABLE II Specific Development Restrictions Within SUD 41A			
Land Use Classification	APZ-2 (Allowable)	DNL Zone II (Allowable)	DNL Zone III (Allowable)
#1	NO	YES (DNL 45)	YES (DNL 45)
#2	NO	YES (DNL 45)	YES (DNL 45)
#3	NO	YES (DNL 45)	YES (DNL 45)
#4	YES	YES	YES
#5	YES/NO(1,2)	YES	YES
#6	YES/NO(1,2)	YES	YES
#7	YES/NO(1,2)	YES	YES
#8	YES	YES	YES
I-1/I-2	YES/NO(1,2)	YES	YES
RMH-1/RMH-2	NO	NO	NO
<b>Notes to table:</b>			
(1) Use is not allowable if it involves the lodging of people (transient lodging, hotels, motels, recreational vehicle parks, camp grounds).			
(2) Use is not allowable if it involves a large concentration of people. A large concentration of people is defined as a gathering of individuals in an area that would result in an average density of greater than 25 people per acre per hour during a 24-hour period, or a single event that would result in the gathering of 50 or more individuals per acre at any one time. Density averages shall be calculated per Ft. Campbell JLUS, Joint Land Use Study, dated January 1996.			
DNL < 45 Interior Day Night Noise Level of < 45dB. Noise attenuation measures incorporated into the construction of the building to bring the interior DNL to < (less than or equal to) 45dB.			

(H) Land within the overlay zone APZ, DNL-II or DNL-III may not be used for any purpose other than those indicated by the approved development plan and under the conditions attached thereto. Property owners should consult both the text of this chapter, the Official Zoning Map and the Fort Campbell Joint Land Use Study (JLUS), January 1996, to determine the location of properties in question and the limitations imposed thereon by this chapter.

(1) All construction must meet the minimum requirements of the Kentucky Building Code. Residential developments shall be designed and constructed to provide, wherever possible, for the location of outdoor activity areas, such as balconies and patios, on the side of the building which is sheltered from the aircraft flight path. In the

designated DNL-II and DNL-III, residential dwellings may be constructed provided.

(a) Sound attenuation features are built into the dwelling to bring the interior DNL of the living unit to 45 decibels or below. The architect and the contractor shall provide certification of compliance for sound attenuation features and construction; and

(b) The contents and covenants of deeds identifies the property as being located near an airport and in a DNL-II or DNL-III zone, and the aircraft noise may affect normal livability, value and marketability of the property.

(2) In the APZ, residential developments and limited high density uses are prohibited due to the high probability of aircraft accidents occurring (See Table II, this section).

(3) All lights or illumination used in conjunction with street, parking signs or use of land and structures shall be arranged and operated in such a manner that is not misleading or dangerous to aircraft operating in the vicinity.

(4) No allowable, proposed, transitional or special use of any type shall produce smoke, glare or other visual hazards within three miles of any useable runway.

(5) No allowable, proposed, transitional or special use of any type shall produce electronic interference with navigation signals or radio.

(6) No allowable, proposed, transitional or special use shall promote the gathering, feeding or roosting of birds within 10,000 feet of any runway.

(7) Notwithstanding the provisions of this chapter or any other ordinance, property owners or their agent proposing to erect or alter any structure that may affect the navigable airspace shall notify the Federal Aviation Administration in accordance with FAA Advisory Circular # 70/7460-2 (Appendix 1) and amendments thereto. Structure lighting shall be installed on the structure in accordance with the specific standards established in FAA Advisory Circular #70/7460-1 (Appendix 2) and Amendments thereto.

(Ord. 33-99, passed 11-2-1999; Ord. 10-2006, passed 3-23-2006)

## City of Colombia, Ky. – Noise Buffer Zone

### 11.10 Noise Buffer Zone

A. No residential buildings or other noise sensitive uses such as nursing homes, hospitals etc. shall be located within 900 feet of the Cumberland Parkway right of way unless a site specific noise assessment is prepared by a registered engineer showing that the average day-night noise levels will not exceed 65 dB. The noise analysis shall be based on average daily traffic (ADT) levels projected for 30 years in the future provided by the Kentucky Transportation Cabinet.

B. If traffic projections are not available, an ADT of 14,000 shall be used. If exterior noise levels will exceed 65 dB, noise attenuation measures such as barriers (walls or berms) shall be required as necessary to reduce noise levels to 65 dB or less.

(Ordinance Adopted 5 March 2007.)



## Appendix C – Real Estate Disclosures

As discussed in section IV – Compatibility Mitigation Tools, the concept of real estate disclosures to assist in reducing conflict between a military installation and its neighbors has been used with some success.

During our various committee meetings this concept raised interest to a level that LTADD was invited to brief the Kentucky General Assembly's Interim Joint Committee on Veterans, Military Affairs, and Public Protection. This briefing occurred on 23 November 2021. A partial result of that briefing was the introduction of House Bill 89 "*AN ACT relating to real property disclosures*" during the 2022 Regular Session. In addition to presenting selected information contained in this study that highlighted need for and the method of implementation, a briefing paper was also provided. This paper served as a summation of the issues and their potential mitigation via the use of real estate disclosures. The following text is from that paper.

### **KENTUCKY REAL ESTATE DISCLOSURES & MILITARY INSTALLATIONS**

#### **Introduction**

This paper outlines the need for updates to the Commonwealth of Kentucky's real estate disclosure form - 402 - *Seller's Disclosure of Property Conditions*. In particular, enhancing the ability to promote compatible land use around military installations that will protect both the military's mission and potential homeowners from unnecessary conflicts.

#### **Background**

In 2019, Lincoln Trail Area Development District in cooperation with Fort Knox, initiated a review and update of the 2008 Joint Land Use Study (JLUS). This prior study provided background and analysis of potential concerns in the surrounding region that might inhibit Fort Knox's missions. This new study, now referred to as a Compatible Use Plan (CUP), was funded via a grant from

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the DoD's Office of Local Defense Community Cooperation (OLDCC). The new study, currently in a draft format, presents a broad look at many factors that can contribute to incompatible land use policies. This study is currently available for review and comment at [missionknox.org](http://missionknox.org). Several issues were identified and evaluated. They included examples such as, frequency spectrum availability, light pollution, habitat and agricultural lands preservation. This paper focuses on one tool to provide insight to and mitigation of the issue of dense residential development and its adverse effects on the military's national defense missions, particularly in Kentucky.

Residential development is needed in support of Fort Knox and the growing economy of the region. This area in central Kentucky has seen tremendous growth that places pressure on the housing market. The construction of the Nucor Steel mill in Meade County with over 400 direct jobs scheduled to open in 2022. The continued warehousing and logistics expansions in Bullitt County of millions of square feet and the ongoing distillery growth in Nelson County all contribute to this issue. In addition, the recent announcement by Ford Motor Company of the location of two new facilities in the Glendale - Hardin County area will create unprecedented stress on the existing housing market. These battery manufacturing facilities are slated to create 5,000 full-time jobs when they come online in 2025. This would be a 4% increase of the entire civilian employment in the region even without consideration of the offshoot businesses that will be created as a result.

These new facilities, only 25 miles south of Fort Knox's main gate via US31W, will place further stress on the area's available housing stock. The distances involved are not a large factor in the region. As an example, per the 2018 U.S. Census' American Community Survey (ACS), 17 % of workers in Hardin County already travel between 10 and 24 miles to work one-way. An additional 24% travel up to 50 miles and another 17% travel over 50 miles, to their worksite. The current quality of roads and low congestion factors in the Elizabethtown-Fort Knox Metropolitan Statistical Area (MSA) allow for an average commute time of only 23 minutes even with the distances involved.

The four-county CUP Study Area (Bullitt, Hardin, Meade, and Nelson) had 12,479 residential building permits issued between 2010 and 2020, thus over

11% of the current 111,032 units were built in the last 10 years. Fort Knox estimates from March 2021, posit that they are almost 200 homes short of their current need, even with over 2,300 single-family homes currently on post. Fort Knox has committed an additional \$80 million to build 60 new residences and provide renovations to the existing homes. The study area has an occupancy rate of almost 94% with its per unit population of 2.43, both in excess of the statewide average of 90% and only 2.26 persons per unit rate. Looking at the 5-Year unemployment rate, even with the Covid-19 induced spike, the four-county area is still only at 4.9%. These factors combine to highlight a need for additional housing in the region that would need to exceed the current growth rate.

### Primary Concern

The aforementioned data is presented to underscore our awareness of the ongoing need for housing in the region. Our concern becomes the location of this housing. The area in the immediate vicinity of Fort Knox is very susceptible to residential growth which in turn creates tremendous pressure on the continuation of Fort Knox's missions. Noise complaints, light pollution, and general encroachment "against the fence" are all factors that can contribute to downgrading or elimination of these missions.

The ability to formally make new residents aware of the noise and other issues that arise from active military training is crucial to limiting these complaints and maintaining the missions – both current and potential future ones. Since the departure of the Armor School, existing residents have perhaps become immune to the concept of ongoing noise in the area. Training activities have been more sporadic and not perhaps as continuous as in prior years. Persons new to the area may not be aware of the potential for noise, dust, overflights, etc., associated with Fort Knox's training.

The primary concern is complaints and conflicts will escalate. When the converted Yano Range area in the southeast corner of Fort Knox reopens in 2023 as the Digital Air Ground Integration Range (DAGIR), the level of training at the post is going to increase dramatically. A \$52 million investment, it will allow for multiple air and ground units to operate and fire weapons

simultaneously. This will be only the second of this type of range in the U.S., and the only one east of the Rockies. It will be used by units from all across the country for training.

### Potential Mitigation Measure

Many states have rules in place that require disclosures during the transfer of residential real estate. In this case specific ones for being near a military installation or airfield and the potential issues that could arise. In Kentucky the disclosure form is 402 - *Seller's Disclosure of Property Conditions* (<https://krec.ky.gov/Documents/402-SellersDisclosureofPropertyCondition.pdf>) It is hosted by the Kentucky Real Estate Commission under the Public Protection Cabinet. KRS-324.360 is the primary statute that governs the design of form 402. Some requirements on the form are federally mandated such as issues involving lead paint. Others, such as asbestos, are state regulations. Radon, flood plains, physical condition of the home, home-owners associations, and water/sewer capabilities are other common examples. An unusually extreme but necessary example, if the home previously contained a meth lab, is a required disclosure on Kentucky's form. This form does not apply to all transactions, only ones that may involve a realtor and some other selected cases. Court ordered foreclosures and sales by owner directly are examples that are not covered by this form. Thus, it is not a perfect catchall solution but one tool available to help with mitigation.

The following examples of such regulations from other states are provided to assist with the discussion.

Tennessee has statute 66-5-210, Disclosure Form, that lays out the requirements for:

*...anyone transferring title to residential real property must provide information about the condition of the property. This completed form constitutes that disclosure by the seller.*

Their form includes a section requiring the seller to answer if they are aware of "Neighborhood noise problems or other nuisances?" The state also notes that regarding airport noise:

*Buyers should investigate the impact of airport flight paths and the noise levels at different times of the day over that property. For more information on airport noise, contact the Tennessee Department of Transportation.*

Virginia statute 55.1-704. Required disclosures pertaining to a military air installation.

*The owner of residential real property located in any locality in which a military air installation is located shall disclose to the purchaser whether the subject parcel is located in a noise zone or accident potential zone, or both, if so designated on the official zoning map by the locality in which the property is located. Such disclosure shall be provided to the purchaser on a form provided by the Real Estate Board on its website. Such disclosure shall state the specific noise zone or accident potential zone, or both, in which the property is located according to the official zoning map.*

Texas Property Code § 5.008, Seller's Disclosure of Property Condition, provides that:

*A seller of residential real property comprising not more than one dwelling unit located in this state shall give to the purchaser of the property a written notice as prescribed by this section or a written notice substantially similar to the notice prescribed by this section which contains, at a minimum, all of the items in the notice prescribed by this section...*

The Texas Real Estate Commission's Form No. OP-H provides the buyer information on this specific issue in section 11 as follows:

*This property may be located near a military installation and may be affected by high noise or air installation compatible use zones or other operations. Information relating to high noise and compatible use zones is available in the most recent Air Installation Compatible Use Zone Study or Joint Land Use Study prepared for a military installation and may be accessed on the Internet website of the military*

*installation and of the county and any municipality in which the military installation is located.*

North Carolina's general statute Chapter 47E provides general information on residential property disclosures to include the requirement that sellers respond to the following in item 26.

*Is there any noise, odor, smoke, etc. from commercial, industrial, or military sources which affects the property?*

### **Summary**

This describes just one tool that is available to assist in mitigating issues between military installations and their surrounding communities. This tool may only be implemented at the state level as there is no local authority for real estate disclosures to be implemented. We are working with local officials on other specific concerns that can be addressed via various policies and regulations that are available to them.

## Bibliography

Allen, Kevin M., "Army Air Crews",  
[<http://www.armyaircrews.com/index.html>], (accessed 15 Sept. 2020).

AirNav.com, [<http://www.airnav.com/airport/KEKX>], (accessed 29 August 2021).

AirNav.com, [<http://www.airnav.com/airport/kftk>], (accessed 29 August 2021).

Association of Defense Communities, *Greater Fort Knox Region Creates New Military Spouse Career Partnership*, 17 July, 2020.  
[<https://defensecommunities.org/2020/07/greater-fort-knox-region-creates-new-military-spouse-career-partnership/>], (accessed 20 August 2021).

Avey, Derek D., *Fort Knox Workforce Population Breakdown 2020*, U.S. Army, Fort Knox, Garrison Command, IMKN-PI, Information Paper, 6 January 2020.

Beerman, Perry and Susan J. Demas, *FAA: Michigan laser pointers targeted aircraft in flight 810 times over last decade*, Michigan Advance, 7 Sept. 2021, [<https://michiganadvance.com/2021/09/07/faa-michigan-laser-pointers-targeted-aircraft-in-flight-810-times-over-last-decade/>], (accessed 10 Sept. 2021).

Brus, Ryan, *Resident feedback results in new plan to improve on-post housing*, Fort Knox News,  
[[https://www.army.mil/article/241529/resident\\_feedback\\_results\\_in\\_new\\_plan\\_to\\_improve\\_on\\_post\\_housing](https://www.army.mil/article/241529/resident_feedback_results_in_new_plan_to_improve_on_post_housing)], (accessed 1 Sept. 2021).

Bullitt County, *Bullitt County Comprehensive Plan*, Bullitt County Joint Planning Commission, 2015.

Bullitt County, Permits for Cell Tower construction, Bullitt County Planning Office, 2012-2019.

Bullitt County, *Special Overlay District, KY 245 Tourism District*, Bullitt County Joint Planning Commission (BCJPC), April 2021.

Center for Public Environmental Oversight, "Military,"  
[<http://www.cpeo.org/encroachment.html>], (accessed 10 August 2021).

City of Radcliff, *City of Radcliff Comprehensive Plan*, Planning Dept, 2019.

City of Radcliff, *The Zoning Ordinance and Development Regulations for The City of Radcliff*, The Radcliff Planning Commission, 1984 with updates.

City of Shepherdsville, *Shepherdsville History*,  
[<https://shepherdsville.net/history>], (accessed 10 August 2021).

City of West Point, *Comprehensive Plan*, 2004.

City of West Point, History, [<https://westpoint.ky.gov/Pages/history.aspx>], (accessed 26 August 2021).

Clear, Gina, *Solar farm given redo in Hardin County*, The News-Enterprise, 16 Sept. 2021, [[https://www.thenewsenenterprise.com/news/local/solar-farm-given-redo-in-hardin-county/article\\_499ec236-b152-57a7-9930-36d6029289b3.html](https://www.thenewsenenterprise.com/news/local/solar-farm-given-redo-in-hardin-county/article_499ec236-b152-57a7-9930-36d6029289b3.html)], (accessed 16 September 2021)

Commonwealth of Kentucky, 2015 Kentucky Statewide Rail Plan, Kentucky Transportation Cabinet, April 2015.

Commonwealth of Kentucky, *2018 Kentucky Building Code*, Department of Housing, Buildings, and Construction, First Edition, June 2018.



Commonwealth of Kentucky, *2018 Kentucky Residential Code*, Department of Housing, Buildings, and Construction, Second Edition, May 2020.

Commonwealth of Kentucky, *Accessibility and Connectivity Study – Final Report*, Division of Planning Highway District 4, Kentucky Transportation Cabinet, March 2021.

Commonwealth of Kentucky, Building Codes, Department of Housing, Buildings and Construction, [https://dhbc.ky.gov/newstatic\_info.aspx?static\_id=333], (accessed 27 August 2021).

Commonwealth of Kentucky, *County Government in Kentucky*, Revised 2016.

Commonwealth of Kentucky, Dept. of Fish & Wildlife Resources (KDFWR), [https://app.fw.ky.gov/speciesinfo/QuadListSpecies.asp], (accessed 10 August 2021).

Commonwealth of Kentucky, Kentucky's *Invasive/Nuisance Species*, KDFWR, [https://fw.ky.gov/More/Pages/Nuisance-Species-Plans.aspx] (accessed 10 August 2021).

Commonwealth of Kentucky, *Invasive Species*, KDFWR, [https://fw.ky.gov/InvasiveSpecies/Pages/default.aspx] (accessed 10 August 2021).

Commonwealth of Kentucky, Department of Housing, Building, and Construction, Division of Building Code Enforcement, [https://dhbc.ky.gov/newstatic\_info.aspx?static\_id=297], (accessed 27 August 2021).

Commonwealth of Kentucky, Environmental Protection Cabinet, Division of Water, [https://eec.ky.gov/Environmental-

Protection/Water/Drinking/Pages/Drinking%20Water.aspx} (accessed 4 May 2021).

Commonwealth of Kentucky, KRS 100.113, Legislative Research Commission, [https://apps.legislature.ky.gov/law/statutes/statute.aspx?id=26681], (accessed June 3 2020).

Commonwealth of Kentucky, *Municipal Separate Storm Sewer Systems*, Kentucky Division of Water, [https://eec.ky.gov/Environmental-Protection/Water/Comp\_Insp/Pages/MS4.aspx], (accessed 27 Aug. 2001)

Commonwealth of Kentucky, *Noise Analysis and Abatement Policy*, Kentucky Transportation Cabinet (KYTC), Division of Environmental Analysis, effective date 1 July 2020.

Commonwealth of Kentucky, PACE, Department of Agriculture, [https://www.kyagr.com/marketing/pace.html], (accessed 15 April 2021).

Commonwealth of Kentucky, Real Estate Commission, [https://krec.ky.gov/new\_docs.aspx?cat=47&menuid=58], (accessed 15 April 2021).

Commonwealth of Kentucky, Senate Bill 266, Kentucky General Assembly, Legislative Research Commission, 2021 Regular Session, [https://apps.legislature.ky.gov/record/21rs/sb266.html], (accessed 8 Aug. 2021).

Commonwealth of Kentucky, Traffic Flow geospatial dataset, Reporting years 2016 and 2020, KYTC, [https://datamart.kytc.ky.gov/], (downloaded 6 Sept. 2021).

Commonwealth of Kentucky, *Wastewater Discharge Permits*, Kentucky Environmental Protection Cabinet, [https://eec.ky.gov/Environmental-

Protection/Water/PermitCert/KPDES/Pages/default.aspx], (accessed 27 Aug. 2021).

County Health Rankings & Roadmaps, *Air and Water Quality*, [https://www.countyhealthrankings.org/explore-health-rankings/measures-data-sources/county-health-rankings-model/health-factors/physical-environment/air-and-water-quality], (accessed 19 Aug. 2021).

Crawford, Matthew M., *KGS Landslide Inventory: From Design to Application*, Kentucky Geological Survey, 2014.

DeHann, Jenn, *Officials raise safety concerns, warn of repercussions after local aircraft targeted by lasers*, Army.mil, 30 Apr. 2021, [https://www.army.mil/article/245800/officials\_raise\_safety\_concerns\_warn\_of\_repercussions\_after\_local\_aircraft\_targeted\_by\_lasers], (accessed 4 May 2021).

Dun & Bradstreet, *LWDA Lincoln Trail Marketable Records*, Market Insight, 25 January 2021.

Elizabethtown Regional Airport, [https://ekxairport.com/pilot-information/], (accessed 29 August 2021).

Encyclopedia Britannica, “Karst”, [https://www.britannica.com/search?query=karst], (accessed 13 August 2021).

ENTRAN, PLC, *Fort Knox Regional Highway Capacity Study*, Louisville, KY, Aug. 2009.

Evans Jr., Maj Gen John R., *Fort Knox and the Compatible Use Plan*, Presentation, Joint Meeting - Fort Knox CUP Committees, Radcliff, KY, 20 September 2019.

Federal Register, *Removal of the Special Rule for Model Aircraft*, 11 December 2020, [https://www.federalregister.gov/documents/2020/12/11/2020-26726/removal-of-the-special-rule-for-model-aircraft], (accessed 14 November 2021).

Finley, Marty, *Carbon credits generate more than \$150,000 in first-year revenue*, The News-Enterprise, 6 Apr. 2012, [https://subscriber.thenewsenterprise.com/content/carbon-credits-generate-more-150000-first-year-revenue], (accessed 7 August 2021).

Fort Knox Housing, [https://www.fortknoxhousing.com], (accessed 1 Sept. 2021).

Francis, Carina, *Fort Knox policy prohibits flying drones on installation*, Fort Knox Gold Standard, 12 January 2017, [https://www.fkgoldstandard.com/content/fort-knox-policy-prohibits-flying-drones-installation], (accessed 13 May 2020).

Green, Marcus, *Permit puts LG&E's Bullitt County pipeline 'one step closer' to construction*, WDRB Media, 10 September 2021, [https://www.wdrb.com/in-depth/permit-puts-lg-es-bullitt-county-pipeline-one-step-closer-to-construction/article\_ed7daa48-1260-11ec-92ff-c358e72c65c0.html], (accessed 16 September 2021).

Hardin County, About, [https://hcky.org/about/], (accessed 26 August 2021).

Hardin County, *KY 313 Corridor*, map, Hardin County Planning and Development Commission, c. 2018.

HDR, Inc., *Fort Knox Traffic Study and Improvement Plan*, Jan. 2008.

Homeland Infrastructure Foundation- Level Data, Aug. 2021 extract. [https://hifld-geoplatform.opendata.arcgis.com/datasets/cellular-

towers/explore?location=10.771279%2C-15.454722%2C2.25], (extracted 18 August 2021).

International Dark-Sky Association, *Outdoor Lighting Basics*, [https://www.darksky.org/our-work/lighting/lighting-for-citizens/lighting-basics/], (3 November 2020).

Kentuckiana Regional Planning and Development Agency (KIPDA), *About*, [https://www.kipda.org/about], (accessed 4 August 2021).

Kentucky Air National Guard, 123<sup>rd</sup> Airlift Wing, [https://www.123aw.ang.af.mil/About-Us/], (accessed 29 August 2021).

Kentucky Geological Survey (KGS), *Landslide Hazards in Kentucky*, 2020.

Kentucky League of Cities, Information Central, [https://www.klc.org/InfoCentral/Detail/33/form-of-government], (accessed 31 July 2021).

Kentucky Natural Lands Trust (KNLT), *Bernheim-Fort Knox Wildlands Corridor*, [https://knlt.org/bernheim-ftknox], (accessed 11 August 2021).

Knox Regional Development Alliance (KRDA), *About KRDA*, [https://growknox.org/about-krda/], (accessed 23 August 2021).

Knox Regional Development Alliance, *Articles of Incorporation of Core Committee, Inc.*, 13 Dec. 2006, filed with Kentucky Secretary of State 18 Dec. 2006.

Knox Regional Development Alliance, *KRDA partners with Kentucky Career Center, Fort Knox to assist military spouse*, 8 July 2020, [https://growknox.org/military-spouse/], (accessed 20 August 2021).

Lincoln Trail Area Development District (LTADD), *CEDS 2020*, [https://ltadd.org/wp-content/uploads/2020/11/2020-CEDS-Update.pdf], (accessed 18 August 2021).

Lincoln Trail Area Development District, *2015 Lincoln Trail Region Hazard Mitigation Plan*, 2015.

Louisville International Airport, [https://sdf-airport.com/], (accessed 29 August 2021).

Louisville-Metro, *Urban Heat Island Project*, [https://louisvilleky.gov/government/sustainability/urban-heat-island-project], (accessed 27 Aug. 2021).

Lozar, Robert C., and Richard Schneider, *Ambient Light Encroachment at Military Installations*, U.S. Army Corps of Engineers, Construction Engineering Research Laboratory, Champaign, IL, October 2005.

Malyasov, Dylan, U.S. Army begins construction of new high tech live-fire range at Fort Knox, Defense Blog, 24 July 2019, [https://defence-blog.com/u-s-army-begins-construction-of-new-high-tech-live-fire-range-at-fort-knox], (accessed 8 April 2021).

Martin, Capt. Stephen, *Kentucky Guard fights fires at Fort Knox*, National Guard News, 27 Oct. 2010, [https://www.nationalguard.mil/News/Article-View/Article/587602/kentucky-guard-fights-fires-at-fort-knox], (accessed 9 August 2021).

Meade County, *Meade County Comprehensive Plan*, Planning and Zoning, 2013.

Meade County, *Subdivision Regulations*, Meade County Planning Commission, as amended 31 May 2011.

Michael Baker International, *Fort Knox Real Property Vision Plan*, Final Sept. 2021.

Microsoft US Building Footprints, [https://github.com/Microsoft/USBuildingFootprints], (accessed 3 November 2020).

Moretto, Lauren, Charles M Francis, *What factors limit bat abundance and diversity in temperate, North American urban environments?* Journal of Urban Ecology, Volume 3, Issue 1, January 2017, jux016, https://doi.org/10.1093/jue/jux016, (accessed 17 August 2021).

Nelson County, *Nelson County 2035: A Comprehensive Plan for the Cities of Bardstown, Bloomfield, Fairfield, and New Haven and Nelson County*, Joint City-County Planning Commission, 2016.

NewGeography, *Small Cities Business Services Jobs – 2016 Best Cities Rankings*, [https://www.newgeography.com/content/005329-small-cities-business-services-jobs-2016-best-cities-rankings], (accessed 20 August 2021).

New Services Queue, PJM, [https://www.pjm.com/planning/services-requests/interconnection-queues.aspx], (accessed 16 September 2021).

Niemeyer, Liam, *Ky. Bill Would Allow Ban Of Large Solar Projects On Farmland*, Ohio Valley ReSource, Inc./WKMS, 24 Feb. 2021), [https://ohiovalleyresource.org/2021/02/24/ky-bill-would-allow-ban-of-large-solar-projects-on-farmland/], (accessed 16 Sept. 2021).

Nykaza, Edward T., Kathleen Hodgdon, Gloria Wienke, Trent Gaugler, Peg Krecker, and George Luz, *An Investigation of Community Attitudes Toward Blast Noise*, U.S. Army Corps of Engineers, Construction Engineering Research Laboratory (CERL) US Army Engineer Research and Development Center, (Champaign, IL, April 2012).

Owsley, Becca, *Helicopter door lands on home*, The News-Enterprise, 9 Sept. 2019, [https://www.thenewsenterprise.com/news/local/helicopter-door-lands-on-home/article\_13793ce8-9dcf-57cf-a2b1-aaf77dbdce35.html], (accessed 15 Sept. 2020).

Pilgrim, Eric, *Army to break ground on Digital Air-Ground Integration Range this fall*, Fort Knox News, 8 Oct. 2019, [https://www.army.mil/article/224783/army\_to\_break\_ground\_on\_digital\_air\_ground\_integration\_range\_this\_fall], (accessed 2 Sept. 2020).

Pilgrim, *Congressional*, *Army leaders praise success of Fort Knox energy resiliency*, Fort Knox News, 25 October 2018, [https://www.army.mil/article/212915/congressional\_army\_leaders\_praise\_success\_of\_fort\_knox\_energy\_resiliency], (accessed 12 August 2019).

Pilgrim, *Fort Knox DPW wins big at Interior Lighting Campaign awards presentation*, Fort Knox News, 12 August 2019, [https://www.army.mil/article/225625/fort\_knox\_dpw\_wins\_big\_at\_interior\_lighting\_campaign\_awards\_presentation], (accessed 9 Aug. 2021).

Pilgrim, *Fort Knox earns two Army energy awards for successfully taking post 'off the grid'*, Fort Knox News, 29 August 2019. [https://www.army.mil/article/226413/fort\_knox\_earns\_two\_army\_energy\_awards\_for\_successfully\_taking\_post\_off\_the\_grid], (accessed 9 Aug. 2021).

Pilgrim, *Fort Knox Energy Program receives another award during Army video-teleconference ceremony*, U.S. Army.mil, 22 October 2020, [https://www.army.mil/article/240217/fort\_knox\_energy\_program\_receives\_another\_award\_during\_army\_video\_teleconference\_ceremony], (accessed 9 Aug. 2021).

Pilgrim, *Fort Knox Garrison deputy speaks at Radcliff Rotary Club meeting*, Fort Knox News, 19 March



2021,[[https://www.army.mil/article/244461/fort\\_knox\\_garrison\\_deputy\\_speaks\\_at\\_radcliff\\_rotary\\_club\\_meeting](https://www.army.mil/article/244461/fort_knox_garrison_deputy_speaks_at_radcliff_rotary_club_meeting)], (accessed 1 Sept. 2021).

Pilgrim, Eric, *Fort Knox official: Digital Air-Ground Integration Range construction on track for 2023 completion*, *Fort Knox News*, 11 May 2021, [[https://www.army.mil/article/246226/fort\\_knox\\_official\\_digital\\_air\\_ground\\_integration\\_range\\_construction\\_on\\_track\\_for\\_2023\\_completion](https://www.army.mil/article/246226/fort_knox_official_digital_air_ground_integration_range_construction_on_track_for_2023_completion)], (accessed 1 June 2021).

Pilgrim, 'Survey says' — *Fort Knox numbers remain high in Army-wide housing resident satisfaction report*, *Fort Knox News*, [[https://www.army.mil/article/236842/survey\\_says\\_fort\\_knox\\_numbers\\_remain\\_high\\_in\\_army\\_wide\\_housing\\_resident\\_satisfaction\\_report](https://www.army.mil/article/236842/survey_says_fort_knox_numbers_remain_high_in_army_wide_housing_resident_satisfaction_report)], (accessed 1 Sept. 2021).

Radcliff-Elizabethtown MPO, About, [<https://radcliff-elizabethtown-mpo.org/index.php/about>], (accessed 4 August 2021).

Rector, Matthew D., *The United States Army at Fort Knox* (Charleston: Arcadia Publishing, 2005).

Rempfer, Kyle, *Army resurrects V Corps after seven years to bolster Europe*, *Army Times*, [<https://www.armytimes.com/news/your-army/2020/02/12/army-resurrects-v-corps-after-seven-years-to-bolster-europe/>], (accessed 10 September 2020).

Rose, Maureen, *Wildfire on Fort Knox*, *U.S. Army News*, 28 Oct. 2010, [[https://www.army.mil/article/47320/wildfire\\_on\\_fort\\_knox](https://www.army.mil/article/47320/wildfire_on_fort_knox)], (accessed 9 August 2021).

Rowse, E.G., Lewanzik D., Stone E.L., Harris S., Jones G. (2016) *Dark Matters: The Effects of Artificial Lighting on Bats*. In: Voigt C., Kingston T. (eds) *Bats in the Anthropocene: Conservation of Bats in a Changing World*. Springer, Cham. [https://doi.org/10.1007/978-3-319-25220-9\\_7](https://doi.org/10.1007/978-3-319-25220-9_7) (accessed 17 August 2021).

Sentinel Landscapes, Total Funding by Partner, [<https://sentinellandscapes.org/about/our-work/>], (accessed 19 Jan. 2021).

Sentinel Landscapes, *Federal Programs*, [<https://sentinellandscapes.org/about/federal-programs/>], (accessed 19 Jan. 2021).

Shepherdsville/Bullitt County Tourist & Convention Commission, [<https://travelbullitt.org/adventures/the-wine-whiskey-trail>], (accessed 10 August 2021).

Smoke, Capt. Jo, *Twenty years of energy investments pay off for Fort Knox*, Fort Knox Office of Public Affairs, 31 March, 2015, [[https://www.army.mil/article/145354/Twenty\\_years\\_of\\_energy\\_investment\\_s\\_pay\\_off\\_for\\_Fort\\_Knox/](https://www.army.mil/article/145354/Twenty_years_of_energy_investment_s_pay_off_for_Fort_Knox/)], [accessed 12 Aug. 2021).

Smoke, *Twenty years of energy investments pay off for Fort Knox*, [[https://www.army.mil/article/145354/Twenty\\_years\\_of\\_energy\\_investment\\_s\\_pay\\_off\\_for\\_Fort\\_Knox/](https://www.army.mil/article/145354/Twenty_years_of_energy_investment_s_pay_off_for_Fort_Knox/)], 9accessed 12 Aug. 2021).

Staley, Crystal, *Nucor Breaks Ground on 400-Job Steel Mill in Brandenburg*, 23 October 2020, [<https://kentucky.gov/Pages/Activity-stream.aspx?n=GovernorBeshear&prId=428.>], (accessed 5 August 2021).

Tableau Public, "Laser Event Data 2020-2020," [<https://public.tableau.com/app/profile/aoc.web.management/viz/LaserEventViz/LaserEvents20102020>], (accessed 10 Sept. 2021)

*The Lane Report*, *Fort Knox to build a state-of-the-art elementary school*, [<https://www.lanereport.com/145544/2021/08/fort-knox-to-build-a-state-of-the-art-elementary-school/>], (accessed 5 Sept. 2021).

The Ledger Independent, *EKPC announces Pearl Hollow Landfill as newest site for renewable energy plant*, 10 May, 2005, [<https://maysville-online.com/news/12022/ekpc-announces-pearl-hollow-landfill-as-newest-site-for-renewable-energy-plant>], (accessed 7 August 2021).

Thayer, Rose L., *Billion-dollar Army housing project begins next week at five bases*, *Stars and Stripes*, 23 April, 2021 [<https://www.stripes.com/theaters/us/billion-dollar-army-housing-project-begins-next-week-at-five-bases-1.670959>] (accessed 20 August 2021).

Teleworks USA, *What is Teleworks USA*, [<https://www.teleworksusa.com/work>], (accessed 20 August 2021).

The News-Enterprise, *KRDA partnership offers job network for newcomers*, 21 July, 2020, [[https://www.thenewsenterprise.com/news/local/krda-partnership-offers-job-network-for-newcomers/article\\_786cc48a-4d89-5ae6-b78e-0e56d8781cb8.html](https://www.thenewsenterprise.com/news/local/krda-partnership-offers-job-network-for-newcomers/article_786cc48a-4d89-5ae6-b78e-0e56d8781cb8.html)], (accessed 20 August 2021).

University of Kentucky, *2020-2021 Economic Situation & Outlook*, College of Agriculture, Food and Economics, [<https://agecon.ca.uky.edu/2020-2021-economic-situation-outlook>], (accessed 8 September 2021).

University of Kentucky, Faculty and Staff, [<https://www.uky.edu/see/facultystaff>], (accessed 4 August 2021).

University of Louisville, William F. Ekstrom Library, Government Resources: States: Kentucky Facts, [[https://library.louisville.edu/ekstrom/gov\\_states/kyfacts](https://library.louisville.edu/ekstrom/gov_states/kyfacts)], (accessed 4 May 2021).

U.S. Dept. of Agriculture, Environmental Easement Boundaries, Natural Resources Conservation Service, [<https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/technical/nra/dma/?cid=stelprdb1043925>], (accessed 15 April 2021).

U.S. Dept. of Commerce, Advanced Hydrologic Prediction Service, National Weather Service, Gauge LBJK2, [<https://water.weather.gov/ahps2/hydrograph.php?wfo=lmk&gage=lbjk2>], (accessed 11 Sept. 2021).

U.S. Dept. of Commerce, “Annual Estimates of the Resident Population for Incorporated Places in Kentucky: April 1, 2010 to July 1, 2019 (SUB-IP-EST2019-ANNRES-21)”, Census Bureau, Release Date: May 2020.

U.S. Dept. of Commerce, Fort Knox CDP, “Daytime Population,” Census Bureau. 2000 and 2010.

U.S. Dept. of Commerce, New Private Housing Structures Authorized by Building Permits for Hardin County, KY [BPPRIV021093], Census Bureau, retrieved from FRED, Federal Reserve Bank of St. Louis; [<https://fred.stlouisfed.org/series/BPPRIV021093>], (accessed 14 August 2021).

U.S. Dept. of Commerce, “Regional Price Parities by State and Metro Areas”, Bureau of Economic Analysis, [<https://www.bea.gov/data/prices-inflation/regional-price-parities-state-and-metro-area>], (accessed 9 July 2021).

U. S. Dept. of Commerce, VIIRS Daily Mosaic, NOAA, Earth Observation Group, [<https://ngdc.noaa.gov/eog/viirs.html>], (accessed 3 November 2020).

U.S. Dept. of Defense, *An Introduction to OLDCC*, Office of Local Defense Community Cooperation, [<https://oldcc.gov/introduction>], (accessed 4 June 2021).

U.S. Dept. of Defense, Army Regulation 200-1, *Environmental Protection and Enhancement*, Headquarters, Dept. of the Army, Washington D.C., Dec. 2007.

U.S. Dept. of Defense, *Draft Finding of No Significant Impact (FNSI)/Finding of No Practicable Alternative*, U.S. Army, Fort Knox Environmental Management

Division, 17 Dec. 2017,  
[[https://www.army.mil/article/215243/draft\\_finding\\_of\\_no\\_significant\\_impact\\_fnsifinding\\_of\\_no\\_practicable\\_alternative](https://www.army.mil/article/215243/draft_finding_of_no_significant_impact_fnsifinding_of_no_practicable_alternative)], (accessed 14 January 2020).

U. S. Dept. of Defense, *Fort Knox Installation Compatible Use Zone Study – 2018*, (Aberdeen Proving Ground, MD, June 2018), Environmental Noise Branch, Environmental Health Sciences Division, Army Public Health Center.

U. S. Dept. of Defense, “Fort Knox Placemat” U.S. Army, Fort Knox Garrison Command, datasheet, 17 March, 2021.

U. S. Dept. of Defense, Fort Knox Schools, DODEA, Southeast District, [<https://www.dodea.edu/americas/southeast/fortknox/index.cfm>], (accessed 1 Sept. 2021).

U. S. Dept. of Defense, *Godman Airfield Operations Manual*, U.S. Army, Fort Knox, Garrison Command, Airfield Division, 7 Aug. 2019.

U. S. Dept. of Defense, *History of Fort Knox*, U.S. Army Fort Knox, [<https://home.army.mil/knox/index.php/about/history>], (accessed 10 September 2020).

U. S. Dept. of Defense, U.S. Army Fort Knox  
[<https://home.army.mil/knox/index.php/announcements/dealing-wildlife-native-kentucky>], (accessed 10 August 2021).

U.S. Dept. of Defense, [www.repi.mil](http://www.repi.mil), READINESS AND ENVIRONMENTAL PROTECTION INTEGRATION [REPI] PROGRAM PROJECT PROFILE, FORT KNOX.

U.S. Dept. of Energy, 2020 Federal Energy and Water Management Award Winners, [<https://www.energy.gov/eere/femp/2020-federal-energy-and-water-management-award-winners>], (accessed 9 Aug. 2021).

U.S. Dept. of Energy, *State Profile and Energy Estimates: Kentucky*, Energy Information Administration, [<https://www.eia.gov/state/?sid=KY>], (accessed 16 Aug. 2021).

U.S. Dept. of Energy, *Renewable Energy Explained*, Energy Information Administration (EIA), [<https://www.eia.gov/energyexplained/renewable-sources>], (accessed 16 Aug. 2021).

U.S. Environmental Protection Agency, *Heat Island Effect*, [<https://www.epa.gov/heatislands>], (accessed 27 Aug. 2021).

U.S. Environmental Protection Agency, *Heat Island Impacts*, [[https://19january2017snapshot.epa.gov/heat-islands/heat-island-impacts\\_.html](https://19january2017snapshot.epa.gov/heat-islands/heat-island-impacts_.html)], (accessed 27 Aug. 2021).

U.S. Environmental Protection Agency, *Summary of the Clean Air Act*, [<https://www.epa.gov/laws-regulations/summary-clean-air-act>], (accessed 19 Aug. 2021).

U.S. Environmental Protection Agency, *Summary of the Clean Water Act*, [<https://www.epa.gov/laws-regulations/summary-clean-water-act>], (accessed 19 Aug. 2021).

U.S. Environmental Protection Agency, *What Climate Change Means for Kentucky*, August 2016.

U.S. Department of Housing and Urban Development, *Noise Assessment Training*, Presentation, [[https://www.hud.gov/sites/documents/DOC\\_14222.PDF](https://www.hud.gov/sites/documents/DOC_14222.PDF)], (accessed 6 April 2021). Slide 2.

U.S. Department of Housing and Urban Development, *Noise Abatement and Control* (24 CFR Part 51B), Federal Register, 26 March 1996)

U.S. Dept. of the Interior, ECOS Environmental Conservation Online System, Fish & Wildlife Service, [https://fws.maps.arcgis.com/home/webmap/viewer.html?webmap=9d8de5e265ad4fe09893cf75b8dbfb77], (accessed 12 August 2021).

U.S. Dept. of the Interior, *Mammoth Cave: Explore the World's Longest Cave*, [https://www.doi.gov/blog/mammoth-cave-explore-worlds-longest-cave], (accessed 21 August 2021).

U.S. Dept. of Interior, *Smart Growth and Heat Islands*, Environmental Protection Agency, [https://www.epa.gov/heatislands/smart-growth-and-heat-islands], (accessed 27 Aug. 2021).

U.S. Dept. of Labor, *OSHA Technical Manual (OTM), Section III: Chapter 5.*, Occupational Safety and Health Administration, [https://www.osha.gov/otm/section-3-health-hazards/chapter-5], (accessed 6 May 2021), sec. II, B, 10.

U.S. Dept. of Transportation, Digital Obstacle File, Federal Aviation Administration, [https://www.faa.gov/air\_traffic/flight\_info/aeronav/digital\_products/dof], Release date July 13, 2021.

U.S. Dept. of Transportation, Don't Let a Prank Lead To Prison, Federal Aviation Administration, [https://www.faa.gov/education/highlight\_reel/?highlight=140418\_laser\_fbi#:~:text=Aiming%20a%20laser%20at%20an%20aircraft%20is%20a%20federal%20crime,be%20eligible%20for%20a%20reward.], (accessed 10 Sept. 2021).

U.S. Dept. of Transportation, *FAA Announces Small UAS Registration Rule*, Federal Aviation Administration, 14 December 2015, [https://www.faa.gov/newsroom/faa-announces-small-uas-registration-rule], (accessed 14 November 2021).

U.S. Dept. of Transportation, Federal Highways Administration, [https://www.fhwa.dot.gov/policyinformation/travel\_monitoring/20mayvtv], (accessed 3 Sept. 2021).

U.S. Dept. of Transportation, FOIA Library, Geographic listing of hobbyist/non-hobbyists UAS registry enrollments and registrants, CY2015 Q4 to CY 2021 Q3, Federal Aviation Administration, [https://www.faa.gov/FOIA/electronic\_reading\_room], (accessed 15 November 2021).

United States Code 49, 44809. *Exception for limited recreational operations of unmanned aircraft.* [https://uscode.house.gov/view.xhtml?req=granuleid:USC-prelim-title49-section44809&num=0&edition=prelim], (accessed 15 November 2021).

Van Velzer, Ryan, *LG&E Proposes Largest Solar Field In Kentucky*, WFPL, 27 Jan. 2020, [https://wfpl.org/lge-proposes-largest-solar-field-in-kentucky/], (accessed 8 Aug. 2021).

Vernier, *What is the difference between "A weighting" and "C weighting"?*, [https://www.vernier.com/til/3500], (accessed 7 July 2021).

Wal\_Mart, Kentucky, [https://corporate.walmart.com/our-story/locations/united-states/Kentucky], (accessed 4 August 2021).

Watkins, Jimmy, *Bat colonies roosting, flourishing thanks to artificial bark*, 19 April 2013, [https://www.army.mil/article/101527/Bat\_colonies\_roosting\_\_flourishing\_thanks\_to\_artificial\_bark/], (accessed 9 August 2021).

Whittaker, G. Clay, "How Does The FBI Catch People Who Shine Lasers At Airplanes?", *Popular Science*, 18 Jul. 2015, [https://www.popsoci.com/can-we-crack-down-aircraft-laser-perpetrators], (accessed 10 Sept. 2021).



Winn Companies, Knox Hills, [<https://www.knoxhills.com/>] (accessed 8 June, 2021).

WLKT TV, *Wildfires Flare Up in KY. Counties*, 22 Oct. 2010, [<https://www.wlky.com/article/wildfires-flare-up-in-ky-counties/3731929>], (accessed 10 August 2021).

## ENDNOTES

<sup>1</sup> Office of Local Defense Community Cooperation, *An Introduction to OLDCC*, [https://oldcc.gov/introduction], (accessed 4 June 2021).

<sup>2</sup> Kentucky League of Cities, Information Central, [https://www.klc.org/InfoCentral/Detail/33/form-of-government], (accessed 31 July 2021).

<sup>3</sup> *County Government in Kentucky*, Revised 2016, Legislative Research Commission, p. 12.

<sup>4</sup> *County Government in Kentucky*, Revised 2016, Legislative Research Commission, p. 71

<sup>5</sup> City of Shepherdsville, *Shepherdsville History*, [https://shepherdsville.net/history], (accessed 10 August 2021).

<sup>6</sup> Shepherdsville/Bullitt County Tourist & Convention Commission, [https://travelbullitt.org/adventures/the-wine-whiskey-trail], (accessed 10 August 2021).

<sup>7</sup> City of Shepherdsville, *Shepherdsville History*, [https://shepherdsville.net/history/], (accessed 10 August 2021).

<sup>8</sup> Hardin County Government, About, [https://hcky.org/about/], (accessed 26 August 2021).

<sup>9</sup> City of West Point, History, [https://westpoint.ky.gov/Pages/history.aspx], (accessed 26 August 2021).

<sup>10</sup> KRS 100.113, Commonwealth of Kentucky, [https://apps.legislature.ky.gov/law/statutes/statute.aspx?id=26681], (accessed June 3 2020)

<sup>11</sup> Department of Housing, Building, and Construction, Division of Building Code Enforcement, [https://dhbc.ky.gov/newstatic\_info.aspx?static\_id=297], (accessed 27 August 2021).

<sup>12</sup> Department of Housing, Buildings, and Construction, *2018 Kentucky Building Code*, First Edition, June 2018, p i.

<sup>13</sup> Department of Housing, Buildings, and Construction, *2018 Kentucky Residential Code*, Second Edition, May 2020, p ii.

<sup>14</sup> Department of Housing, Buildings and Construction, Building Codes, [https://dhbc.ky.gov/newstatic\_info.aspx?static\_id=333], (accessed 27 August 2021).

<sup>15</sup> Kentuckiana Regional Planning and Development Agency, *About*, [https://www.kipda.org/about], (accessed 4 August 2021).

<sup>16</sup> Lincoln Trail Area Development District, *CEDS 2020*, [https://ltadd.org/wp-content/uploads/2020/11/2020-CEDS-Update.pdf], (accessed 18 August 2021).

<sup>17</sup> Radcliff-Elizabethtown MPO, About, [https://radcliff-elizabethtown-mpo.org/index.php/about], (accessed 4 August 2021).

<sup>18</sup> Knox Regional Development Alliance, *About KRDA*, [https://growknox.org/about-krda/], (accessed 23 August 2021).

<sup>19</sup> U.S. Census Bureau, New Private Housing Structures Authorized by Building Permits for Hardin County, KY [BPPRIV021093], retrieved from FRED, Federal Reserve Bank of St. Louis; [https://fred.stlouisfed.org/series/BPPRIV021093], (14 August 2021).

<sup>20</sup> Bullitt County Joint Planning Commission, *Bullitt County Comprehensive Plan*, 2015. Sec. 8, p. 1-2.

<sup>21</sup> Bullitt County Joint Planning Commission, *Bullitt County Comprehensive Plan*, 2015. Sec. 4, p. 23-24.

<sup>22</sup> Bullitt County Joint Planning Commission, *Bullitt County Comprehensive Plan*, 2015. Sec. 4, p. 21.

<sup>23</sup> The Radcliff Planning Commission, *The Zoning Ordinance and Development Regulations for The City of Radcliff*, 1984 with updates, p 183.

<sup>24</sup> Planning Dept. City of Radcliff, *City of Radcliff Comprehensive Plan*, 2019, p 2-9

<sup>25</sup> Advanced Hydrologic Prediction Service, National Weather Service, Gauge LBJK2, [https://water.weather.gov/ahps2/hydrograph.php?wfo=lmk&gage=lbjk2], (accessed 11 Sept. 2021).

<sup>26</sup> Murray Wanner, City of Radcliff, email to CUP Study group (LTADD) 24 March 2020.

<sup>27</sup> City of West Point, *Comprehensive Plan*, 2004, p. 7.

<sup>28</sup> City of West Point, *Comprehensive Plan*, 2004, p. 8.

<sup>29</sup> *Meade County Comprehensive Plan*, 2013, p. 38.

<sup>30</sup> *Meade County Comprehensive Plan*, 2013, p. 30.

<sup>31</sup> *Meade County Comprehensive Plan*, 2013, p. 30.

<sup>32</sup> *Meade County Comprehensive Plan*, 2013, p. 38.

<sup>33</sup> *Nelson County 2035: A Comprehensive Plan for the Cities of Bardstown, Bloomfield, Fairfield, and New Haven and Nelson County*, 2016, Ch. 4, p. 29.

<sup>34</sup> Division of Planning Highway District 4, Kentucky Transportation Cabinet, *Accessibility and Connectivity Study – Final Report*, March 2021. p. 8.

<sup>35</sup> KYTC, 2015 Kentucky Statewide Rail Plan, April 2015, sec. 2, p. 42.

<sup>36</sup> Elizabethtown Regional Airport, [https://ekxairport.com/pilot-information/], (accessed 29 August 2021).

<sup>37</sup> AirNav.com, [http://www.airnav.com/airport/KEKX], (accessed 29 August 2021).

<sup>38</sup> Louisville International Airport, [https://sdf-airport.com/], (accessed 29 August 2021).

<sup>39</sup> 123<sup>rd</sup> Airlift Wing, KYANG, [https://www.123aw.af.mil/About-Us/], (accessed 29 August 2021).

---

<sup>40</sup> USDOT, Federal Highways Administration, [https://www.fhwa.dot.gov/policyinformation/travel\_monitoring/20mayvtv], (accessed 3 Sept. 2021).

<sup>41</sup> *Fort Knox Traffic Study and Improvement Plan*, HDR, Inc., Jan. 2008, p. 2-2.

<sup>42</sup> *Fort Knox Traffic Study and Improvement Plan*, HDR, Inc., Jan. 2008, p. 9-1.

<sup>43</sup> *Fort Knox Regional Highway Capacity Study*, ENTRAN, PLC, Louisville, KY, Aug. 2009, p. II-4.

<sup>44</sup> *Fort Knox Regional Highway Capacity Study*, ENTRAN, PLC, p.V-1-4.

<sup>45</sup> *Fort Knox Regional Highway Capacity Study*, ENTRAN, PLC, p.V-4-8.

<sup>46</sup> Regional Price Parities by State and Metro Areas, U.S. Bureau of Economic Analysis, [https://www.bea.gov/data/prices-inflation/regional-price-parities-state-and-metro-area], (accessed 9 July 2021).

<sup>47</sup> U.S. Army Fort Knox, *History of Fort Knox*, [https://home.army.mil/knox/index.php/about/history], (accessed 10 September 2020).

<sup>48</sup> Matthew D. Rector, *The United States Army at Fort Knox* (Charleston: Arcadia Publishing, 2005), 7.

<sup>49</sup> Rector, *The United States Army at Fort Knox*, 21.

<sup>50</sup> U.S. Army Fort Knox, *History of Fort Knox*, [https://home.army.mil/knox/index.php/about/history], (accessed 10 September 2020).

<sup>51</sup> U.S. Census, Fort Knox CDP, “Daytime Population.”

<sup>52</sup> Fort Knox Garrison Command, “Fort Knox Placemat” datasheet, 17 March, 2021.

<sup>53</sup> Fort Knox Schools, DODEA, Southeast District, [https://www.dodea.edu/americas/southeast/fortknox/index.cfm], (accessed 1 Sept. 2021).

<sup>54</sup> *Fort Knox to build a state-of-the-art elementary school*, The Lane Report, [https://www.lanereport.com/145544/2021/08/fort-knox-to-build-a-state-of-the-art-elementary-school/], (accessed 5 Sept. 2021).

<sup>55</sup> U.S. Army Fort Knox, *History of Fort Knox*, [https://home.army.mil/knox/index.php/about/history], (accessed 10 September 2020).

<sup>56</sup> Maj Gen John R. Evans Jr., *Fort Knox and the Compatible Use Plan*, Presentation, Joint Meeting - Fort Knox CUP Committees, Radcliff, KY, 20 September 2019, p. 19.

<sup>57</sup> Evans., *Fort Knox and the Compatible Use Plan*, Presentation, Joint Meeting - Fort Knox CUP Committees, Radcliff, KY, 20 September 2019, p. 17.

<sup>58</sup> Kyle Rempfer, *Army resurrects V Corps after seven years to bolster Europe*, *Army Times*, [https://www.armytimes.com/news/your-army/2020/02/12/army-resurrects-v-corps-after-seven-years-to-bolster-europe/], (accessed 10 September 2020).

<sup>59</sup> Rempfer, *Army’s resurrected V Corps will go to Poland*, *Army Times*, (accessed 10 September 2020).

ENDNOTES

<sup>60</sup> Eric Pilgrim, *Fort Knox official: Digital Air-Ground Integration Range construction on track for 2023 completion*, *Fort Knox News*, 11 May 2021, [https://www.army.mil/article/246226/fort\_knox\_official\_digital\_air\_ground\_integration\_range\_construction\_on\_track\_for\_2023\_completion], (accessed 1 June 2021).

<sup>61</sup> AirNav.com, [http://www.airnav.com/airport/kftk], (accessed 29 August 2021).

<sup>62</sup> Fort Knox, Garrison Command, Airfield Division, *Godman Airfield Operations Manual*, 7 Aug. 2019, p.7.

<sup>63</sup> Evans., *Fort Knox and the Compatible Use Plan*, Presentation, Joint Meeting - Fort Knox CUP Committees, Radcliff, KY, 20 September 2019, p. 16-17.

<sup>64</sup> Environmental Noise Branch, Environmental Health Sciences Division, Army Public Health Center, *Fort Knox Installation Compatible Use Zone Study – 2018*, (Aberdeen Proving Ground, MD, June 2018), p. 1-4.

<sup>65</sup> Edward T. Nykaza, Kathleen Hodgdon, Gloria Wienke, Trent Gaugler, Peg Krecker, and George Luz, *An Investigation of Community Attitudes Toward Blast Noise*, U.S. Army Corps of Engineers, Construction Engineering Research Laboratory (CERL) US Army Engineer Research and Development Center, (Champaign, IL, April 2012). p.35-36.

<sup>66</sup> Vernier, *What is the difference between “A weighting” and “C weighting”?*, [https://www.vernier.com/tit/3500], (accessed 7 July 2021).

<sup>67</sup> Occupational Safety and Health Administration, *OSHA Technical Manual (OTM) Section III: Chapter 5.*, [https://www.osha.gov/otm/section-3-health-hazards/chapter-5], (accessed 6 May 2021), sec. II,B,10.

<sup>68</sup> Edward T. Nykaza, et al, *An Investigation of Community Attitudes Toward Blast Noise*, U.S. Army Corps of Engineers, Construction Engineering Research Laboratory (Champaign, IL, April 2012), p. 2.

<sup>69</sup> Army Regulation 200-1, *Environmental Protection and Enhancement*, Headquarters, Dept. of the Army, Washington D.C., Dec. 2007, p. 44.

<sup>70</sup> Army Regulation 200-1, p. 44.

<sup>71</sup> Edward T. Nykaza, et al, *An Investigation of Community Attitudes Toward Blast Noise*, U.S. Army Corps of Engineers, Construction Engineering Research Laboratory (Champaign, IL, April 2012), p. 2.

<sup>72</sup> Army Regulation 200-1, p. 45.

<sup>73</sup> Eric Pilgrim, *Army to break ground on Digital Air-Ground Integration Range this fall*, *Fort Knox News*, 8 Oct. 2019, [https://www.army.mil/article/224783/army\_to\_break\_ground\_on\_digital\_air\_ground\_integration\_range\_this\_fall], (accessed 2 Sept. 2020).

<sup>74</sup> Dylan Malyasov, U.S. Army begins construction of new high tech live-fire range at Fort Knox, *Defense Blog*, 24 July 2019, [https://defence-blog.com/u-s-army-begins-construction-of-new-high-tech-live-fire-range-at-fort-knox], (accessed 8 April 2021).

<sup>75</sup> Kevin M. Allen, “Army Air Crews”, [http://www.armyaircrews.com/index.html], (accessed 15 Sept. 2020).

- 
- <sup>76</sup> Becca Owsley, *Helicopter door lands on home*, The News-Enterprise, 9 Sept. 2019, [https://www.thenewsenterprise.com/news/local/helicopter-door-lands-on-home/article\_13793ce8-9dcf-57cf-a2b1-aaf77dbdce35.html], (accessed 15 Sept. 2020).
- <sup>77</sup> Michael Baker International, *Fort Knox Real Property Vision Plan*, Final Sept. 2021. p. 11.
- <sup>78</sup> Michael Baker International, *Fort Knox Real Property Vision Plan*. p. 48.
- <sup>79</sup> Michael Baker International, *Fort Knox Real Property Vision Plan*. p. 48.
- <sup>80</sup> Michael Baker International, *Fort Knox Real Property Vision Plan*. p. 57-66.
- <sup>81</sup> Fort Knox Garrison Command, “Fort Knox Placemat” datasheet, 17 March, 2021.
- <sup>82</sup> Fort Knox Housing, [https://www.fortknoxhousing.com], (accessed 1 Sept. 2021).
- <sup>83</sup> Eric Pilgrim, ‘Survey says’ — *Fort Knox numbers remain high in Army-wide housing resident satisfaction report*, Fort Knox News, [https://www.army.mil/article/236842/survey\_says\_fort\_knox\_numbers\_remain\_high\_in\_army\_wide\_housing\_resident\_satisfaction\_report], (accessed 1 Sept. 2021).
- <sup>84</sup> Pilgrim, *Fort Knox Garrison deputy speaks at Radcliff Rotary Club meeting*, Fort Knox News, 19 March 2021, [https://www.army.mil/article/244461/fort\_knox\_garrison\_deputy\_speaks\_at\_radcliff\_rotary\_club\_meeting], (accessed 1 Sept. 2021).
- <sup>85</sup> Ryan Brus, *Resident feedback results in new plan to improve on-post housing*, Fort Knox News, [https://www.army.mil/article/241529/resident\_feedback\_results\_in\_new\_plan\_to\_improve\_on\_post\_housing], (accessed 1 Sept. 2021).
- <sup>86</sup> Winn Companies, Knox Hills, [https://www.knoxhills.com/] (accessed 8 June, 2021).
- <sup>87</sup> Fort Knox Garrison Command, “Fort Knox Placemat” datasheet, 17 March, 2021.
- <sup>88</sup> Fort Knox Garrison Command, “Fort Knox Placemat” datasheet, 17 March, 2021.
- <sup>89</sup> Evans, *Fort Knox and the Compatible Use Plan*, Presentation, Joint Meeting - Fort Knox CUP Committees, Radcliff, KY, 20 September 2019, p. 19.
- <sup>90</sup> Annual Estimates of the Resident Population for Incorporated Places in Kentucky: April 1, 2010 to July 1, 2019 (SUB-IP-EST2019-ANNRES-21), U.S. Census Bureau, Release Date: May 2020.
- <sup>91</sup> Wal\_Mart, Kentucky, [https://corporate.walmart.com/our-story/locations/united-states/Kentucky], (accessed 4 August 2021).
- <sup>92</sup> University of Kentucky, Faculty and Staff, [https://www.uky.edu/see/facultystaff], (accessed 4 August 2021).
- <sup>93</sup> Crystal Staley, Kentucky.gov, *Nucor Breaks Ground on 400-Job Steel Mill in Brandenburg*, 23 October 2020, [https://kentucky.gov/Pages/Activity-stream.aspx?n=GovernorBeshear&prld=428.], (accessed 5 August 2021).
- <sup>94</sup> Derek D. Avey, *Fort Knox Workforce Population Breakdown 2020*, (U.S. Army, Fort Knox, Garrison Command, IMKN-PI, Information Paper, 6 January 2020).
- <sup>95</sup> Avey, *Fort Knox Workforce Population Breakdown 2020*.

## ENDNOTES

- <sup>96</sup> *LWDA Lincoln Trail Marketable Records*, (Dun & Bradstreet, Market Insight, 25 January 2021).
- <sup>97</sup> Fort Knox Garrison Command, “Fort Knox Placemat” datasheet, 17 March, 2021.
- <sup>98</sup> Federal Aviation Administration, Digital Obstacle File, [https://www.faa.gov/air\_traffic/flight\_info/aeronav/digital\_products/dof], Release date July 13, 2021.
- <sup>99</sup> Cell Tower data was combined from several sources to include: Federal Communications Commission, 2002 & 2018 Cell Tower extract from online data portal. Homeland Infrastructure Foundation- Level Data, Aug. 2021 extract. [https://hifld-geoplatform.opendata.arcgis.com/datasets/cellular-towers/explore?location=10.771279%2C-15.454722%2C2.25], Bullitt County Planning Office, Permits for Cell Tower construction. 2012-2019.
- <sup>100</sup> Federal Aviation Administration, *FAA Announces Small UAS Registration Rule*, 14 December 2015, [https://www.faa.gov/newsroom/faa-announces-small-uas-registration-rule], (accessed 14 November 2021).
- <sup>101</sup> Federal Register, *Removal of the Special Rule for Model Aircraft*, 11 December 2020, [https://www.federalregister.gov/documents/2020/12/11/2020-26726/removal-of-the-special-rule-for-model-aircraft], (accessed 14 November 2021).
- <sup>102</sup> United States Code 49, 44809. *Exception for limited recreational operations of unmanned aircraft*. [https://uscode.house.gov/view.xhtml?req=granuleid:USC-prelim-title49-section44809&num=0&edition=prelim], (accessed 15 November 2021).
- <sup>103</sup> FAA, FOIA Library, Geographic listing of hobbyist/non-hobbyists UAS registry enrollments and registrants, CY2015 Q4 to CY 2021 Q3, [https://www.faa.gov/FOIA/electronic\_reading\_room], (accessed 15 November 2021).
- <sup>104</sup> Carina Francis, *Fort Knox policy prohibits flying drones on installation*, Fort Knox Gold Standard, 12 January 2017, [https://www.fkgoldstandard.com/content/fort-knox-policy-prohibits-flying-drones-installation], (accessed 13 May 2020).
- <sup>105</sup> Edward T. Nykaza, et al, *An Investigation of Community Attitudes Toward Blast Noise*, U.S. Army Corps of Engineers, Construction Engineering Research Laboratory (Champaign, IL, April 2012), 1.
- <sup>106</sup> Eric Pilgrim, *Army to break ground on Digital Air-Ground Integration Range this fall*, Fort Knox News, 8 October 2019, [https://www.army.mil/article/224783/army\_to\_break\_ground\_on\_digital\_air\_ground\_integration\_range\_this\_fall], (accessed 7 November 2019).
- <sup>107</sup> Fort Knox Environmental Management Division, *Draft Finding of No Significant Impact (FNSI)/Finding of No Practicable Alternative*, 17 Dec. 2017, [https://www.army.mil/article/215243/draft\_finding\_of\_no\_significant\_impact\_fnsi\_finding\_of\_no\_practicable\_alternative], (accessed 14 January 2020).



- <sup>108</sup> Robert C. Lozar, Richard Schneider, *Ambient Light Encroachment at Military Installations*, U.S. Army Corps of Engineers, Construction Engineering Research Laboratory (Champaign, IL, October 2005), 1-2.
- <sup>109</sup> E.G. Rowse, Lewanzik D., Stone E.L., Harris S., Jones G. (2016) *Dark Matters: The Effects of Artificial Lighting on Bats*. In: Voigt C., Kingston T. (eds) *Bats in the Anthropocene: Conservation of Bats in a Changing World*. Springer, Cham. [https://doi.org/10.1007/978-3-319-25220-9\\_7](https://doi.org/10.1007/978-3-319-25220-9_7) (accessed 17 August 2021).
- <sup>110</sup> Lozar, *Ambient Light Encroachment at Military Installations*, 1.
- <sup>111</sup> Lauren Moretto, Charles M Francis, *What factors limit bat abundance and diversity in temperate, North American urban environments?* *Journal of Urban Ecology*, Volume 3, Issue 1, January 2017, jux016, <https://doi.org/10.1093/jue/jux016>, (accessed 17 August 2021).
- <sup>112</sup> VIIRS Daily Mosaic, NOAA, Earth Observation Group, [\[https://ngdc.noaa.gov/eog/viirs.html\]](https://ngdc.noaa.gov/eog/viirs.html), (accessed 3 November 2020)
- <sup>113</sup> Microsoft US Building Footprints, [\[https://github.com/Microsoft/USBuildingFootprints\]](https://github.com/Microsoft/USBuildingFootprints), (accessed 3 November 2020).
- <sup>114</sup> G. Clay Whittaker, "How Does The FBI Catch People Who Shine Lasers At Airplanes?", *Popular Science*, 18 Jul. 2015, [\[https://www.popsci.com/can-we-crack-down-aircraft-laser-perpetrators/\]](https://www.popsci.com/can-we-crack-down-aircraft-laser-perpetrators/), (accessed 10 Sept. 2021).
- <sup>115</sup> Perry Beerman and Susan J. Demas, *FAA: Michigan laser pointers targeted aircraft in flight 810 times over last decade*, *Michigan Advance*, 7 Sept. 2021, [\[https://michiganadvance.com/2021/09/07/faa-michigan-laser-pointers-targeted-aircraft-in-flight-810-times-over-last-decade/\]](https://michiganadvance.com/2021/09/07/faa-michigan-laser-pointers-targeted-aircraft-in-flight-810-times-over-last-decade/), (accessed 10 Sept. 2021).
- <sup>116</sup> Laser Event Data 2020-2020, Tableau Public, [\[https://public.tableau.com/app/profile/aoc.web.management/viz/LaserEventViz/LaserEvents20102020\]](https://public.tableau.com/app/profile/aoc.web.management/viz/LaserEventViz/LaserEvents20102020), (accessed 10 Sept. 2021)
- <sup>117</sup> Jenn DeHann, *Officials raise safety concerns, warn of repercussions after local aircraft targeted by lasers*, *Army.mil*, 30 Apr. 2021, [\[https://www.army.mil/article/245800/officials\\_raise\\_safety\\_concerns\\_warn\\_of\\_repercussions\\_after\\_local\\_aircraft\\_targeted\\_by\\_lasers\]](https://www.army.mil/article/245800/officials_raise_safety_concerns_warn_of_repercussions_after_local_aircraft_targeted_by_lasers), (accessed 4 May 2021).
- <sup>118</sup> Don't Let a Prank Lead To Prison, Federal Aviation Administration, [\[https://www.faa.gov/education/highlight\\_reel/?highlight=140418\\_laser\\_fbi#:~:text=Aiming%20a%20laser%20at%20an%20aircraft%20is%20a%20federal%20crime,be%20eligible%20for%20a%20reward.\]](https://www.faa.gov/education/highlight_reel/?highlight=140418_laser_fbi#:~:text=Aiming%20a%20laser%20at%20an%20aircraft%20is%20a%20federal%20crime,be%20eligible%20for%20a%20reward.), (accessed 10 Sept. 2021).
- <sup>119</sup> Center for Public Environmental Oversight, "Military"; [\[http://www.cpeo.org/encroachment.html\]](http://www.cpeo.org/encroachment.html), (accessed 10 August 2021).
- <sup>120</sup> Kentucky Dept. of Fish & Wildlife Resources, [\[https://app.fw.ky.gov/speciesinfo/QuadListSpecies.asp\]](https://app.fw.ky.gov/speciesinfo/QuadListSpecies.asp), (accessed 10 August 2021).
- <sup>121</sup> Jimmy Watkins, *Bat colonies roosting, flourishing thanks to artificial bark*, 19 April 2013,

- [\[https://www.army.mil/article/101527/Bat\\_colonies\\_roosting\\_\\_flourishing\\_thanks\\_to\\_artificial\\_bark/\]](https://www.army.mil/article/101527/Bat_colonies_roosting__flourishing_thanks_to_artificial_bark/), (accessed 9 August 2021).
- <sup>122</sup> ECOS Environmental Conservation Online System, U.S. Fish & Wildlife Service, [\[https://fws.maps.arcgis.com/home/webmap/viewer.html?webmap=9d8de5e265ad4fe09893cf75b8dbfb77\]](https://fws.maps.arcgis.com/home/webmap/viewer.html?webmap=9d8de5e265ad4fe09893cf75b8dbfb77), (accessed 12 August 2021).
- <sup>123</sup> KDFWR, Kentucky's *Invasive/Nuisance Species*, [\[https://fw.ky.gov/More/Pages/Nuisance-Species-Plans.aspx\]](https://fw.ky.gov/More/Pages/Nuisance-Species-Plans.aspx) (accessed 10 August 2021).
- <sup>124</sup> KDFWR, *Invasive Species*, [\[https://fw.ky.gov/InvasiveSpecies/Pages/default.aspx\]](https://fw.ky.gov/InvasiveSpecies/Pages/default.aspx) (accessed 10 August 2021).
- <sup>125</sup> U.S. Army Fort Knox [\[https://home.army.mil/knox/index.php/announcements/dealing-wildlife-native-kentucky\]](https://home.army.mil/knox/index.php/announcements/dealing-wildlife-native-kentucky), (accessed 10 August 2021).
- <sup>126</sup> *2015 Lincoln Trail Region Hazard Mitigation Plan*, Lincoln Trail ADD, Section 3.3 Risk Assessment, p. 28-31.
- <sup>127</sup> *What Climate Change Means for Kentucky*, U.S. Environmental Protection Agency, August 2016.
- <sup>128</sup> *2015 Lincoln Trail Region Hazard Mitigation Plan*, LTADD, Section 3.3 Risk Assessment, p. 25.
- <sup>129</sup> Maureen Rose, *Wildfire on Fort Knox*, *U.S. Army News*, 28 Oct. 2010, [\[https://www.army.mil/article/47320/wildfire\\_on\\_fort\\_knox\]](https://www.army.mil/article/47320/wildfire_on_fort_knox), (accessed 9 August 2021).
- <sup>130</sup> Capt. Stephen Martin, *Kentucky Guard fights fires at Fort Knox*, *National Guard News*, 27 Oct. 2010, [\[https://www.nationalguard.mil/News/Article-View/Article/587602/kentucky-guard-fights-fires-at-fort-knox\]](https://www.nationalguard.mil/News/Article-View/Article/587602/kentucky-guard-fights-fires-at-fort-knox), (accessed 9 August 2021)
- <sup>131</sup> *Wildfires Flare Up in KY. Counties*, WLKT TV, 22 Oct. 2010, [\[https://www.wlky.com/article/wildfires-flare-up-in-ky-counties/3731929\]](https://www.wlky.com/article/wildfires-flare-up-in-ky-counties/3731929), (accessed 10 August 2021).
- <sup>132</sup> "Karst", *Encyclopedia Britannica*, [\[https://www.britannica.com/search?query=karst\]](https://www.britannica.com/search?query=karst), (accessed 13 August 2021).
- <sup>133</sup> *2015 Lincoln Trail Region Hazard Mitigation Plan*, LTADD, Section 3.3 Risk Assessment, p. 121.
- <sup>134</sup> *2015 Lincoln Trail Region Hazard Mitigation Plan*, LTADD, Section 3.3 Risk Assessment, p. 118.
- <sup>135</sup> *Mammoth Cave: Explore the World's Longest Cave*, U.S. Dept. of the Interior, [\[https://www.doi.gov/blog/mammoth-cave-explore-worlds-longest-cave\]](https://www.doi.gov/blog/mammoth-cave-explore-worlds-longest-cave), (accessed 21 August 2021).
- <sup>136</sup> *Subdivision Regulations*, Meade County Planning Commission, as amended 31 May 2011.
- <sup>137</sup> *Landslide Hazards in Kentucky*, Kentucky Geological Survey, 2020.

- 
- <sup>138</sup> Matthew M. Crawford, *KGS Landslide Inventory: From Design to Application*, Kentucky Geological Survey, 2014.
- <sup>139</sup> Kentucky Natural Lands Trust, *Bernheim-Fort Knox Wildlands Corridor*, [https://knlt.org/bernheim-ftknox], (accessed 11 August 2021).
- <sup>140</sup> *2020-2021 Economic Situation & Outlook*, University of Kentucky, College of Agriculture, Food and Economics, [https://agecon.ca.uky.edu/2020-2021-economic-situation-outlook], (accessed 8 September 2021).
- <sup>141</sup> *Air and Water Quality*, County Health Rankings & Roadmaps, [https://www.countyhealthrankings.org/explore-health-rankings/measures-data-sources/county-health-rankings-model/health-factors/physical-environment/air-and-water-quality], (accessed 19 Aug. 2021).
- <sup>142</sup> *Summary of the Clean Air Act*, U.S. Environmental Protection Agency (EPA), [https://www.epa.gov/laws-regulations/summary-clean-air-act], (accessed 19 Aug. 2021).
- <sup>143</sup> *Summary of the Clean Water Act*, EPA, [https://www.epa.gov/laws-regulations/summary-clean-water-act], (accessed 19 Aug. 2021).
- <sup>144</sup> Army Regulation 200-1, p. 13.
- <sup>145</sup> Army Regulation 200-1, p. 6.
- <sup>146</sup> *Heat Island Effect*, EPA, [https://www.epa.gov/heatislands], (accessed 27 Aug. 2021).
- <sup>147</sup> *Urban Heat Island Project*, Louisville-Metro, [https://louisvilleky.gov/government/sustainability/urban-heat-island-project], (accessed 27 Aug. 2021).
- <sup>148</sup> *Heat Island Impacts*, EPA, [https://19january2017snapshot.epa.gov/heat-islands/heat-island-impacts\_.html], (accessed 27 Aug. 2021).
- <sup>149</sup> University of Louisville, William F. Ekstrom Library, Government Resources: States: Kentucky Facts, [https://library.louisville.edu/ekstrom/gov\_states/kyfacts], (accessed 4 May 2021).
- <sup>150</sup> Environmental Protection Cabinet, Division of Water, Commonwealth of Kentucky [https://eec.ky.gov/Environmental-Protection/Water/Drinking/Pages/Drinking%20Water.aspx} (accessed 4 May 2021).
- <sup>151</sup> *KY 313 Corridor*, map, Hardin County Planning and Development Commission, c. 2018.
- <sup>152</sup> *Special Overlay District, KY 245 Tourism District*, Bullitt County Joint Planning Commission (BCJPC), April 2021.
- <sup>153</sup> Traffic Flow geospatial dataset, Reporting years 2016 and 2020, KYTC, [https://datamart.kytc.ky.gov/], (downloaded 6 Sept. 2021).
- <sup>154</sup> Winn Companies, Knox Hills, [https://www.knoxhills.com/] (accessed 8 June 2021).
- <sup>155</sup> Rose L. Thayer, *Billion-dollar Army housing project begins next week at five bases*, *Stars and Stripes*, 23 April 2021 [https://www.stripes.com/theaters/us/billion-dollar-

- army-housing-project-begins-next-week-at-five-bases-1.670959] (accessed 20 August 2021).
- <sup>156</sup> *Renewable Energy Explained*, U.S. Energy Information Administration (USEIA), [https://www.eia.gov/energyexplained/renewable-sources], (accessed 16 Aug. 2021).
- <sup>157</sup> *State Profile and Energy Estimates: Kentucky*, USEIA, [https://www.eia.gov/state/?sid=KY], (accessed 16 Aug. 2021).
- <sup>158</sup> Eric Pilgrim, *Congressional, Army leaders praise success of Fort Knox energy resiliency*, *Fort Knox News*, 25 October 2018, [https://www.army.mil/article/212915/congressional\_army\_leaders\_praise\_success\_of\_fort\_knox\_energy\_resiliency], (accessed 12 August 2019).
- <sup>159</sup> Capt. Jo Smoke, *Twenty years of energy investments pay off for Fort Knox*, Fort Knox Office of Public Affairs, 31 March, 2015, [https://www.army.mil/article/145354/Twenty\_years\_of\_energy\_investments\_pay\_off\_for\_Fort\_Knox/], [accessed 12 Aug. 2021].
- <sup>160</sup> Pilgrim, *Fort Knox Energy Program receives another award during Army video-teleconference ceremony*, U.S. Army.mil, 22 October 2020, [https://www.army.mil/article/240217/fort\_knox\_energy\_program\_receives\_another\_award\_during\_army\_video\_teleconference\_ceremony], (accessed 9 Aug. 2021).
- <sup>161</sup> 2020 Federal Energy and Water Management Award Winners, U.S. Department of Energy (DOE), [https://www.energy.gov/eere/femp/2020-federal-energy-and-water-management-award-winners], (accessed 9 Aug. 2021).
- <sup>162</sup> Pilgrim, *Fort Knox earns two Army energy awards for successfully taking post 'off the grid'*, *Fort Knox News*, 29 August 2019. [https://www.army.mil/article/226413/fort\_knox\_earns\_two\_army\_energy\_awards\_f\_or\_successfully\_taking\_post\_off\_the\_grid], (accessed 9 Aug. 2021).
- <sup>163</sup> Pilgrim, *Fort Knox DPW wins big at Interior Lighting Campaign awards presentation*, *Fort Knox News*, 12 August 2019, [https://www.army.mil/article/225625/fort\_knox\_dpw\_wins\_big\_at\_interior\_lighting\_campaign\_awards\_presentation], (accessed 9 Aug. 2021).
- <sup>164</sup> Smoke, *Twenty years of energy investments pay off for Fort Knox*, [https://www.army.mil/article/145354/Twenty\_years\_of\_energy\_investments\_pay\_off\_for\_Fort\_Knox/], 9accessed 12 Aug. 2021).
- <sup>165</sup> *EKPC announces Pearl Hollow Landfill as newest site for renewable energy plant*, *The Ledger Independent*, 10 May 2005, [https://maysville-online.com/news/12022/ekpc-announces-pearl-hollow-landfill-as-newest-site-for-renewable-energy-plant], (accessed 7 August 2021).
- <sup>166</sup> Marty Finley, *Carbon credits generate more than \$150,000 in first-year revenue*, *The News-Enterprise*, 6 Apr. 2012, [https://subscriber.thenewsenterprise.com/content/carbon-credits-generate-more-150000-first-year-revenue], (accessed 7 August 2021).

- 
- <sup>167</sup> Marcus Green, *Permit puts LG&E's Bullitt County pipeline 'one step closer' to construction*, WDRB Media, 10 September 2021, [https://www.wdrb.com/in-depth/permit-puts-lg-es-bullitt-county-pipeline-one-step-closer-to-construction/article\_ed7daa48-1260-11ec-92ff-c358e72c65c0.html], (accessed 16 September 2021).
- <sup>168</sup> Ryan Van Velzer, *LG&E Proposes Largest Solar Field In Kentucky*, WFPL, 27 Jan. 2020, [https://wfpl.org/lge-proposes-largest-solar-field-in-kentucky/], (accessed 8 Aug. 2021).
- <sup>169</sup> Gina Clear, *Solar farm given redo in Hardin County*, *The News-Enterprise*, 16 Sept. 2021, [https://www.thenewsenterprise.com/news/local/solar-farm-given-redo-in-hardin-county/article\_499ec236-b152-57a7-9930-36d6029289b3.html], (accessed 16 September 2021).
- <sup>170</sup> New Services Queue, PJM, [https://www.pjm.com/planning/services-requests/interconnection-queues.aspx], (accessed 16 September 2021).
- <sup>171</sup> Liam Niemeyer, *Ky. Bill Would Allow Ban Of Large Solar Projects On Farmland*, Ohio Valley ReSource, Inc./WKMS, 24 Feb. 2021), [https://ohiovalleyresource.org/2021/02/24/ky-bill-would-allow-ban-of-large-solar-projects-on-farmland/], (accessed 16 Sept. 2021).
- <sup>172</sup> Senate Bill 266, Kentucky General Assembly, 2021 Regular Session, [https://apps.legislature.ky.gov/record/21rs/sb266.html], (accessed 8 Aug. 2021).
- <sup>173</sup> NewGeography, *Small Cities Business Services Jobs – 2016 Best Cities Rankings*, [https://www.newgeography.com/content/005329-small-cities-business-services-jobs-2016-best-cities-rankings], (accessed 20 August 2021).
- <sup>174</sup> Association of Defense Communities, *Greater Fort Knox Region Creates New Military Spouse Career Partnership*, 17 July, 2020. [https://defensecommunities.org/2020/07/greater-fort-knox-region-creates-new-military-spouse-career-partnership/], (accessed 20 August 2021).
- <sup>175</sup> Knox Regional Development Alliance, *KRDA partners with Kentucky Career Center, Fort Knox to assist military spouse*, 8 July 2020, [https://growknox.org/military-spouse/], (accessed 20 August 2021).
- <sup>176</sup> Knox Regional Development Alliance, *KRDA partners with Kentucky Career Center, Fort Knox to assist military spouse*, 8 July 2020.
- <sup>177</sup> *The News-Enterprise*, *KRDA partnership offers job network for newcomers*, 21 July, 2020, [https://www.thenewsenterprise.com/news/local/krda-partnership-offers-job-network-for-newcomers/article\_786cc48a-4d89-5ae6-b78e-0e56d8781cb8.html], (accessed 20 August 2021).
- <sup>178</sup> *The News-Enterprise*, *KRDA partnership offers job network for newcomers*, 21 July, 2020.
- <sup>179</sup> Teleworks USA, *What is Teleworks USA*, [https://www.teleworksusa.com/work}, (accessed 20 August 2021).

## ENDNOTES

- <sup>180</sup> www.repi.mil; The Department of Defense (DoD)'s REPI Program is a key tool for combating encroachment that can limit or restrict military training, testing, and operations. The REPI Program protects these military missions by helping remove or avoid land-use conflicts near installations and addressing regulatory restrictions that inhibit military activities. The REPI Program is administered by the Office of the Secretary of Defense (OSD).
- A key component of the REPI Program is the use of buffer partnerships among the Military Services, private conservation groups, and state and local governments, authorized by Congress at 10 U.S.C. § 2684a. These win-win partnerships share the cost of acquisition of easements or other interests in land from willing sellers to preserve compatible land uses and natural habitats near installations and ranges that helps sustain critical, at-risk military mission capabilities.
- <sup>181</sup> www.repi.mil, READINESS AND ENVIRONMENTAL PROTECTION INTEGRATION [REPI] PROGRAM PROJECT PROFILE, FORT KNOX.
- <sup>182</sup> Environmental Easement Boundaries, USDA, Natural Resources Conservation Service, [https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/technical/nra/dma/?cid=stelprdb1043925], (accessed 15 April 2021).
- <sup>183</sup> Total Funding by Partner, Sentinel Landscapes, [https://sentinel landscapes.org/about/our-work/], (accessed 19 Jan. 2021).
- <sup>184</sup> *Federal Programs*, Sentinel Landscapes, [https://sentinel landscapes.org/about/federal-programs/], (accessed 19 Jan. 2021).
- <sup>185</sup> PACE, Kentucky Department of Agriculture, [https://www.kyagr.com/marketing/pace.html], (accessed 15 April 2021).
- <sup>186</sup> Kentucky Real Estate Commission, [https://krec.ky.gov/new\_docs.aspx?cat=47&menuid=58], (accessed 15 April 2021).
- <sup>187</sup> *Noise Analysis and Abatement Policy*, Division of Environmental Analysis, Kentucky Transportation Cabinet, effective date 1 July 2020, p. 23.
- <sup>188</sup> *Noise Assessment Training*, Presentation, U.S. Department of Housing and Urban Development, [https://www.hud.gov/sites/documents/DOC\_14222.PDF], (accessed 6 April 2021). Slide 2.
- <sup>189</sup> *Noise Abatement and Control* (24 CFR Part 51B), HUD, Federal Register, 26 March 1996)
- <sup>190</sup> *Noise Assessment Training*, Presentation, HUD, [https://www.hud.gov/sites/documents/DOC\_14222.PDF], (accessed 6 April 2021). Slide 6.
- <sup>191</sup> *Outdoor Lighting Basics*, International Dark-Sky Association, [https://www.darksky.org/our-work/lighting/lighting-for-citizens/lighting-basics/], (3 November 2020).
- <sup>192</sup> *Smart Growth and Heat Islands*, EPA, [https://www.epa.gov/heatislands/smart-growth-and-heat-islands], (accessed 27 Aug. 2021).

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<sup>193</sup> *Municipal Separate Storm Sewer Systems*, Kentucky Division of Water, [[https://eec.ky.gov/Environmental-Protection/Water/Comp\\_Insp/Pages/MS4.aspx](https://eec.ky.gov/Environmental-Protection/Water/Comp_Insp/Pages/MS4.aspx)], (accessed 27 Aug. 2001)

<sup>194</sup> *Wastewater Discharge Permits*, Kentucky Environmental Protection Cabinet, [<https://eec.ky.gov/Environmental-Protection/Water/PermitCert/KPDES/Pages/default.aspx>], (accessed 27 Aug. 2021).

<sup>195</sup> Edward T. Nykaza, et al, *An Investigation of Community Attitudes Toward Blast Noise*, U.S. Army Corps of Engineers, Construction Engineering Research Laboratory (Champaign, IL, April 2012), p. 28.

<sup>196</sup> Lozar, *Ambient Light Encroachment at Military Installations*, 6.

<sup>197</sup> *Articles of Incorporation of Core Committee, Inc.*, 13 Dec. 2006, filed with Kentucky Secretary of State 18 Dec. 2006.

<sup>198</sup> Army Regulation 200-1, p. 45.