Final Environmental Assessment

Tennessee Army National Guard (TNARNG) Range Expansion - Arnold Air Force Base, Tennessee

Prepared for

Arnold Air Force Base

Prepared by

SAIC
From Science to Solutions

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FINDING OF NO SIGNIFICANT IMPACT (FONSI)/
TENNESSEE ARMY NATIONAL GUARD (TNARNG) RANGE EXPANSION
AT ARNOLD AIR FORCE BASE, TN

Pursuant to the Council on Environmental Quality regulations for implementing the procedural provisions of the National Environmental Policy Act (NEPA; 40 Code of Federal Regulations [CFR] 1500-1508) and Air Force Regulation 32 CFR Part 989, the AETC/TSDCA has prepared an Environmental Assessment (EA) to identify and evaluate the effects associated with the expansion of the TNARNG range at Arnold AFB.

PURPOSE AND NEED

The purpose of the proposed action is to meet the premobilization training and readiness requirements for Combat Arms, Combat Support, and Combat Service Support units under the Army Forces Generation Model in one single location, to minimize logistical issues. Travel to several different locations minimizes available training time and increases costs. The proposed action would result in the Volunteer Training Site-Tullahoma's (VTS-T) ability to meet approximately 90 percent of a soldier's annual training requirement in a single location.

DESCRIPTION OF THE PROPOSED ACTION

The Proposed Action is for the TNARNG to expand upon and modernize existing training range capabilities at the Volunteer Training Site (VTS) at Arnold AFB. The Proposed Action consists of the development of six training ranges within the existing TNARNG leasehold area on Arnold AFB: (1) an MK-19, 40-mm Grenade Machine Gun Range; (2) a Convoy Commanders Reaction Course (CCRC); (3) a Primary Combined Arms Collective Training Facility (CACTF) Range; (4) a Secondary CACTF Range; (5) an M16 calibration or "zero" range; and (6) a .50 caliber familiarization range. With the exception of the CCRC, all ranges are proposed for development within or adjacent to TNARNG ranges within the existing TNARNG range complex north of Wattendorf Highway. The CCRC is proposed for development south of Wattendorf Highway using existing roadways. An alternative to the Proposed Action is similar to the Proposed Action, with the exception of developing only one CACTF. Associated range support facilities will be included within each range design, such as parking and staging areas, control towers, operational and storage buildings, bleacher enclosures, and ammunition breakdown buildings. Some minor road improvements, such as right of way maintenance and graveling, may also be necessary to support large military vehicles. (EA Section 2.1)

ALTERNATIVE 1: No Secondary CACTF

Alternative 1 is the same as the Proposed Action, with the exception of the Secondary CACTF Range, which would not be developed. (EA Section 2.2)

DESCRIPTION OF THE NO-ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Action would not occur. The TNARNG would not develop the new range capabilities and TNARNG training activities would continue as currently conducted on the installation. The TNARNG would be negatively impacted and risk readiness degradation. The status quo only serves to limit the opportunities to train TNARNG soldiers within

the state at increased cost to the tax payer. Most importantly, degraded readiness negatively impacts the chances of soldier survival in combat. (EA Section 2.3)

ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD

Alternatives initially considered for the Proposed Action include conducting training off-site, utilizing other locations within Tennessee, and utilization of other land areas on Arnold AFB for development of the new range areas. However, none of these alternatives would meet the purpose and need for the Proposed Action and were, therefore, not carried forward. (EA Section 1.3)

ANTICIPATED ENVIRONMENTAL EFFECTS

Impacts under the Proposed Action are associated with development, operation, and maintenance of the proposed ranges. The following resources were eliminated from detailed analysis because it was determined there was no potential impact to Air Installation Compatible Use Zone, geology, socioeconomics and environmental Justice, and traffic flow. (EA Sections 1.5 through 1.6)

The following issues were studied in detail: land use, safety, biological resources, cultural resources, geomorphology and soils, water quality and hydrology, air quality, noise, utility infrastructure and hazardous materials/waste and solid waste. No significant impacts have been identified under the Proposed Action.

Land Use: Minor insignificant changes in land use would occur, from unimproved to semi-improved or improved grounds. (EA Section 4.1)

Safety: Safety impacts associated with range operations would be minimized through implementation of standard TNARNG and Air Force safety protocols for range operations and no significant impacts have been identified. (EA Section 4.2)

Biological Resources: While the Proposed Action has the potential to result in the disturbance 81.27 acres of sensitive habitat, this represents approximately less than 2 percent of the total sensitive habitat within the TNARNG leased area at Arnold AFB. No significant impacts have been identified for sensitive habitat or plant and animal species. (EA Section 4.3)

Cultural Resources: All areas have been surveyed within areas proposed for TNARNG Range expansion for the presence of cultural resources; no sites determined to be eligible or potentially eligible on the National Register of Historic Places are currently identified within the project area. (EA Section 4.4)

Geomorphology and Soils: Land disturbance would cover more than 1 acre of land area and will therefore require a National Pollutant Discharge Elimination System (NPDES) permit. This NPDES permit would require implementation of best management practices (BMPs) to minimize soil erosion impacts. (EA Section 4.5)

Water Quality and Hydrology: Construction and operations would avoid wetlands and surface water bodies, and would not result in any significant adverse impacts to water resources. NPDES permitting would be required due to the size of the development area. (EA Section 4.6)

Air Quality: Construction emissions would cause short-term and temporary increases, primarily in particulate matter emissions. These emissions would cease once the project is complete and there would be no long-term increases in air emissions. (EA Section 4.7)

Noise: Construction noise would cause temporary increases in noise, and munitions noise may cause annoyance from the firing of the MK-19, M16/M4, and M2 machine guns. Receptors are located approximately 2 miles away from sites where small arms would be used; noise would be consistent with current operations and would be sufficiently diminished as to not cause hearing damage to potential receptors. (EA Section 4.8)

Utility Infrastructure: There is no expected increase in utility usage associated with the proposed projects, and no new utility connections are anticipated. (EA Section 4.9)

Hazardous Materials and Solid/Hazardous Waste: The installation has developed programs and procedures to comply with all federal/state hazardous materials and hazardous waste management and reporting requirements and construction and training activities would avoid existing Installation Restoration Program sites. The would be minimal solid waste generation as a result of the project; most waste would be associated with land clearing and would either be recycled or burned on site. (EA Section 4.10)

Chapter 5.0 of the EA provides an extensive list of applicable resource-specific plans, permits, and management requirements that would be implemented as part of the Proposed Action and Alternative 1. All potential impacts would be minimized through implementation of avoidance measures and other management actions and BMPs listed in Chapter 5.0 of the EA.

CUMULATIVE IMPACTS

The cumulative effects of the Proposed Action when added to other past, present, and reasonably foreseeable future actions were evaluated and found to be insignificant. Cumulative effects from the temporary, minor increase in air emissions, waste generation, noise and traffic during construction would be inconsequential and BMPs would be used to minimize adverse effects. It is unlikely that the projects would be constructed simultaneously, further reducing the potential for cumulative adverse effects. (Evaluated in each EA resource area section, beginning in Sections 4.1.4, ending in Section 4.10.4)

PUBLIC NOTICE AND AGENCY CONSULTATION

The Air Force published a public notice in the Tullahoma News, Herald Chronicle, and Manchester Times once per week for four weeks starting on 1 July 2011, notifying the public of the Air Force's intent to sign a Finding of No Significant Impact (FONSI). No comments were received. The Tennessee Historical Commission, State Historic Preservation Office (SHPO), provided concurrence on 15 June 2011 and 18 July 2011 that no historic or archaeological resources would be affected by the Proposed Action. The USFWS also replied, indicating concerns over potential alteration of suitable roosting habitat for the federally endangered gray bat; the USFWS requested botanical and zoological surveys. The U.S. Air Force conducted the requested surveys and coordinated with the USFWS regarding the results. Consequently, the USFWS provided no objection to the Proposed Action or Alternatives. Information regarding the USFWS correspondence is provided in Section 4.3 of the Final EA. No other public or agency comments were received. All agency and tribal correspondence received is provided in Appendix A of the Final EA.

FINDING OF NO SIGNIFICANT IMPACT – Based upon my review of the facts and analyses contained in the EA, which is hereby incorporated by reference, I conclude that the Proposed Action will not have a significant impact on the natural or human environment. An Environmental Impact Statement is not required for this action. This analysis fulfills the requirements of the NEPA, the President's Council on Environmental Quality, and 32 CFR Part 989.

Date: 4 January 2013

JEFFREY M. TODD, Colonel, USAF, P.E.
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Communications, Installations
and Mission Support

Final Environmental Assessment

Tennessee Army National Guard (TNARNG) Range Expansion at Arnold Air Force Base, Tennessee

Prepared for

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List of Acronyms, Abbreviations, and Symbols

ACAM	Air Conformity Applicability Model
AEDC	Arnold Engineering Development Center
AFB	Air Force Base
AFI	Air Force Instruction
AFMC	Air Force Materiel Command
AFOSH	Air Force Occupational and Environmental Safety, Fire Protection, and Health
AFPD	Air Force Policy Directive
AICUZ	Air Installation Compatible Use Zone
APE	area of potential effects
AQCR	Air Quality Control Region
ARFORGEN	Army Forces Generation
ATA	Aerospace Testing Alliance
BMP	best management practice
CA	Combat Arms
CACTF	Combined Arms Collective Training Facility
CCRC	Convoy Commanders Reaction Course
C&D	construction and demolition
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CS	Combat Support
CPQC	Combat Pistol Qualification Course
CSS	Combat Service Support
CWA	Clean Water Act
dB	decibels
dBA	A-weighted decibels
dBC	C-weighted decibels
dBP	decibels unweighted (peak)
DoD	Department of Defense
DoDI	Department of Defense Instruction
DODIC	Department of Defense Identification Code
EA	Environmental Assessment
EO	Executive Order
ESA	Endangered Species Act
EPCRA	Emergency Planning and Community Right-to-Know Act
FAA	Federal Aviation Administration
FICON	Federal Interagency Committee on Noise
FICUN	Federal Interagency Committee on Urban Noise
FONSI	Finding of No Significant Impact
HMMWV	high-mobility multipurpose wheeled vehicle
HWMP	Hazardous Waste Management Plan
Hz	hertz
INRMP	Integrated Natural Resources Management Plan
IPP	invasive pest plant
IRP	Installation Restoration Program
DNL	day-night average sound level
L_{eq}	equivalent sound level
L_{max}	maximum sound level
MBTA	Migratory Bird Treaty Act
MK	mark

List of Acronyms, Abbreviations, and Symbols, Cont'd

mm	millimeters
MOU	Memorandum of Understanding
MVA	megavolt ampere
NAAQS	National Ambient Air Quality Standards
NEI	National Emissions Inventory
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
OSHA	Occupational Safety and Health Administration
PM	particulate matter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
PM_{10}	particulate matter less than 10 microns in diameter
RCRA	Resource Conservation and Recovery Act
ROI	region of influence
RTE	rare, threatened, and endangered
SDZ	surface danger zone
SHPO	State Historic Preservation Office
SO_2	sulfur dioxide
SPL	sound pressure level
SVOC	semivolatile organic compound
STX	Situational Training Exercise
SWMU	solid waste management unit
TCA	Tennessee Code Annotated
TDEC	Tennessee Department of Environment and Conservation
TNARNG	Tennessee Army National Guard
TRI-DDS	Toxic Release Inventory-Data Delivery System
TTB	Tactical Training Base
TUB	Tullahoma Utilities Board
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UXO	unexploded ordnance
VOC	volatile organic compound
VTS	Volunteer Training Site
VTS-T	Volunteer Training Site - Tullahoma

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1.0 Purpose and Need for Action

1.1 Background

Arnold Air Force Base (AFB) is located in Coffee and Franklin Counties in middle Tennessee. The Base is approximately 70 miles southeast of Nashville, the state capitol, and near the towns of Manchester, Tullahoma, and Winchester. Arnold AFB is the largest employer in the two-county area (Figure 1-1).

Arnold AFB occupies 39,081 acres, including the 3,632-acre Woods Reservoir and various sectors of improved, semi-improved, and unimproved grounds. The base has 5,494 acres of cultivated pine forests and 23,053 acres of hardwood forests (U.S. Air Force, 2006). Grasslands and early successional habitats in utility rights-of-way provide 2,219 acres of habitat for numerous rare species. Arnold AFB contains 1,894 acres of jurisdictional wetlands. The remaining 4,683 acres are occupied by wildlife food plots, buildings/structures, mowed/bushhogged areas, and other open areas (U.S. Air Force, 2006).

The Tennessee Army National Guard (TNARNG) occupies the Volunteer Training Site-Tullahoma (VTS-T), which covers 7,391 acres on the northwestern side of Arnold AFB (Figure 1-2).

1.1.1 Operations

Arnold Engineering Development Center (AEDC), which is located on Arnold AFB, is the most advanced and largest complex of flight simulation test facilities in the world, with 58 aerodynamic and propulsion wind tunnels, rocket and turbine engine test cells, space environmental chambers, arc heaters, ballistic ranges, and other specialized units. Facilities can simulate flight conditions from sea level to altitudes of more than 100,000 feet, and from subsonic velocities to those well over Mach 14.

The TNARNG uses the VTS-T on Arnold AFB for training purposes under license with the Air Force. The VTS-T includes a cantonment area and large areas for artillery maneuvers, weapons training, and bivouac (Figure 1-1). The VTS-T functions as a major training area for combat readiness utilized by the TNARNG and Army Reserve units from Tennessee and active duty Army units. Training conducted on the VTS-T is directed by the National Guard Bureau and includes 26 weekend (inactive duty training) and annual training events (2-week summer encampment). An annual average of 35,000 man-days (one soldier training for one day) of troop, tank, and artillery training takes place on the VTS-T. The primary land use of the VTS-T is military training and maneuvers in large expansive areas of unimproved land.

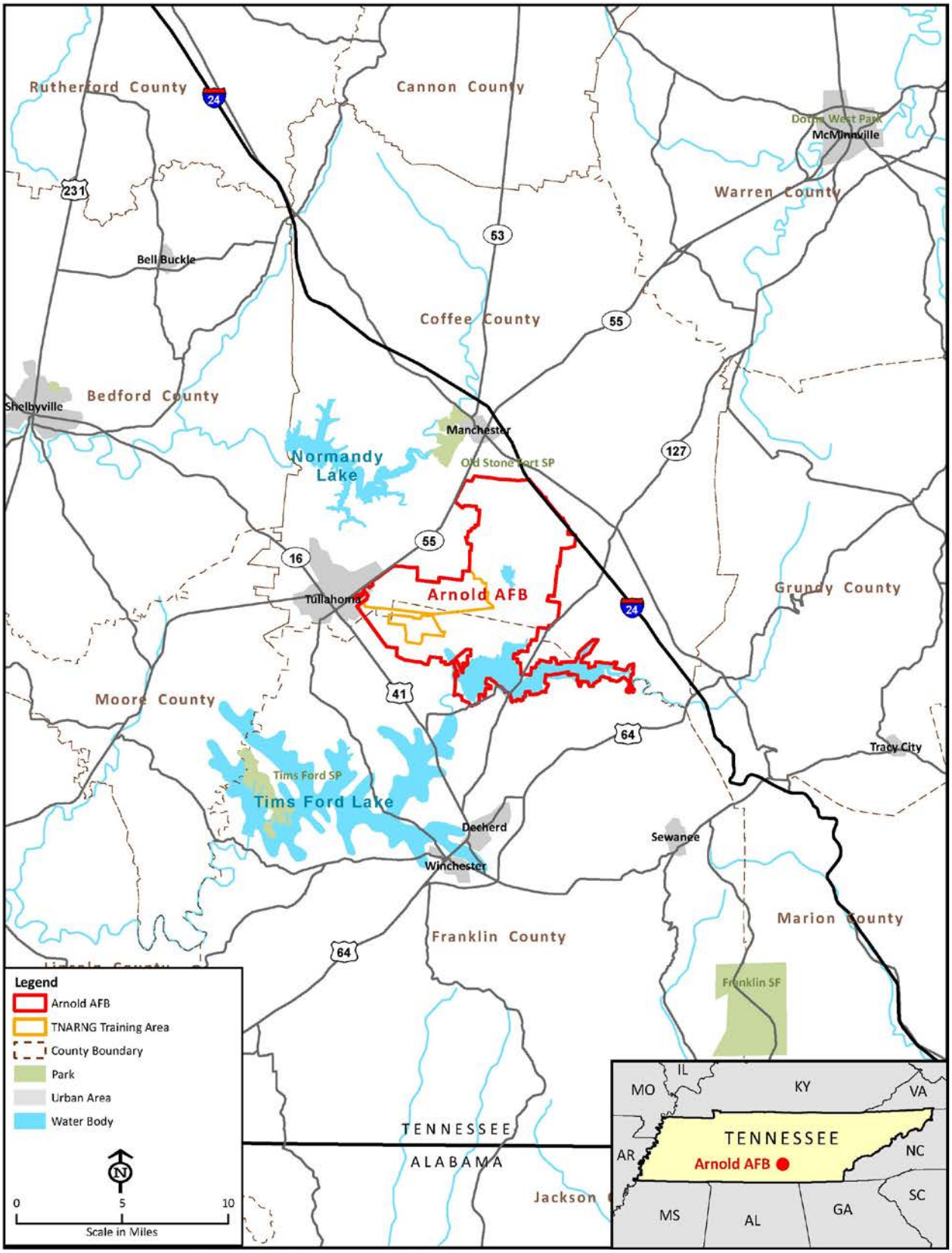

FIGURE 1-1
LOCATION OF ARNOLD AFB AND VTS-T
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

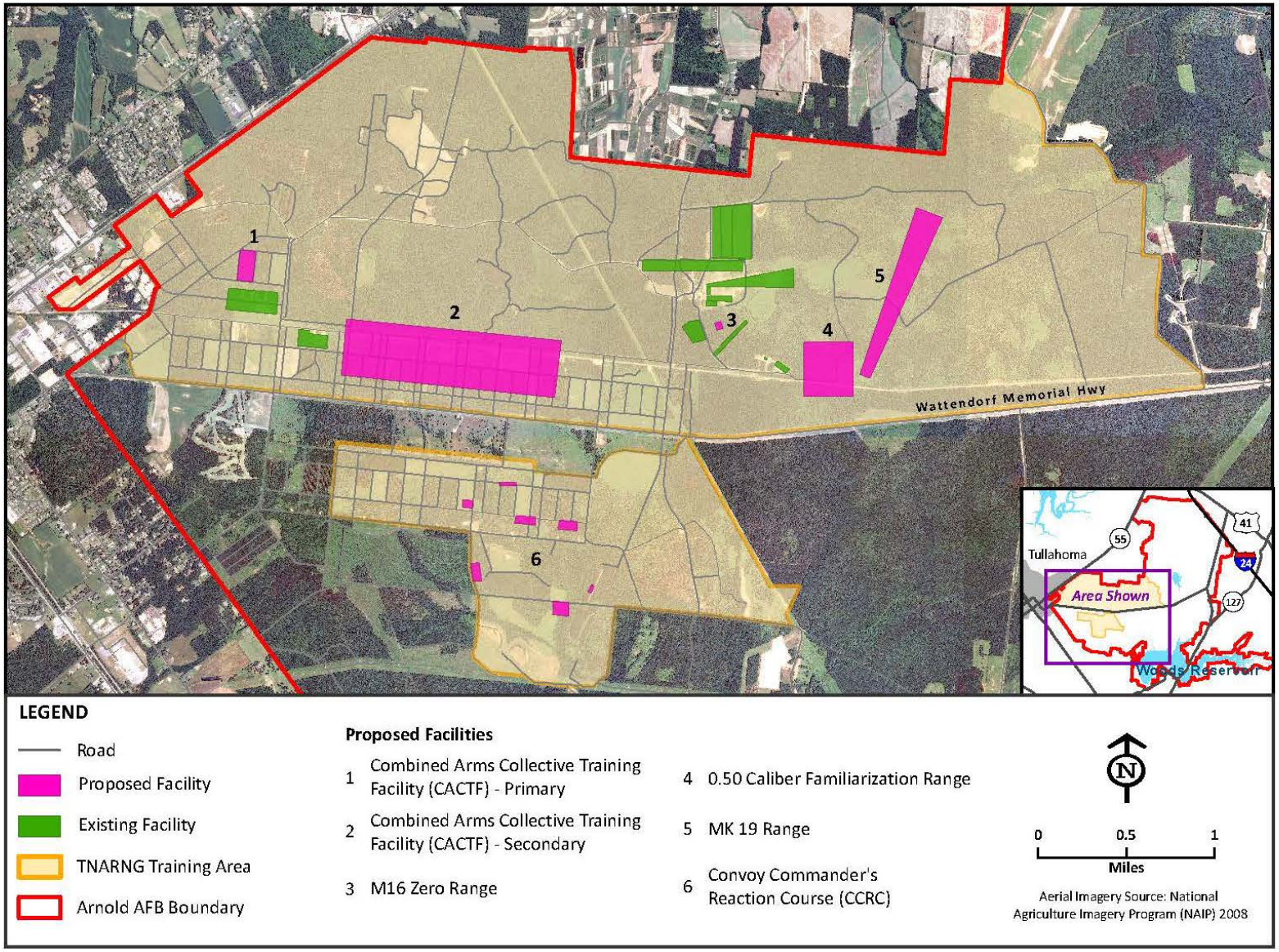

FIGURE 1-2
LOCATION OF EXISTING AND PROPOSED RANGES AT VTS-T
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

1.1.2 History

Arnold AFB is named for the late General Henry H. "Hap" Arnold, who served as commander of the Army Air Forces. In 1949, Congress authorized $100 million for the construction of AEDC. On 25 June 1951, one year after General Arnold's death, President Harry Truman dedicated the AEDC.

The TNARNG is currently operating at Arnold AFB under two permits. One permit is for exclusive use of 104 acres where the TNARNG's cantonment area is located. The second permit is a joint-use 5 year permit (AFMC AR-4-07-001, expires in 2012) to conduct training activities on approximately 7,391 acres of Arnold AFB property and includes the maneuver area, rifle range, and laser-firing tank range/artillery maneuver area south of Wattendorf Highway.

1.1.3 Military Mission

The existing military mission is to support the development of aerospace systems by testing hardware in facilities that simulate flight conditions. As part of Arnold AFB's overall mission, the base supports armed forces combat readiness by providing sustained realistic military training environments. Ecosystem management helps maintain natural landscapes for this military training. During peacetime, the role of the TNARNG is as a state military force under the direction of the governor of Tennessee, through the state adjutant general. The state mission is to provide trained and disciplined forces for local or statewide emergencies, such as natural disasters and storms, civil disturbances, and homeland security missions. The federal mission of the TNARNG is to maintain properly trained and equipped units that can promptly mobilize for war, national emergency, or as otherwise needed. The TNARNG provides facilities at VTS-T to conduct total force training for these missions. The capacity of the existing facilities limits the flexibility for training units to sustain operational readiness to exceed mission requirements.

1.1.4 Proposed Action

The TNARNG proposes to expand upon and modernize existing training range capabilities at the Volunteer Training Site (VTS) at Arnold AFB. The Proposed Action consists of the development of six training ranges within the existing TNARNG leasehold area on Arnold AFB (Figure 1-2): (1) an MK-19, 40-millimeter (mm) Grenade Machine Gun Range; (2) a Convoy Commanders Reaction Course (CCRC); (3) a Primary Combined Arms Collective Training Facility (CACTF) Range; (4) a Secondary CACTF Range; (5) an M16 calibration or "zero" range; and (6) a .50 caliber familiarization range.

With the exception of the CCRC, all ranges are proposed for development within or adjacent to TNARNG ranges inside the existing TNARNG range complex north of Wattendorf Highway. The CCRC is proposed for development south of Wattendorf Highway using existing roadways. An alternative to the Proposed Action is similar to the Proposed Action, with the exception of developing only one CACTF. Associated

range support facilities will be included within each range design, such as parking and staging areas, control towers, operational and storage buildings, bleacher enclosures, and ammunition breakdown buildings. Some minor road improvements, such as right-of-way maintenance and graveling, may also be necessary to support large military vehicles.

1.2 Purpose and Need for Proposed Action

An implied mission of the TNARNG VTS Command is to support changing trends in readiness and/or training requirements as identified by the Tennessee Joint Forces Headquarters and as prescribed within the Army Forces Generation (ARFORGEN) Model. VTS-T's current ranges facilitate training for potentially 3,000 soldiers annually, providing ranges and training facilities that meet approximately 70 percent of these soldiers' annual training requirements. Currently, several active component and National Guard training facilities are available to TNARNG units, out of state, for conducting readiness training associated with the proposed facilities to acquire the additional 30 percent of training currently lacking. However, the TNARNG is tasked by ARFORGEN to conduct this type of training within the state, in preparation toward a required cycle of readiness. Thus, off-site training does not comply with the ARFORGEN Model. Therefore, the purpose for the Proposed Action is to meet the premobilization training and readiness requirements for Combat Arms (CA), Combat Support (CS), and Combat Service Support (CSS) units under the ARFORGEN Model in one single location, to minimize logistical issues; travel to several different locations minimizes available training time and increases costs. The Proposed Action would result in the VTS-T's ability to meet approximately 90 percent of a soldier's annual training requirement in a single location.

The need for the Proposed Action at Arnold AFB is associated with limited availability of TNARNG facilities within the state. No other training site in Tennessee has the existing ability and capacity to support the full CA, CS, and CSS requirement with minimal improvement. Currently, the TNARNG has two other training sites within Tennessee: the Milan Training Center (Lavinia, Tennessee) and the Smyrna Training Center (Smyrna, Tennessee). However, neither site has enough land for the required surface danger zones (SDZs) and/or already has other facilities in place, precluding expansion projects. The Milan site is a long, narrow 2,200-acre site that cannot accommodate the required SDZs, and the Smyrna site is very small (300 acres) with no room for full-scale range development. Thus, since both the Milan and Smyrna training sites at capacity, expansion at Tullahoma is needed.

In addition, the VTS-T is the best location given its location in middle Tennessee. Within Tennessee, it is approximately 10 hours drive from the westernmost armory to the easternmost armory. There are approximately 3,300 TNARG members located in each of the three grand divisions of the state. Each unit requires state-of-the-art training capabilities to meet annual, semiannual, premobilization, and home station

ARFORGEN requirements. Given the central location of the VTS-T to all TNARNG units, it is a prime location for future development. The land leased by the TNARNG from Arnold AFB is large enough to support the proposed range SDZs, whereas other Tennessee training sites are not.

Furthermore, the TNARNG VTS-T must utilize land currently available within the bounds of its lease agreement with Arnold AFB to develop these new training facilities. This requirement is part of the Army's Sustainable Range Program, which dictates that training activities utilize current land and impact areas to the extent possible.

Each grand division of the state and its associated customer units of VTS training sites (approximately 3,000 soldiers per training site) would be positively impacted by the Proposed Action, both in quality and efficient use of resources and training lands provided.

1.3 Alternatives Considered but Not Carried Forward

Alternatives initially considered for the Proposed Action include conducting training off-site, utilizing other locations within Tennessee, and utilization of other land areas on Arnold AFB for development of the new range areas. However, none of these alternatives would meet the purpose and need for the Proposed Action and were, therefore, not carried forward.

Conducting training outside Tennessee would conflict with the ARFORGEN Model, which requires the State Adjutant General to conduct all premobilization home station training within the state if at all possible.

No other VTS locations within Tennessee can support consolidation of the ranges in a single location. Neither the Milan nor the Smyrna training site has the size or capacity to support the Proposed Action.

Utilizing other locations at Arnold is not possible given the TNARNG lease restrictions. New impact areas would have to be created to support the proposed range projects outside of the currently leased area, which does not comply with the Army's Sustainable Range Program. Utilization of current/existing land and impact areas, covered by the existing TNARNG lease, supports the proposed expansion projects without the need for newly created impact areas.

1.4 Authority and Scope of the Environmental Assessment

This Environmental Assessment (EA) was prepared in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality (CEQ) regulations of 1978, and Title 32 Code of Federal Regulations (CFR) Part 989.

The following laws, regulations, and guidance are addressed in this EA:

- NEPA and implementing regulations
- National Historic Preservation Act (NHPA)
- Antiquities Act
- Historic Sites Act
- Archaeological and Historic Preservation Act
- Archaeological Resources Protection Act
- Native American Graves Protection and Repatriation Act
- American Indian Religious Freedom Act
- Endangered Species Act (ESA)
- Fish and Wildlife Coordination Act
- Clean Water Act (CWA)
- Water Quality Act
- Clean Air Act
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (as amended by the Superfund Amendments and Reauthorization Act)
- Executive Order (EO) 11990, Protection of Wetlands
- EO 11988, Floodplain Management
- EO 11593, Protection and Enhancement of the Cultural Environment
- EO 13287, Preserve America
- EO 13175, Consultation and Coordination with Indian Tribal Governments
- EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds
- 32 CFR 989, Environmental Impact Analysis Process
- 36 CFR 800, *Protection of Historic Properties* (incorporating amendments effective 05 August 2004)
- 36 CFR 63, Determinations of Eligibility for Inclusion in the National Register
- Department of Defense Instruction (DoDI) 4710.02, *DoD Interactions with Federally Recognized Tribes*
- DoDI 4715.3, Environmental Conservation Program (DoD, 1977)

- AFI 32-7065, Cultural Resources Management Program Air Force Instruction (AFI) 32-7064, Integrated Natural Resources Management
- Presidential Memorandum on Government-to-Government Relationship with Tribal Governments (September 24, 2004)

The Air Force published a public notice in the *Tullahoma News, Herald Chronicle*, and *Manchester Times* once per week for four weeks starting on 1 July 2011notifying the public of the Air Force's intent to sign a Finding of No Significant Impact (FONSI). The Air Force also provided copies of the EA to the following agencies for review and comment: the Tennessee Department of Environment and Conservation (TDEC) Office of General Counsel and TDEC's Divisions of: Water Pollution Control, Air Pollution Control, Solid Waste Management, and Natural Heritage; the Tennessee Historical Commission; Tennessee Wildlife Resources Agency; and the Tennessee Ecological Services Field Office for the U.S. Fish and Wildlife Service (USFWS). The Tennessee Historical Commission, State Historic Preservation Office (SHPO), provided concurrence on 15 June 2011 and 18 July 2011 that no historic or archaeological resources would be affected by the Proposed Action (Appendix A). The USFWS also replied, indicating concerns over potential alteration of suitable roosting habitat for the federally endangered Indiana bat; the USFWS requested species surveys. The U.S. Air Force conducted the requested survey and coordinated with the USFWS regarding the results. Consequently, the USFWS provided no objection to the Proposed Action or Alternatives provided tree clearing is conducted between 15 October and 31 March. Information regarding the USFWS correspondence is provided in Section 4.3 of the Final EA.

The Air Force notified the following Native American tribes of a "No Historic Properties Affected" finding for the Proposed Action: Alabama-Coushatta Tribe of Texas, Alabama Quassarte Tribal Town, Chickasaw Nation of Oklahoma, Choctaw Nation of Oklahoma, Eastern Band of Cherokee Indians, Kialegee Tribal Town, Muscogee (Creek) Nation of Oklahoma, Poarch Creek Indians, Shawnee Tribe, Thlopthlocco Tribal Town, United Keetowah Band of Cherokee, Absentee Shawnee Tribe of Oklahoma, Cherokee Nation of Oklahoma, and Seminole Nation of Oklahoma. The following Native American tribes responded that no impacts to religious, cultural, or historical assets of the associated tribes would be affected: Alabama-Coushatta Tribe of Texas; Choctaw Nation of Oklahoma; Chickasaw Nation; and Eastern Band of Cherokee Indians.

No other public or agency comments were received during the Draft EA review period (1 July 2011 through 1 August 2011). All agency and tribal correspondence received is provided in Appendix A.

1.5 Issues Eliminated from Detailed Analysis

The resource areas discussed below have been eliminated from detailed analysis in this document because there is no potential for the Proposed Action or Alternative action to impact these resources.

1.5.1 Air Installation Compatible Use Zone

Arnold AFB has an active airfield and an exemption from Headquarters Air Force Materiel Command (AFMC) for Air Installation Compatible Use Zone (AICUZ) consideration because of the limited number and types of flying operations. The proposed project area is not within any accident potential zones and would not impact airfield operations or management. Therefore, AICUZ was eliminated as an issue warranting further analysis.

1.5.2 Geology

Proposed development, training, and maintenance activities would be limited to the ground surface, possibly to a depth of several feet. While there may be impacts to soils within the project area, underlying geology is not expected to be impacted by the Proposed or Alternative Actions, and this issue was not carried forward for detailed analysis.

1.5.3 Socioeconomics and Environmental Justice

The Proposed Action is not expected to have any appreciable socioeconomic impact. There would be minimal increases in the number of soldiers training at the VST-T, and construction activities for the new ranges would likely be conducted by military engineers and local contractors. Therefore, the Air Force does not anticipate socioeconomic impacts, either adverse or beneficial, associated with the Proposed or Alternative Actions, and further analysis is not warranted.

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, requires federal agencies to identify community issues of concern during the NEPA process, particularly those issues relating to decisions that may have an impact on low-income or minority populations. The proposed project would not affect communities outside Arnold AFB, including low-income or minority populations. Therefore, the Air Force does not anticipate impacts associated with environmental justice from the Proposed or Alternative Actions, and further analysis is not warranted.

1.5.4 Traffic Flow

The Proposed Action is not expected to result in any significant increases in on-base traffic. While there may be slight, short-term increases in traffic associated with

training activities, these activities would occur on military range roads that are not accessible to the public. As a result, the Air Force does not anticipate any significant adverse impacts to transportation.

1.6 Issues Studied in Detail

The resource areas below are discussed in detail in this document:

- Land use
- Safety
- Biological resources
- Cultural resources
- Land soils
- Water quality and hydrology
- Air quality
- Noise
- Utility infrastructure
- Hazardous materials/waste and solid waste

1.7 Document Organization

This EA follows the organization established by the CEQ regulations (40 CFR 1500-1508). This document consists of the following sections:

1.0 Purpose and Need for Action

2.0 Description of the Proposed Action and Alternatives

3.0 Existing Conditions

4.0 Environmental Consequences

5.0 Plan, Permit, and Management Requirements

6.0 Persons and Agencies Contacted

7.0 List of Preparers

8.0 References

Appendix A – Public Involvement

2.0 Description of Proposed Action and Alternatives

As required by federal regulations, this EA addresses the possible environmental impacts of a No Action Alternative and the action alternatives. This section describes the action alternatives and the No Action Alternative and briefly discusses the impacts associated with each alternative. This EA identifies constraints and potential impacts from developing, operating, and maintaining the proposed TNARNG ranges.

2.1 Proposed Action

The Proposed Action is for the TNARNG to expand upon and modernize existing training range capabilities at the VTS at Arnold AFB. The Proposed Action consists of the development of six training ranges within the existing TNARNG leasehold area on Arnold AFB: (1) an MK-19, 40-mm Grenade Machine Gun Range; (2) a CCRC; (3) a Primary CACTF Range; (4) a Secondary CACTF Range; (5) an M16 calibration or "zero" range; and (6) a .50 caliber familiarization range. With the exception of the CCRC, all ranges are proposed for development within or adjacent to TNARNG ranges within the existing TNARNG range complex north of Wattendorf Highway. The CCRC is proposed for development south of Wattendorf Highway using existing roadways. An alternative to the Proposed Action is similar to the Proposed Action, with the exception of developing only one CACTF. Associated range support facilities will be included within each range design, such as parking and staging areas, control towers, operational and storage buildings, bleacher enclosures, and ammunition breakdown buildings. Some minor road improvements, such as right-of-way maintenance and graveling, may also be necessary to support large military vehicles. Figure 2-1 through Figure 2-9 show the proposed locations of the ranges under the Proposed Action.

MK-19 Range

For the proposed MK-19 training range (Figure 2-1), primary construction involves clearing of all trees and downrange vegetation in preparation for static targetry (salvage armor vehicles and staked silhouettes); the cleared area would be approximately 200 meters wide by 1,500 meters long. A 4-foot earthen, elevated, gravel firing line would also be constructed. Four firing points would be supported by this design.

A gravel access road would also be constructed, extending parallel with the Arnold AFB rail line from the existing Combat Pistol Qualification Course (CPQC) range, approximately 600 meters to the MK-19 range firing line and ready area. Construction would match the existing gravel road network to the CPQC range, with a total right-of-way of 60 feet and a standard road width of 28 feet.

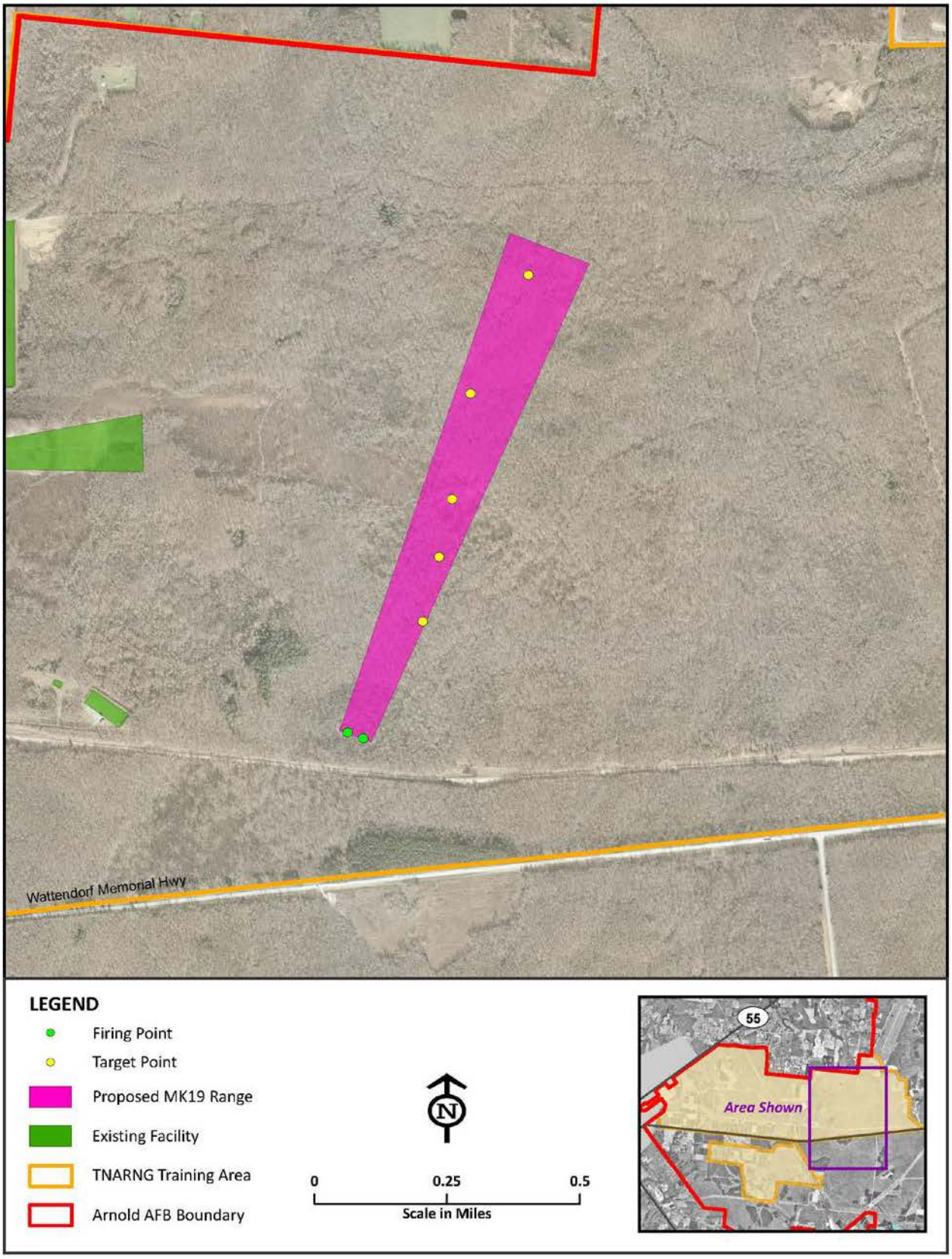

FIGURE 2-1
LOCATION OF PROPOSED MK-19 RANGE
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

Only M385/M918 practice/training ammunition is proposed for this range, with a maximum range of 2,200 meters. Any surface hazard may be mitigated by range personnel practicing safe retrieval practices in accordance with existing instructions (e.g., simple procedure for face shields, gloves, and tongs).

Currently, MK-19 training is not conducted at Arnold AFB. As a result, in addition to actual construction of the proposed training ranges, the Proposed Action also involves new training activities on Arnold AFB.

CCRC

The CCRC (Figure 2-2) has one primary course road, approximately 5 miles in length. The CCRC at VTS-T would incorporate existing road infrastructure within the proposed design; providing adequate separation between roads per training standards. Barrier material would be used to simulate choke points and provide confining areas, which serve to require the convoy to negotiate obstacles normally found in an urban environment. This is a non-live fire range utilizing blank ammunition and/or lasers only.

The CCRC trainees utilize laser training and simulation training devices with blank ammunition, to detect, identify, engage and defeat threats both mounted and dismounted. While the complex is specifically designed to satisfy the training requirements of CA units, tactical convoy operations training can be conducted on this course to train and test CS and CSS units.

The CCRC also supports dismounted infantry squad tactical operations either independently of, or simultaneously with, supporting vehicles. Likewise, the CCRC serves to provide training in movement and convoy operations, in a tactical array, as an integral piece of the overall VTS-T Urban Operations Complex.

Primary Combined Arms Collective Training Facility (CACTF)

The CACTF (Figure 2-3 and Figure 2-4) represents the final stage in a company or battalion's training progression toward assessing unit proficiency/tactical readiness within an urban environment. The CACTF supports the unit commander's urban training objectives in concert with the Urban Assault Course, CCRC, Live Fire Shoot House, and Tactical Training Base (TTB) as a comprehensive evaluation complex. Units, up to battalion level, would operate and execute missions within the CACTF from the existing VTS-T TTB, located nearby. This combination of facilities, as proposed, provides for a "crawl – walk – run" approach to urban training, evaluating a unit's total proficiency based on its performance at a "running pace" within the CACTF.

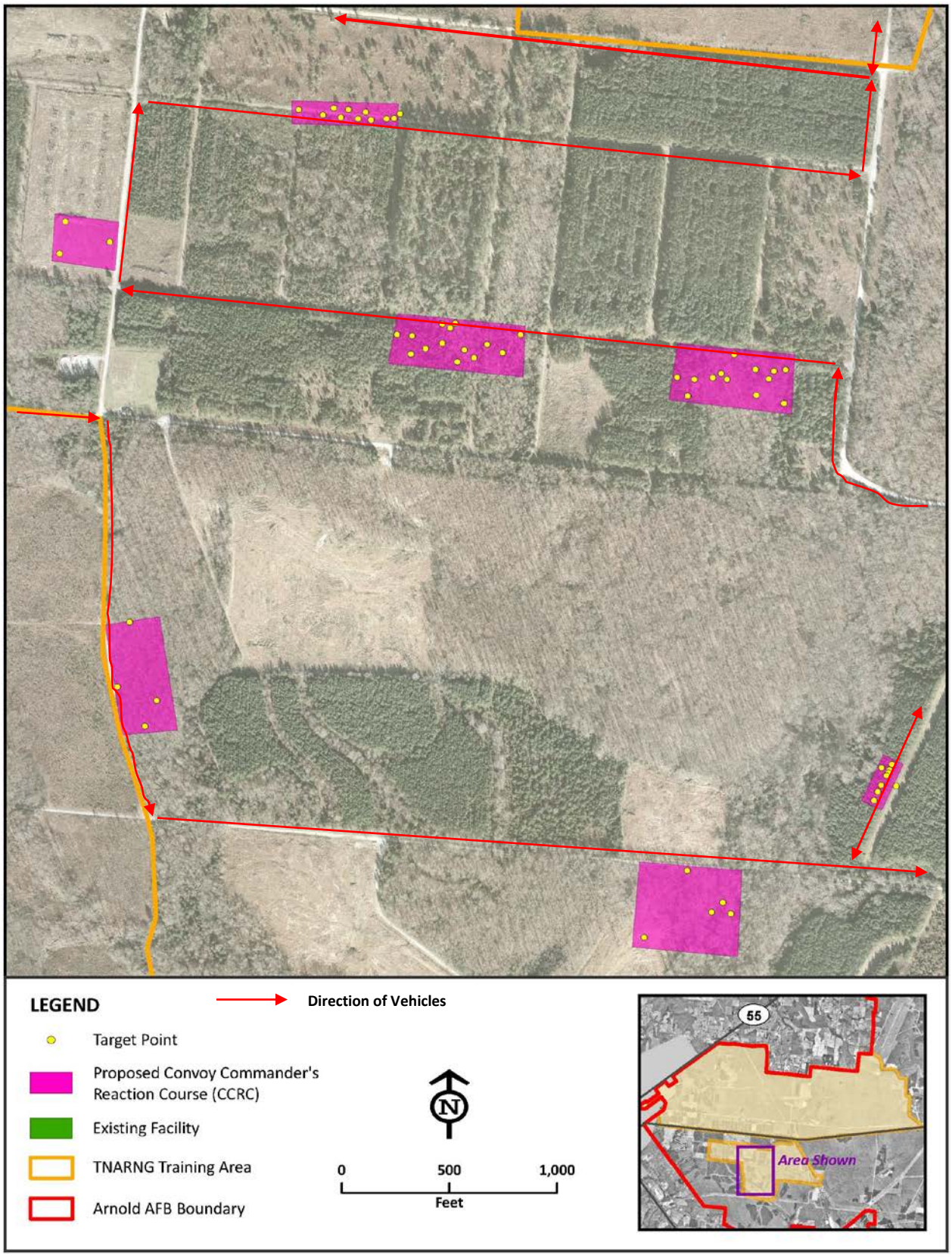

FIGURE 2-2
LOCATION OF PROPOSED CONVOY COMMANDERS REACTION COURSE
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

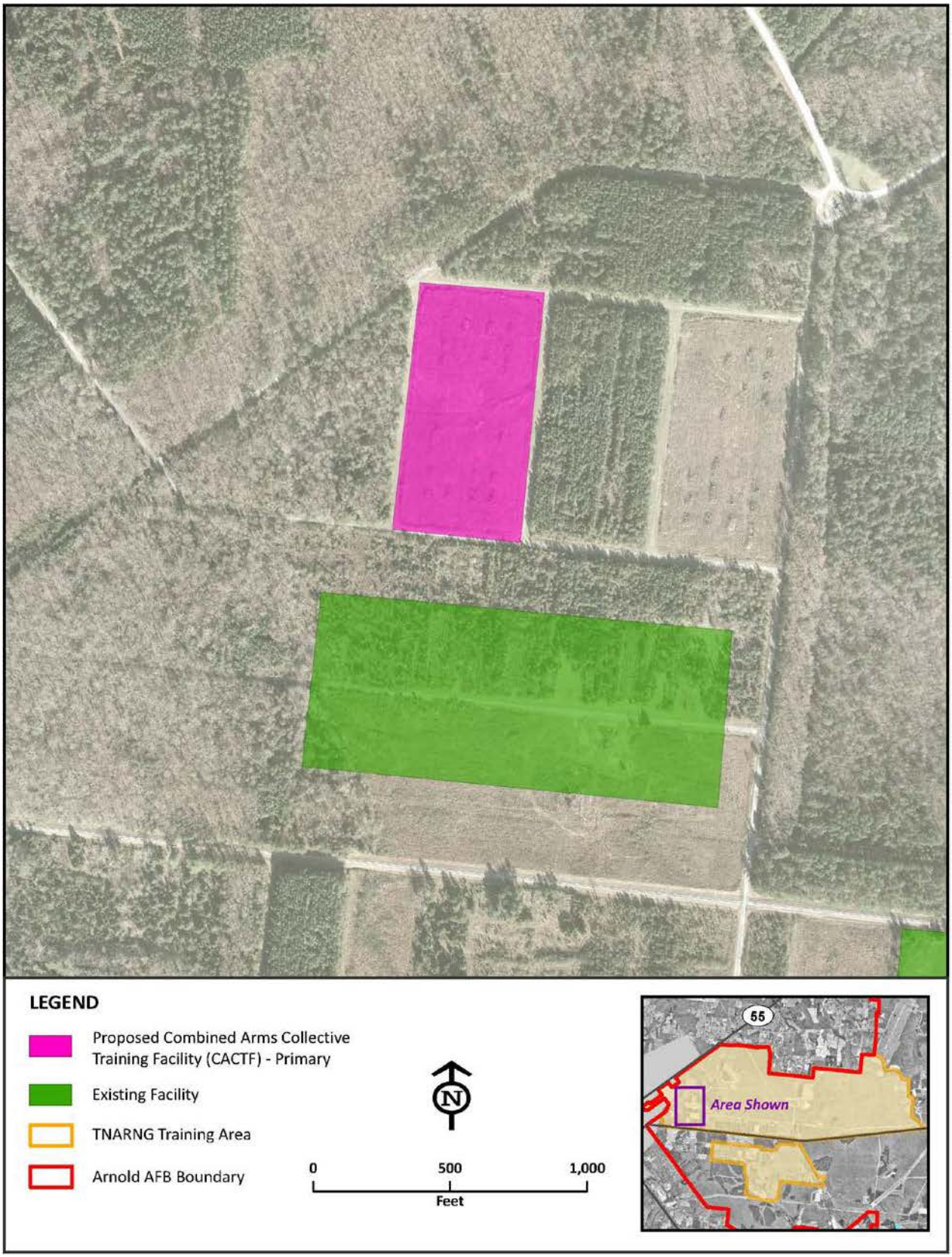

FIGURE 2-3
LOCATION OF PROPOSED PRIMARY COMBINED ARMS COLLECTIVE TRAINING FACILITY
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

FIGURE 2-4
PROPOSED LAYOUT OF PRIMARY COMBINED ARMS COLLECTIVE TRAINING FACILITY
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

The CACTF is intended to support Blank Fire, Multi-Integrated Laser Engagement System/Tactical Engagement System (MILES/TES), Situational Training Exercise (STX), and Field Training Exercise scenarios on a semi-annual basis. The CACTF supports branch-specific lane training and combined arms training up to battalion level across the full spectrum of the following operations: offense, defense, stability, and support. The effectiveness of this facility depends primarily on a unit's creative ability to produce realistic training scenarios from which to evaluate its comprehensive readiness to operate within an urban setting.

The designs of all proposed buildings would utilize 40-foot SEAVANs on a gravel base; the approximate footprint of each building location would be approximately 1,000 square feet. The 40-foot containers would be modified to represent various structures found in an urban environment (municipal buildings, hotels, residential dwellings, schools, police station, etc.), replicating an urban environment. These structures have a life expectancy of 25 years.

Secondary CACTF Range

Similar to the primary CACTF, this project consists of 12 half-acre building sites located within the existing VTS-T installation boundary (Figure 2-5 and Figure 2-6), distributed along Road 2 in an area positioned west of the TTB/Rifle Range Road, north of Wattendorf Highway, south of the AEDC rail line, and east of Road D4.

M16 Zero Range

The proposed location for this range (Figure 2-7) is due north and adjacent to the existing M203 range. The design and site layout would be developed to prevent impediment of the existing intermittent stream that runs through this area.

This range is used to calibrate, or "zero," M16 and M4 rifles and provides for a 32-firing point and 25-meter downrange capability. Range construction would be identical to the existing 25-meter zero range. Clearing and construction impact is approximately 2.5 acres. This range will be restricted to 5.56-mm, M855 ball ammunition, with the SDZ contained within the leased VTS-T boundary.

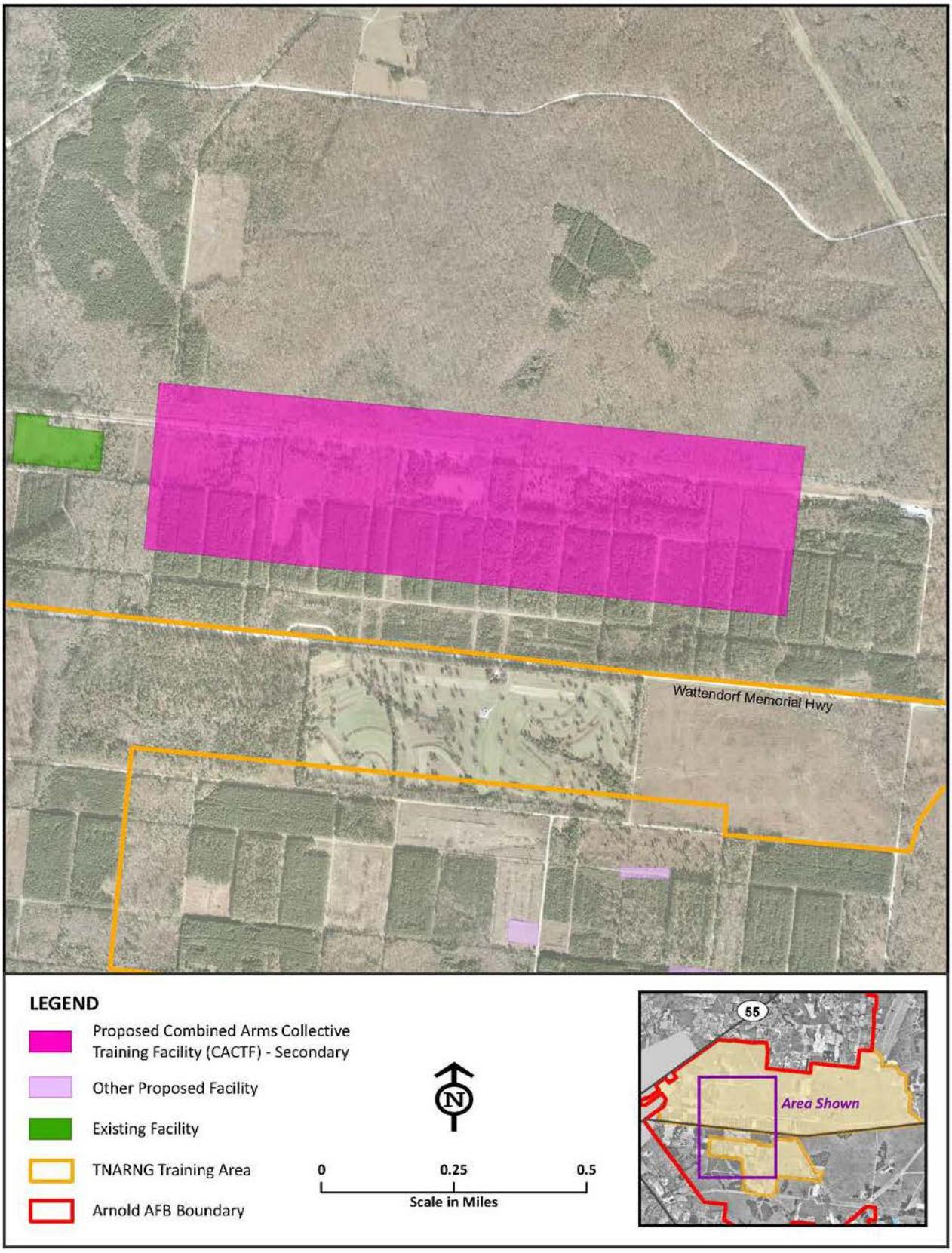

FIGURE 2-5

LOCATION OF PROPOSED SECONDARY COMBINED ARMS COLLECTIVE TRAINING FACILITY

Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

FIGURE 2-6
PROPOSED LAYOUT OF SECONDARY COMBINED ARMS COLLECTIVE TRAINING FACILITY
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

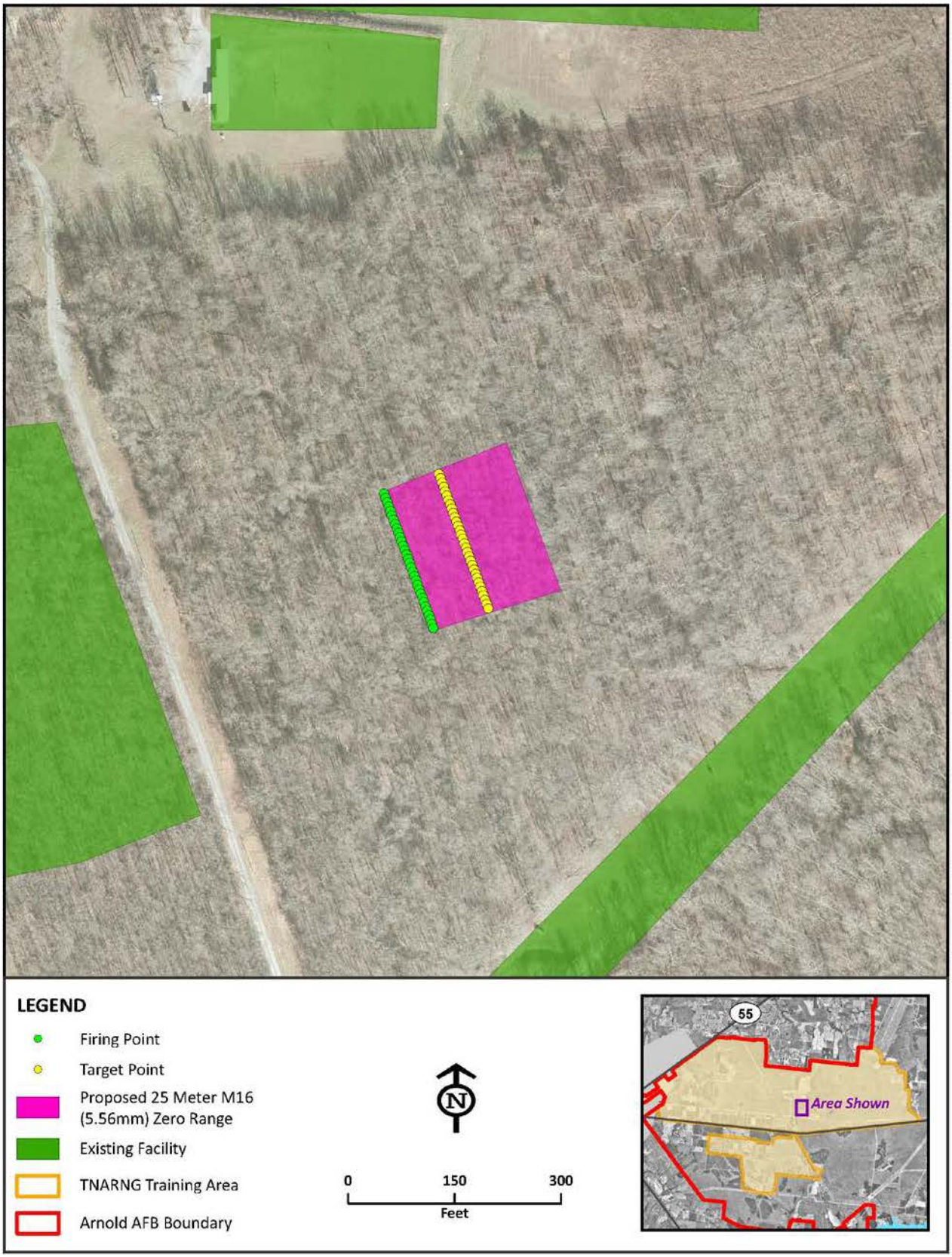

FIGURE 2-7
LOCATION OF PROPOSED M16 ZERO RANGE
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

.50 Caliber Familiarization Range

The proposed location for this range (Figure 2-8 and Figure 2-9) is adjacent, and east of, the current automated pistol qualification range (CPQC). Preliminary design of this range consists of firing .50-caliber M2 machine guns with .50-caliber ball ammunition through a tube-baffle into impact berms. This design restricts the SDZ to no more than 100 meters and provides 100 percent containment of all projectiles during training. The primary objectives of this training range are to support training for crew stoppage drills, crew firing drills, and headspace and timing (hands-on practice). This is not a qualification range, but simply an opportunity for familiarization training of TNARNG soldiers on the M2 weapon system with full-containment and restriction of SDZ being top priority.

FIGURE 2-8
DEPICTION OF PROPOSED .50 CALIBER FAMILIARIZATION RANGE
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

Summary of Proposed Action

The following tables summarize the facilities and infrastructure associated with the Proposed Action, as well as ordnance and vehicle use.

Construction and development of the new ranges would likely occur in over several years due to budgeting and programming requirements.

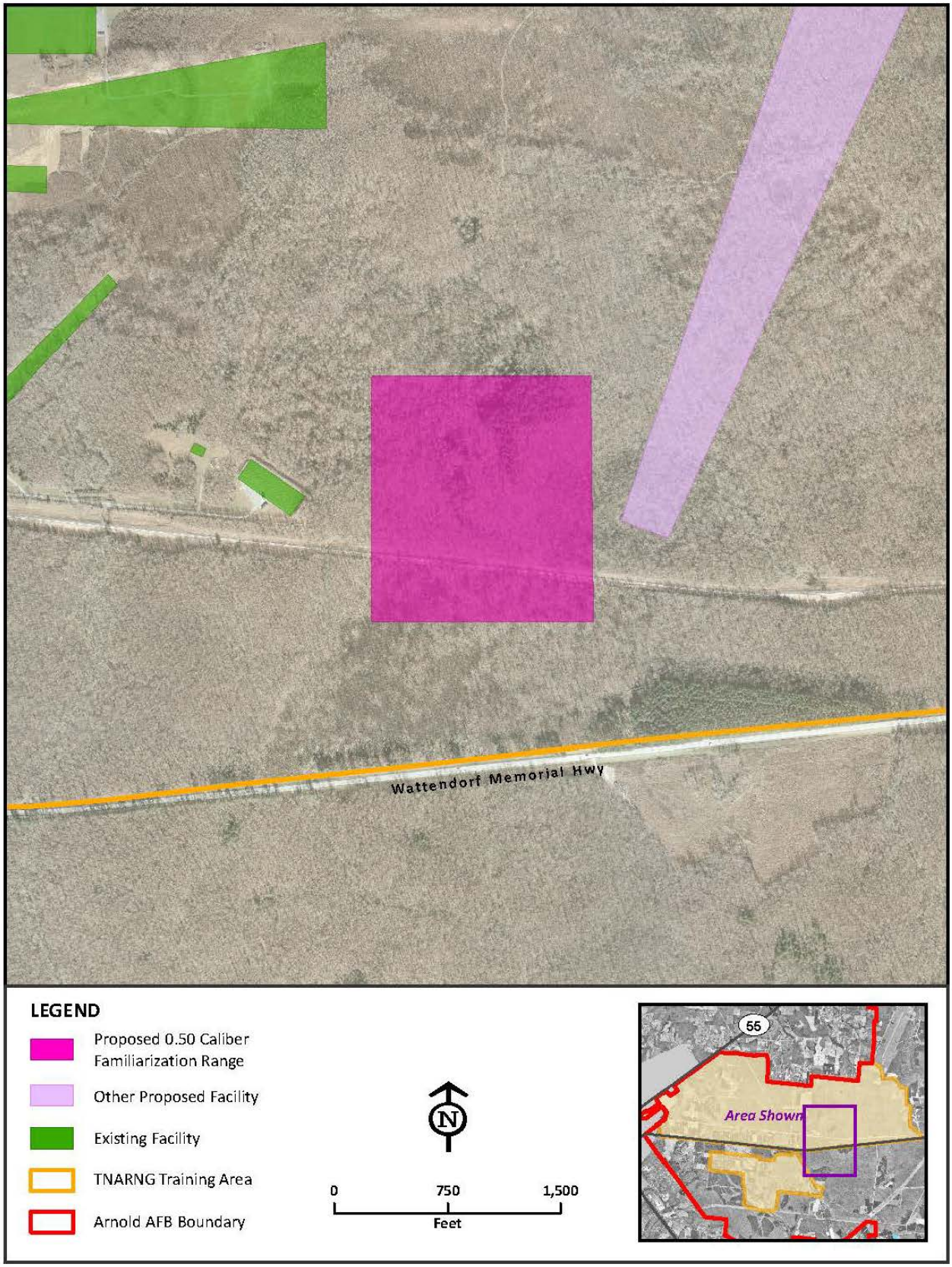

FIGURE 2-9
LOCATION OF PROPOSED .50 CALIBER FAMILIARIZATION RANGE
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

TABLE 2-1
FACILITIES AND INFRASTRUCTURE REQUIRED FOR PROPOSED ACTION
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

Facility/ Infrastructure Type	*Phase I*		*Phase II*	
	# Buildings	*Size (square meters)*	*# Buildings*	*Size (square meters)*
MK-19 Range				
Firing point area	n/a	10	2	20
Gravel road improvement	n/a	5,100	0	0
Gravel parking	n/a	2,000	1	10
Elevated gravel firing line	n/a	500	0	0
CCRC				
Minor road improvements	Consists of limb removal and right-of-way cleanup – no new roads or paving			
CACTF (Alternate)				
12 SEAVAN sites	Prefabricated – no new construction required			
CACTF (Primary)				
Road network	0	1,800	n/a	n/a
Gravel pads for pre-fab buildings	0	800	n/a	n/a
M16 Zero Range				
Firing point area	0	500	2	20
Gravel access/parking	0	2,000	1	10
.50-Caliber Familiarization Range				
Gravel parking	0	250	1	5
Firing point area	0	75	0	0
Elevated berm	0	500	0	0

CACTF = Combined Arms Collective Training Facility; CCRC = Convoy Commanders Reaction Course

TABLE 2-2
LAND AREA CLEARANCE REQUIREMENTS FOR PROPOSED ACTION
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

Facility/ Infrastructure Type	*Area Cleared (square meters)*	*Area Cleared (Acres)*
MK-19 Range	300,000	74
Roadway right of way	11,400	~3
CACTF (Alternate)		
12 SEAVAN sites (1/2 acre each)	24,281	6
CACTF (Primary)	16,268	4
25-Meter Zero Range	10,117	2.5
.50 Caliber M2 Range	5,000	1.25

CACTF = Combined Arms Collective Training Facility

TABLE 2-3
MUNITIONS REQUIREMENTS FOR PROPOSED ACTION
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

Type Munitions	*Annual Quantity*	*Training Location*
40-mm practice grenade	40,000	MK-19 Range
5.56-mm blank	100,000	CCRC/CACTF
5.56-mm ball	30,000	Zero Range
.50-caliber ball	3,000	.50 Caliber M2 Range

mm = millimeters

TABLE 2-4
VEHICLES REQUIRED FOR PROPOSED ACTION
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

Vehicle Type	*Quantity*[1]	*Training Location*
M998 (HMMWV)	15	CCRC
M998 (HMMWV)	10	CACTF
M998 (HMMWV)	2	M16 Zero Range
M998 (HMMWV)	6	MK-19 Range
M998 (HMMWV)	1	.50 Caliber Familiarization Range

HMMWV = high-mobility multipurpose wheeled vehicle; CACTF = Combined Arms Collective Training Facility; CCRC = Convoy Commanders Reaction Course

1. The above vehicle requirements pertain to specific unit requirements. No additional VTS staff vehicles are required to support these ranges. All vehicles noted above would be supplied by the individual units conducting the training.

The ranges, as proposed, require no new staffing for operations or maintenance. It is anticipated that each range would be utilized for twelve 12-hour days per year, with approximately 150 personnel per training day for the CACTF, CCRC, and M16 Zero Ranges, and approximately 50 personnel for the .50 Caliber and MK-19 Ranges. The TNARNG expects approximately 3,000 soldiers to train at VTS-T annually (includes weekend training and 2-week summer encampment training). While the TNARNG anticipates a 20 percent increase in training requirements satisfied by the new ranges/facilities, a minimal increase in soldiers visiting the VTS-T is expected. Soldiers regularly visiting the VTS-T would simply be able to accomplish more of their training at a single site.

Units clean and clear each range upon completion of each day's training. Maintenance is conducted by range staff as needed and as scheduled (generally once a month), based on management's experience with each range. As a rule, VTS-T schedules a minimum of 20 hours of maintenance time per range, per month.

2.2 Alternative 1: No Secondary CACTF

Alternative 1 is the same as the Proposed Action, with the exception of the Secondary CACTF, which would not be developed.

2.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. The TNARNG would not develop the new range capabilities and TNARNG training activities would continue as currently conducted on the installation. The TNARNG would be negatively impacted and risk readiness degradation. The status quo only serves to limit the opportunities to train TNARNG soldiers within the state at increased cost to the tax

payer. Most importantly, degraded readiness negatively impacts the chances of soldier survival in combat.

Although the No Action Alternative would not meet the purpose and need for the Proposed Action, NEPA-implementing regulations require analysis of the No Action Alternative. Essentially, the impacts associated with the No Action Alternative represent the environmental impacts at the proposed locations if the Proposed Action were not implemented. Under the No Action Alternative, there would be no "Proposed Action-related" impacts; however, unrelated ongoing and potential future actions would continue to influence the resources in the area.

2.4 Comparison of Alternatives Carried Forward

TABLE 2-5
COMPARISON OF ALTERNATIVES
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

Resource Area	*Proposed Action*	*Alternative 1 – No Secondary CACTF*	*No Action Alternative*
Land use	Minor changes in land use would occur, from unimproved to semi-improved or improved grounds. However, no significant adverse impacts have been identified.	Impacts would be similar to the Proposed Action. However, impacts would be slightly less due to a lower number of ranges being developed.	The No Action Alternative would not result in any additional impacts within and adjacent to the proposed six ranges beyond the scope of normal conditions and influences. As a result, there would be no significant adverse impacts associated with the No Action Alternative.
Safety	Safety risks inherent to training and range operations would increase with development of the new ranges. However, the TNARNG and the Air Force have many instructions and safety protocols to ensure safe range operations that would minimize any safety issues. As a result, no significant adverse safety impacts are anticipated.		
Biological resources	The Proposed Action has the potential to result in the disturbance 81.27 acres of sensitive habitat (global rank G1, G2, or G3). This represents approximately less than 2 percent of the total sensitive habitat within the TNARNG leased area at Arnold AFB. No significant adverse impacts to threatened or endangered species have been identified. Several BMPs have been identified to minimize any potential significant adverse impacts to flora, fauna, and sensitive habitats and species. (See Chapter 5.0.)		
Cultural resources	All areas have been surveyed within areas proposed for TNARNG Range expansion. No sites determined to be eligible or potentially eligible on the NRHP are currently identified within the project area. As a result, there would be no impacts to cultural resources.		
Geomorphology and soils	The proposed project involves land disturbance, clearing of vegetation, and exposure of soils to increased erosion potential. Requirements for containing soil erosion have been identified for these actions, including the need for an NPDES permit for disturbance of areas greater than 1 acre. Additionally, other management practices per the Tennessee Erosion and Sediment Control Handbook have been identified to minimize soil erosion impacts. No significant adverse impacts to soils have been identified.		

TABLE 2-5
COMPARISON OF ALTERNATIVES, CONT'D
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

Resource Area	*Proposed Action*	*Alternative 1 – No Secondary CACTF*	*No Action Alternative*
Water quality and hydrology	Construction and operations would avoid wetlands and surface water bodies, and would not result in any significant adverse impacts to water resources at Arnold AFB.		
Air quality	Construction emissions would cause short-term and temporary increases, primarily in particulate matter emissions. These levels are below the 10-percent criterion and would not cause significant adverse impacts. Vehicle and munitions emissions are negligible and would not cause significant adverse impacts to air quality.		
Noise	Construction noise associated with the MK-19 Range, CACTF, M16 Zero Range, and the .50-caliber range would cause temporary increases in noise. Receptors at distances greater than 500 feet of the site would not be subject to harmful levels of noise. No significant adverse impacts are expected. Vehicle noise is predicted to be a maximum of 84 dBA while operating and is not expected to attenuate to receptors outside of the range area, thus, no significant adverse impacts from vehicle noise. Munitions noise may cause annoyance from the firing of the MK-19, M16/M4, and M2 machine guns. Receptors are located approximately 2 miles away from sites where small arms would be used. Noise would be sufficiently diminished and would not cause hearing damage to potential receptors. No significant adverse impacts from munitions noise are expected.	Impacts would be the same as described under the Proposed Action. Less noise would occur from the elimination of the Secondary CACTF.	
Utility infrastructure	There is no expected increase in utility usage associated with the proposed projects, and no new utility connections are anticipated. As a result, no impacts to Arnold AFB utility infrastructure have been identified.		
Hazardous materials and solid / hazardous waste	The installation has developed programs and procedures to comply with all federal/state hazardous materials and hazardous waste management and reporting requirements. Hazardous and nonhazardous waste would be generated from planned operations; however, the anticipated type and quantity of these hazardous wastes would pose no significant adverse impacts to the current waste management system. Construction and training activities would avoid existing IRP sites.		

AFB = Air Force Base; BMP = best management practice; IRP = Installation Restoration Program; CACTF = Combined Arms Collective Training Facility; dBA = A-weighted decibels; NPDES = National Pollutant Discharge Elimination System; NRHP = National Register of Historic Places; TNARNG = Tennessee Army National Guard

3.0 Existing Conditions

3.1 Land Use

3.1.1 Definition of Resource

Land use generally refers to the management and use of land by people. The attributes of land use include general land use patterns, land ownership, land management plans, and special use areas. General land use patterns characterize the types of uses within a particular area. Specific uses of land typically include residential, commercial, industrial, agricultural, military, and recreational. Land use also includes areas set aside for preservation or protection of natural resources, wildlife habitat, vegetation, or unique features. Management plans, policies, ordinances, and regulations determine the types of uses that protect specially designated or environmentally sensitive uses.

3.1.2 Existing Conditions

Arnold AFB

Arnold AFB consists of approximately 40,000 acres of federally owned land between Coffee and Franklin Counties in mid-Tennessee. Approximately 3,682 acres of the base are enclosed within a fenced security area and occupied by the AEDC. This industrial complex represents the core of Arnold AFB activities and is the mission-essential portion of the base. The remainder of the base is unfenced and consists of undeveloped forestland.

Industrial use of the AEDC has the most significant impact on land use patterns at Arnold AFB. Of the land within the AEDC complex, 70 percent is in industrial use. Administrative, community commercial and service, and medical uses supporting testing facilities activities and personnel are located on the east and north sides of the AEDC area (U.S. Air Force, 2006).

Major industrial uses outside of the AEDC complex include rocket preparation areas in the north-central portion of the base, an asbestos landfill located on the northeast boundary of the TNARNG range complex, a TVA power substation just northwest of Woods Reservoir, and the primary pumping station and sewage treatment plant in the northeast corner of Arnold Village Military Housing Complex (U.S. Air Force, 2006).

TNARNG VTS-T

The TNARNG occupies the VTS-T, which covers 7,391 acres on the northwestern side of Arnold AFB (Figure 1-2). The primary land use of the VTS-T is military training and

maneuvers in large areas of unimproved land. Located to the east and west of Rifle Range Road and south of Wattendorf Highway, the VTS-T includes a cantonment area, small arms firing ranges, tank trails and maneuver areas. Additionally, the TNARNG uses two active drop zones and firing ranges on Arnold AFB. One drop zone is located in the western part of the base, and the other, larger drop zone is located within the western portion of the AEDC. The firing ranges and their ammunition safety area are located near the drop zones. Other land uses of the VTS-T allowed by the Arnold AFB Integrated Natural Resources Management Plan (U.S. Air Force, 2006) include hunting, riflery, and timber harvest.

Vicinity Land Uses

The properties surrounding Arnold AFB range from highly developed urban areas to remote rural areas. The city of Manchester is adjacent to the north side of the base. This area consists of low-density residential uses and a high school. I-24 runs northwest to southeast along the northeast side of the base separating the base from the Manchester Industrial Park (U.S. Air Force, 2006).

Land uses east of the base are predominantly remote rural areas with scattered single family homes and farms. Similar land use patterns exist to the south. An exception is the University of Tennessee Space Institute campus, which is located on the north side of Woods Reservoir (U.S. Air Force, 2006).

The city of Tullahoma is adjacent to the west side of Arnold AFB. Land uses within the city and in close proximity to the base boundary are predominantly residential, although the Tullahoma Industrial Park is located on the east side of the city adjacent base property (U.S. Air Force, 2006).

3.2 Safety and Occupational Health

3.2.1 Definition of Resource

The primary concerns with regards to safety from implementation of the Proposed Action are risks from range operations or construction activities. The potential safety impacts of encountering legacy munitions or unexploded ordnance (UXO) during construction activities are also considered. The Air Force has adopted federal standards and/or developed their own standards associated with these potential safety issues. Relevant federal and Air Force standards related to safety are described below.

Range Operations – Construction and management of firing ranges is performed in accordance with AFI 32-1023, *Design and Construction Standards and Execution of Facility Construction Projects*, and AFI 36-2226, *Combat Arms Program*. Safety issues typically

associated with firing ranges include installation security, range safety, and the handling and storage of munitions. Installation security includes measures to safeguard military personnel and assets by controlling and preventing access to restricted areas by unauthorized persons. These measures may include the construction of barriers (e.g., fences), limiting personnel and vehicle access to designated entrances/exits, the use of personnel identification and control systems, and the employment of security forces as appropriate.

Range safety includes measures to protect users of the range and the general public from exposure to potentially dangerous range operations (i.e., live firing). Measures to address public safety may include the designation and control of range SDZs, which establish the maximum area of potential exposure to range operations (e.g., from ricochets or overshooting a target). Munitions handling and storage procedures are strictly regulated to ensure public and personnel safety, including the delineation of quantity-distance (Q-D) arcs around munitions storage facilities (U.S. Air Force, 2003).

All firing ranges on Air Force installations must be constructed in accordance with the Air Force Civil Engineer Support Agency Engineering Technical Letter 08-11, *Small Arms Range Design and Construction*. The Air Force has also developed range operating protocols (Security Forces [SF] Instruction 36-2226), which provides definitions, procedures, responsibilities, and guidance for firing range utilization. Prior to range operation at firing ranges, a range flag is raised, signifying that the range is operational. All personnel are checked to make sure that they have required ear protection devices, and instructors are required to wear appropriate eye protection. Finally, personnel are briefed on safety procedures, and the range is inspected to ensure that the surrounding area is clear of unauthorized personnel. During firing range exercises, range instructors monitor personnel to make sure that they have an appropriate number of rounds, training equipment, and hearing protection. At the completion of firing exercises, all spent shell casings ("brass") are collected; all training equipment is secured; all weapons are cleaned and inspected; and all ammunition and weapons are accounted for (U.S. Air Force, 1999).

Construction Safety and Occupational Health – The Air Force implements Occupational Safety and Health Administration (OSHA) standards through DoDI 6055.1, *DoD Safety and Occupational Health Program*, and AFI 91-302, *Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH)*. AFOSH standards supplement OSHA standards to ensure worker safety. The goal is to ensure that guidance is in compliance with OSHA and other federal standards and incorporates "lessons learned" and appropriate parts of consensus standards to provide the supervisor and worker with the tools to prevent mishaps (U.S. Air Force, 2004).

3.2.2 Existing Conditions

Range Operations

The TNARNG VST-T currently operates eight outdoor (noncontained) general purpose firing ranges—five are live fire ranges and three utilize practice rounds. Access to these ranges is controlled. This control is indirectly provided by its centralized location well within the boundaries of Arnold AFB and the TNARNG leased area. Additionally, a number of standard safety procedures exist at Arnold AFB to prevent public access to training ranges. These procedures require every practical effort to keep the designated areas clear of all nonparticipating vehicles and personnel, including implementation of SDZs. If any unauthorized personnel is detected within the SDZs during training, all activity is temporarily halted until the area is again cleared and secured.

Construction Safety and Occupational Health

Day-to-day operations, maintenance, and construction activities conducted at Arnold AFB are performed in accordance with Air Force safety regulations and requirements.

3.3 Biological Resources

3.3.1 Definition of Resource

Biological resources include the native and introduced terrestrial and aquatic plants and animals found on and around the proposed project area. Habitat types are based on floral, faunal, and geophysical characteristics.

Sensitive habitats include areas that the federal government, state government, or the Department of Defense (DoD) have designated as worthy of special protection due to certain characteristics such as high species diversity, special habitat conditions for rare species, or other unique features.

Sensitive species are those species protected under federal or state law (see Laws and Regulations section below), to include threatened and endangered species and migratory birds. An "endangered" species is one that is in danger of extinction throughout all or a significant portion of its range. A "threatened" species is any species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Migratory birds spend only a portion of the year at any one location, with most migratory birds breeding in the temperate or higher latitudes and flying south to wintering grounds in tropical or subtropical climates.

Laws and Regulations

The ESA (Title 16 United States Code [USC] Sections 1531 to 1544; 1997–Supp) was enacted to provide for the conservation of endangered and threatened species and the ecosystems on which they depend. Air Force Policy Directive 32-70 directs the implementation of the ESA. Certain federal activities may require an ESA Section 7 consultation with the USFWS if impacts to federally listed species are possible. Avoidance of impacts by changing the time of action, place of action, or types of activities in locations of federally listed species can be cost- and time-effective if a consultation is avoided.

The Migratory Bird Treaty Act (16 USC 703-712; 1997-Supp) and EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, protect migratory birds and their habitats and establish a permitting process for legal taking. A migratory bird is defined by the USFWS as any species or family of birds that lives, reproduces, or migrates within or across international borders at some point during their annual life cycle. For normal and routine operations such as installation support functions, DoD actions may not result in pursuit, hunting, taking, capturing, killing, possession, or transportation of any migratory bird, bird part, nest, or egg thereof, except as permitted. The DoD must address these routine operations through the Memorandum of Understanding (MOU) developed in accordance with EO 13186. Under the 2003 National Defense Authorization Act, the Armed Forces are exempted from the incidental taking of migratory birds during military readiness activities, except in cases where an activity would likely cause a significant adverse effect to the population of a migratory bird species. As detailed in the final rule in the Federal Register (50 CFR 21), in that situation, the Armed Forces, in cooperation with the USFWS, must develop and implement conservation measures to mitigate or minimize the significant adverse impacts.

AFI 32-7064 provides details on how to manage natural resources in such a way as to comply with federal, state, and local laws and regulations. The AFI calls for the protection and conservation of state-listed species when not in direct conflict with the military mission. Arnold AFB applies for appropriate permits for actions that may affect state-listed species (such as monitoring and handling) and also cooperates with the Tennessee Wildlife Resources Agency to further the goals of the Tennessee State Wildlife Conservation Strategy.

Invasive nonnative species are species introduced from other countries or regions of the United States that threaten native plants and animals by altering the composition, structure, and function of native ecosystems. Invasive nonnative species impose large economic costs on natural resource managers, requiring intensive and extensive management to prevent undesirable ecosystem changes. Recognizing the ecological

and economic impacts of invasive species, EO 13112 (*Invasive Species*) states that each federal agency whose actions may affect the status of invasive species shall:

- Prevent the introduction of invasive species.
- Detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner.
- Monitor invasive species populations accurately and reliably.
- Provide for restoration of native species and habitat conditions in ecosystems that have been invaded.
- Conduct research on invasive species and develop technologies to prevent introduction and provide for environmentally sound control.
- Promote public education on invasive species.

EO 13112 states that no federal agency shall authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive nonnative species in the United States or elsewhere.

3.3.2 Existing Conditions

Flora and Fauna

MK-19 Range

The proposed MK-19 Range consists of about 70 acres and is located north of an unimproved gravel road in an undeveloped area east-southeast of the existing TNARNG weapons ranges (Figure 3-1). About 60 percent of the proposed area is Southern Red Oak – Scarlet Oak forest and 40 percent is Willow Oak – White Oak forest Table 3-1). Wetland communities (temporarily and seasonally flooded cold-deciduous forests) occupy about 1.5 percent of the area. The remaining areas consist of an unimproved gravel road.

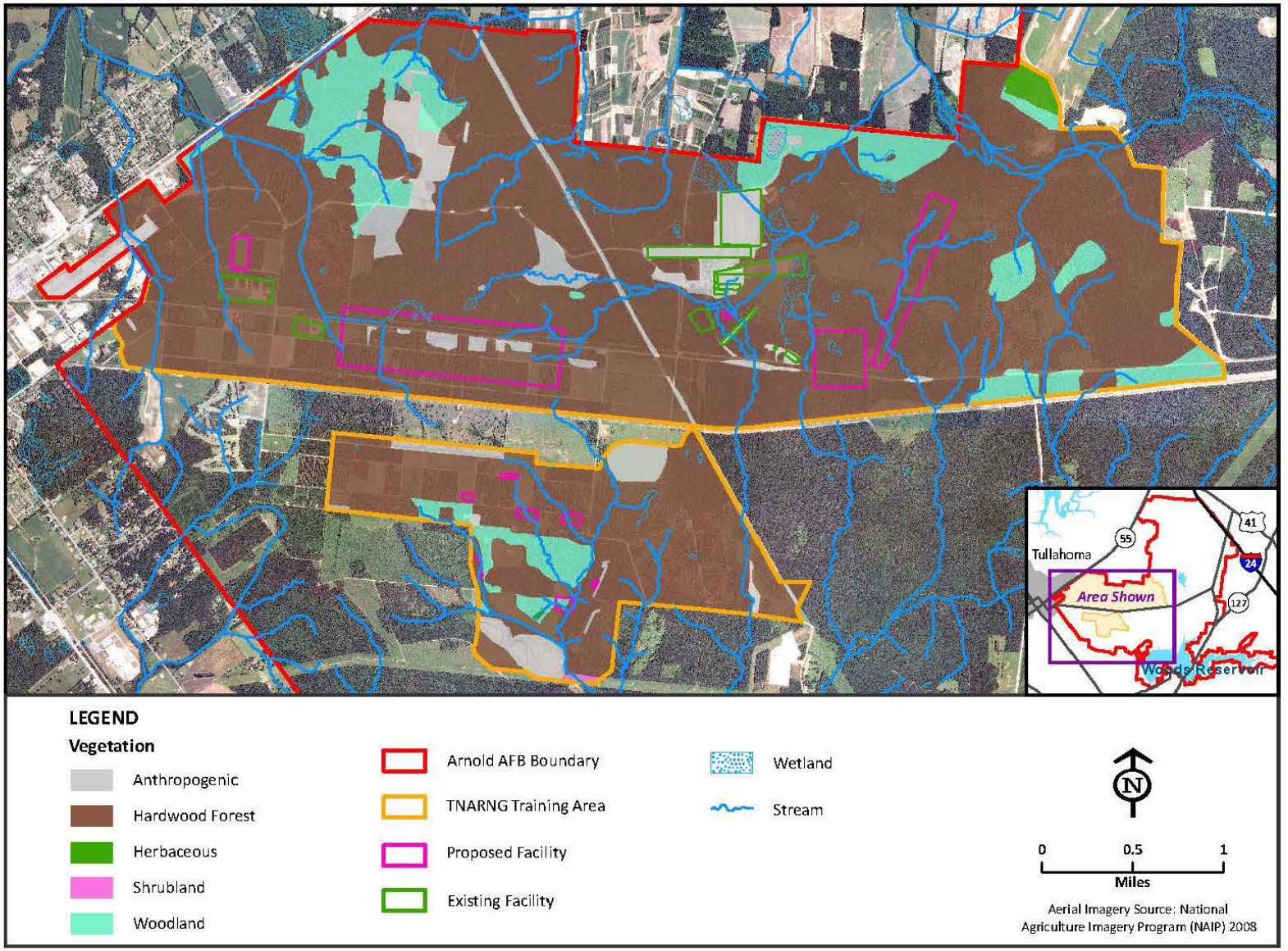

FIGURE 3-1
VEGETATION TYPES AT PROPOSED TNARNG TRAINING RANGES AT ARNOLD AFB
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

CCRC

The proposed CCRC consists of about 1,263 acres and is located along an existing improved and unimproved gravel road system in part of the Camp Forrest area south of Wattendorf Highway (Figure 3-1). About 56.1 percent of the proposed area is loblolly pine plantation. The remainder is Southern Red Oak – Scarlet Oak forest (19.5 percent), White Oak – Southern Red Oak – Post Oak forest (5.4 percent), Post Oak – Blackjack Oak Woodland (8.3 percent), Southern Blackberry – Dewberry Shrubland (0.5 percent), agricultural or food plots (5.5 percent), clear-cut areas (4.6 percent) and disturbed herbaceous wetland (0.1 percent) (Table 3-1). Wetland communities (temporarily and seasonally flooded cold-deciduous forests) occupy a small part of the landscape (less than 1 percent). The remaining areas consist of roads and other human-created structures.

TABLE 3-1
VEGETATION COMMUNITIES AT PROPOSED TNARNG TRAINING RANGES, ARNOLD AFB
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

Vegetation Formation and Alliance (Common description)	*MK-19 Range (acres)*	*CCRC (acres)*	*Secondary CACTF (acres)*	*Primary CACTF (acres)*	*M16 Zero Range (acres)*	*.50 Caliber/ M2 Range (acres)*
Lowland or submontane cold-deciduous forest						
Southern red/scarlet oak forest	42.21	245.91		72.01	0.92	44.90
White oak/mixed oak forest		68.01		8.30		0.13
Willow oak/white oak forest	28.37					2.16
Deciduous Forest Subtotal	70.58	313.92		80.31	0.92	47.19
Plantations (planted timber stands)						
Loblolly Pine plantation		708.62	9.72			7.58
Cold-deciduous woodland						
Post oak/ Blackjack oak woodland		105.07		147.55		
Cold-deciduous shrubland						
Southern Blackberry, Southern Dewberry shrubland		*6.87*				
Other						
Anthropogenic				22.43		
Ag fields/food plots		69.88				
Clear-cut		57.59				
Disturbed Herbaceous Wetland		1.68				
Other subtotal		129.15		22.43		
Total	70.58	1,263.63	9.72	250.29	0.92	54.77

CACTF = Combined Arms Collective Training Facility; CCRC = Convoy Commanders Reaction Course

Primary CACTF Area

The proposed Primary CACTF area consists of about 250 acres and is located along an existing improved and unimproved gravel road system in part of the Camp Forrest area (Figure 3-1). About 59 percent of the proposed area is loblolly pine plantation. The remainder is Southern Red Oak – Scarlet Oak forest (28.8 percent), White Oak – Southern Red Oak – Post Oak forest (3.3 percent), and anthropogenic structures and features (8.9 percent) (Table 3-1). Wetland communities (temporarily and seasonally flooded cold-deciduous forests) occupy a very small part of the landscape (less than 1 percent). The remaining areas consist of roads and other human-created structures.

Secondary CACTF Area

The proposed Secondary CACTF area consists of a 9.72-acre area in part of the Camp Forrest area north of Wattendorf Highway (Figure 3-1). The proposed facility is located entirely in a young loblolly pine plantation with a mix of young, deciduous vegetation (Table 3-1). The site is surrounded by improved and unimproved gravel roads. There are no sensitive communities, streams, wetlands, or other aquatic habitats present in the proposed Secondary CACTF area.

M-16 Zero Range

The proposed M-16 range consists of about 1 acre and is located north of an unimproved gravel road in an undeveloped area east-southeast of the existing TNARNG weapons ranges (Figure 3-1). One hundred percent of the proposed area is Southern Red Oak – Scarlet Oak forest (Table 3-1). There are no streams or wetland communities at the site. The remaining areas consist of roads and other human-created structures.

.50-Caliber Familiarization Range

The proposed .50-caliber range consists of nearly 55 acres and is located north of an unimproved gravel road in an undeveloped area east-southeast of the existing TNARNG weapons ranges (Figure 3-1). About 82 percent of the proposed area is Southern Red Oak – Scarlet Oak forest. The remainder is loblolly pine plantation (13.8 percent), Willow Oak – White Oak forest (3.9 percent), and White Oak – Southern Red Oak – Post Oak forest (0.3 percent) (Table 3-1). Wetland communities (temporarily and seasonally flooded cold-deciduous forests) occupy a very small part of the landscape (2.8 percent). The remaining areas consist of unimproved gravel roads and other human-created structures. The remaining areas consist of roads and other human-created structures.

Sensitive Habitat

MK-19 Range

The Southern Red Oak – Scarlet Oak forest and Willow Oak – White Oak forests are predominant sensitive communities in the proposed MK-19 Range (42 and 28 acres, respectively) (Figure 3-2). The proposed MK-19 Range does not include any other communities (Table 3-2). In all, there are nearly 70.58 acres of sensitive habitat within the area.

TABLE 3-2
SENSITIVE HABITATS IN THE PROPOSED TNARNG TRAINING RANGES AT ARNOLD AFB
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

Scientific Name	*Common Name*	*Global Rank*	*Location and Size (acres)*
Woodland			
CEGL004709 - *Quercus stellata - (Quercus coccinea) / Quercus marilandica / Vaccinium pallidum - (Vaccinium stamineum)* Woodland	Post Oak – (Scarlet Oak) / Blackjack Oak / Hillside Blueberry – (Deerberry) Woodland	G2G3	CCRC: 105.07
CEGL004709 Subtotal (All areas combined)			2.12
Forest			
CEGL007364 - *Quercus phellos - Quercus alba - Vaccinium fuscatum - (Viburnum nudum) / Carex (barrattii, intumescens)* Forest	Willow Oak – White Oak / Black Highbush Blueberry – (Wild Raisin) / (Barratt Sedge, Bladder Sedge) Forest	G1G2	MK-19 Range: 28.37 .50 caliber Range:2.16
CEGL007364 Subtotal (All areas combined)			30.53
CEGL007247 - *Quercus falcata-Quercus coccinea-Quercus (stellata,velutina)/ Vaccinium pallidum* Forest	Southern Red Oak – Scarlet Oak (Post Oak, Black Oak)/Hillside Blueberry Forest	G3	MK-19 Range: 42.21 CCRC: 245.91 Primary CACTF: 72.01 M16 Zero Range: 0.92 .50 caliber Range: 44.90
CEGL007247 Subtotal (All areas combined)			161.05
CEGL007746 - *Quercus alba-Quercus (falcata, stellata) / Chasmanthium laxum* Forest	White Oak – (Southern Red Oak, Post Oak)/Slender Spanglegrass Forest	G3G5	CCRC: 68.01 Primary CACTF: 8.30 .50 caliber Range: 0.13
CEGL007746 Subtotal (All areas combined)			12.50
		Total	206.20

Source: U.S. Air Force, 2006
CACTF = Combined Arms Collective Training Facility; CCRC = Convoy Commanders Reaction Course
Note: There are no sensitive plant communities within the proposed Primary CACTF area.
Global Rank Communities
G1 - Extremely rare and critically imperiled in the world
G2 - Very rare and imperiled within the world
G3 - Rare or uncommon in its range
G5 - Demonstrably widespread and secure globally

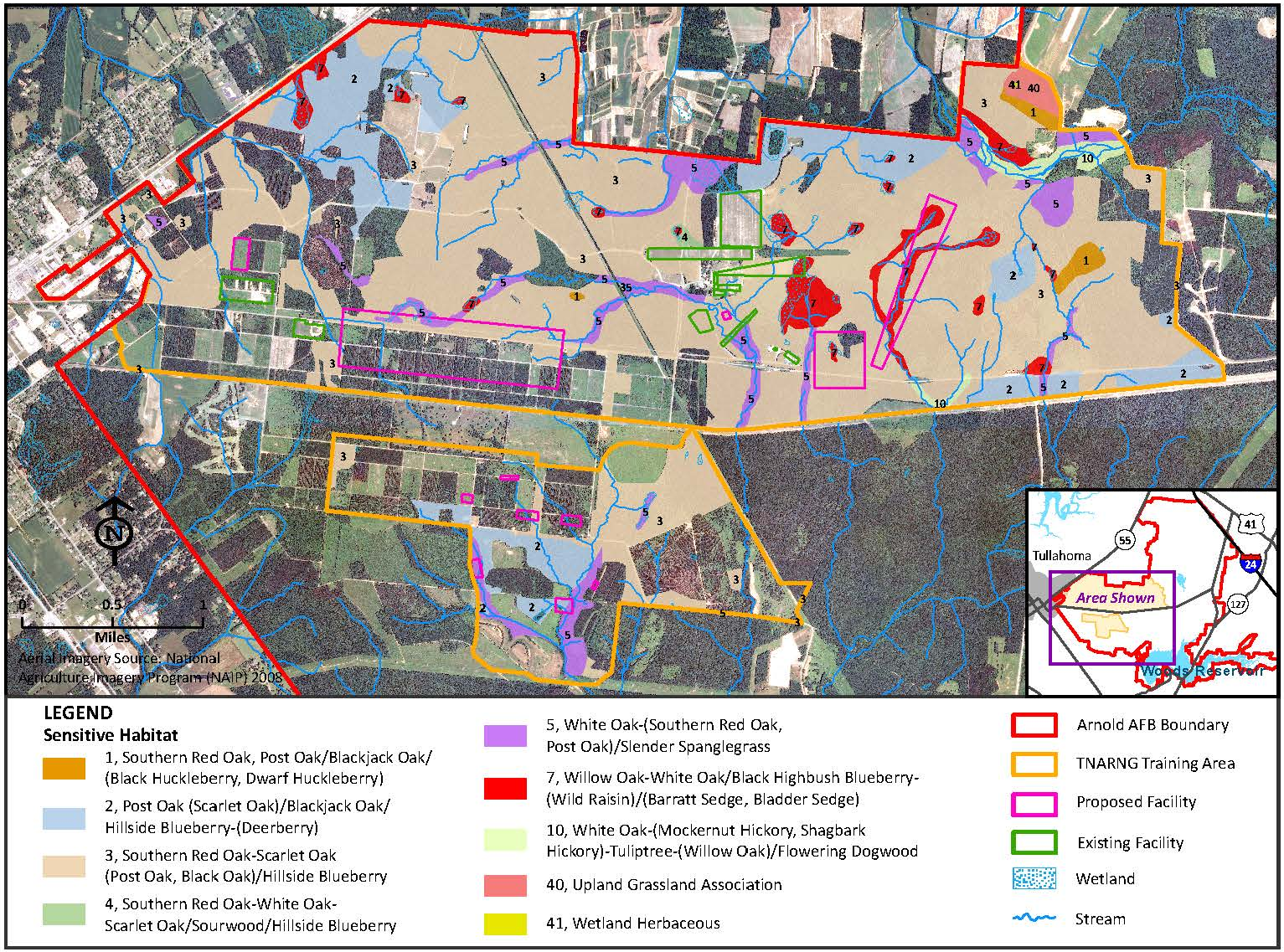

FIGURE 3-2

SENSITIVE HABITATS AT PROPOSED TNARNG TRAINING RANGES AT ARNOLD AFB

Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

CCRC

Sensitive communities at the proposed CCRC include Post Oak – Scarlet Oak Woodland (105 acres), Southern Red Oak – Scarlet Oak forest (245 acres), and White Oak – Mixed Oak forest (68 acres) (Figure 3-2) (Table 3-2).

Primary CACTF Range

Sensitive communities at the proposed Primary CACTF Range include Southern Red Oak – Scarlet Oak forest (72 acres), and White Oak – Mixed Oak forest (8 acres) (Figure 3-2) (Table 3-2).

Secondary CACTF Range

No sensitive communities are located at the proposed Secondary CACTF Range (Figure 3-2) (Table 3-2).

M16 Zero Range

Sensitive communities at the proposed M16 Zero Range include Southern Red Oak - Scarlet Oak forest (less than 1 acre) (Figure 3-2) (Table 3-2).

.50 Caliber Familiarization Range

Sensitive communities at the proposed .50 Caliber Range include Southern Red Oak - Scarlet Oak forest (44 acres), Willow Oak - White Oak forest (2 acres), and White Oak – Mixed Oak forest (less than 1 acre) (Figure 3-2) (Table 3-2).

Sensitive Species

Arnold AFB contains an amazing diversity of organisms. The Arnold AFB *Integrated Natural Resources Management Plan* (INRMP) (U.S. Air Force, 2006) identifies at least 67 rare, threatened, and endangered (RTE) plants and 19 animals on base. At least 18 RTE plant species and 9 RTE animal species (2 birds, 3 mammals, 2 reptiles, 1 amphibian, and 1 fish,) are known to occur in or around the proposed TNARNG training areas (Figure 3-3 and Table 3-3). These species are listed by the State of Tennessee; none are listed as threatened or endangered by the U.S. Fish and Wildlife Service (USFWS). Eggert's sunflower was formerly Listed Threatened by USFWS but was delisted due largely in part to conservation effort and commitments at Arnold AFB. In addition to the nine animal species referenced above Arnold AFB conservation staff tracks the occurrence of another amphibian, which has no special state or federal status.

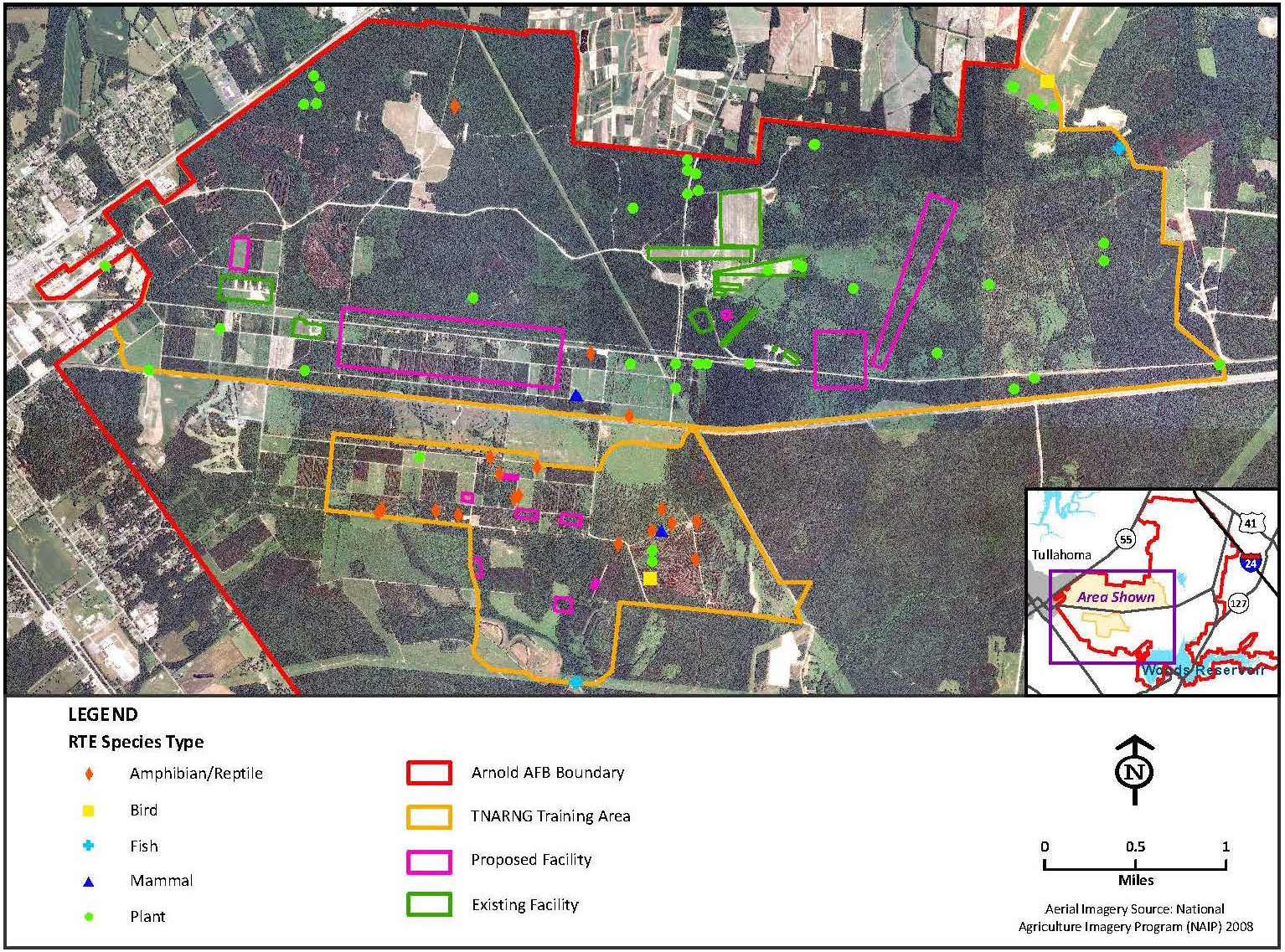

FIGURE 3-3

SENSITIVE SPECIES KNOWN TO OCCUR WITHIN OR NEAR PROPOSED TNARNG TRAINING RANGES AT ARNOLD AFB

Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

TABLE 3-3
SENSITIVE SPECIES KNOWN TO OCCUR WITHIN OR NEAR PROPOSED TNARNG TRAINING RANGES AT ARNOLD AFB
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

Common Name	*Scientific Name*	*Federal Status*	*State Status*	*Preferred Habitat*
		Plants		
Ridge-stem False Foxglove	*Agalinis pseudophylla*	-	E	Barrens Confirmed: Primary CACTF Buffer, CCRC
Pink Lady Slipper	*Cypripedium acaule*	-	S-CE	Oak forests and woodlands Confirmed: MK-19 Range Buffer, M16 Zero Range Buffer, .50 Caliber Range Buffer
Dwarf Sundew	*Drosera brevifolia*	-	T	Wet barrens and ecotones Confirmed: Primary CACTF Buffer, CCRC and Buffer, MK-19 Range Buffer, M16 Zero Range Buffer, .50 Caliber Range Buffer
Pale-purple Coneflower	*Echinacea pallida*	-	T	Barrens and dry openings Confirmed: Primary CACTF Buffer, CCRC Buffer, MK-19 Range Buffer, M16 Zero Range Buffer, .50 Caliber Range Buffer
Cluster fescue	*Festuca paradoxa*	-	S	Wet woods and prairies Confirmed: Primary CACTF Buffer, CCRC Buffer, MK-19 Range Buffer, M16 Zero Range Buffer, .50 Caliber Range Buffer
Dwarf Huckleberry	*Gaylussacia dumosa*	-	T	Barrens Confirmed: Secondary CACTF Buffer, CCRC Buffer, MK-19 Range Buffer, M16 Zero Range Buffer, .50 Caliber Range Buffer
Broad-leaved Beardgrass	*Gymnopogon brevifolius*	-	S	Barrens Confirmed: MK-19 Range Buffer
Eggert's Sunflower	*Helianthus eggertii*	DM	T	Woodlands and grasslands Confirmed: Secondary CACTF Buffer, Primary CACTF Buffer, CCRC and Buffer; MK-19 Range Buffer, M16 Zero Range Buffer, .50 Caliber Range Buffer
Low Frostweed	*Helianthemum propinquum*	-	E	Barrens Confirmed: Primary CACTF Buffer, CCRC Buffer, MK-19 Range Buffer, .50 Caliber Range Buffer
Slender Blue Flag	*Iris prismatica*	-	T	Wet Barrens Confirmed: Secondary CACTF Buffer, MK-19 Range Buffer, M16 Zero Range Buffer, .50 Caliber Range Buffer
Narrowleaf Bushclover	*Lespedeza angustifolia*	-	T	Barrens Confirmed: Primary CACTF Buffer, CCRC Buffer; MK-19 Range Buffer, M16 Zero Range Buffer, .50 Caliber Range Buffer
Fen Orchis	*Liparis loeslii*	-	T	Calcareous seeps Confirmed: M16 Zero Range Buffer

TABLE 3-3
SENSITIVE SPECIES KNOWN TO OCCUR WITHIN OR NEAR PROPOSED TNARNG TRAINING RANGES AT ARNOLD AFB, CONT'D
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

Common Name	*Scientific Name*	*Federal Status*	*State Status*	*Preferred Habitat*
Plants continued				
Canby's Lobelia	*Lobelia canbyi*	-	T	Streams, spring, and riparian zones and mesic hardwood forests Confirmed: MK-19 Range Buffer, M16 Zero Range, .50 Caliber Range, CCRC
Broad-leaved Barbara's Buttons	*Marshallia trinervia*	-	T	Rocky Ravines Confirmed: Primary CACTF Buffer, MK-19 Range Buffer, M16 Zero Range Buffer, .50 Caliber Range Buffer
Roughish Witchgrass	*(Panicum) Dichanthelium acuminatum subsp. leucothrix*	-	S	Wet pine barrens Confirmed: Primary CACTF Buffer, CCRC buffer
Sand Cherry	*Prunus pumila*	-	E	Barrens Confirmed: CCRC, Primary CACTF Buffer; M16 Zero Range Buffer, .50 Caliber Range Buffer
Mayberry	*Vaccinium elliottii*	-	E	Open Flat Woods and Dry Slopes Confirmed: Primary CACTF Buffer, CCRC Buffer
Death-camas	*Zigadenus leimanthoides*	-	T	Acidic wetlands Confirmed: Primary CACTF Buffer, Secondary CACTF Buffer, MK-19 Range Buffer, M16 Zero Range Buffer, .50 Caliber Range Buffer
Animals				
Bachman's Sparrow	*Aimophila aestivalis*	-	E	Dry open pine or oak woods Confirmed: CCRC
Mole Salamander	*Ambystoma talpoideum*	-	*	Pine flatwoods, floodplains, and bottomland hardwood forests Confirmed: Primary CACTF Buffer; CCRC Area and Buffer, M16 Zero Range Buffer, .50 Caliber Range Buffer
Henslow's Sparrow	*Ammodramus henslowii*	-	D	Damp open fields and meadows Confirmed: MK-19 Range Buffer
Flame Chub	*Hemitremia flammea*	-	D	Intermittent and perennial streams Confirmed: CCRC
Barking Tree Frog	*Hyla gratiosa*	-	D	Low wet woods and swamps Confirmed: Primary CACTF Buffer, CCRC Buffer,
Wood Rat	*Neotoma floridana*	-	D	Forested areas Confirmed: Primary CACTF Buffer, CCRC
Slender Glass Lizard	*Ophisaurus attenuatus longicaudus*	-	D	Woodlands, pine forests, and grasslands Confirmed: Primary CACTF Buffer, CCRC
Northern Pine Snake	*Pituophis melanoleucus melanoleucus*	-	T	Pine/pine-oak woods Confirmed: CCRC, Primary CACTF Buffer, M16 Zero Range Buffer, .50 Caliber Range Buffer

TABLE 3-3
SENSITIVE SPECIES KNOWN TO OCCUR WITHIN OR NEAR PROPOSED TNARNG TRAINING RANGES AT ARNOLD AFB, CONT'D
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

Common Name	*Scientific Name*	*Federal Status*	*State Status*	*Preferred Habitat*
Animals continued				
Masked Shrew	*Sorex cinereus*	-	D	Rich woodlands, open fields Confirmed: Primary CACTF Buffer, CCRC Buffer, M16 Zero Range Buffer
Southeastern Shrew	*Sorex longirostris*	-	D	Rich woodlands, open fields Confirmed: Primary CACTF Buffer, CCRC Buffer, M16 Zero Range Buffer
Indiana Bat	*Myotis sodalis*	E	E	Oak woodlands for summer roosting. Surveys conducted in 2012 for MK19 range; results were probable absence (U.S. Air Force, 2012)

Sources: U.S. Air Force, 2006; TDEC, 2008; TDEC, 2009
CACTF=Combined Arms Collective Training Facility; CCRC=Convoy Commanders Reaction Course; CE=Commercially Exploited; D=Deemed in Need of Management; DM=Delisted Taxon; S=Special Concern; T=Threatened
* No federal or state status but tracked by Arnold AFB.

In most cases the RTE species identified in Table 3-3 have been found within a mile of the proposed training areas rather than within a proposed training area itself. The exception to this is the proposed CCRC where five listed plants and five listed animal species have been confirmed within the boundaries of the proposed CCRC. All of these species were identified with the training area but have not been identified in any of the proposed target areas. In general, suitable habitat for all the species in Table 3-3 is present at any of the proposed training areas. Arnold AFB also hosts a federally listed endangered gray bat (*Myotis grisescens*). The bat occurs at the Woods Reservoir Dam and would not be impacted by the Proposed Action. Therefore, this species is not discussed further in this document.

During the public/agency review of the Draft EA, the USFWS identified concerns regarding potential impacts to the Indiana bat, a federally and state-listed endangered species, since the area falls within the bat's habitat range. Arnold AFB conducted a species survey of Indiana bats within the proposed project areas. Mist net and acoustic bat surveys resulted in a probable absence determination of this species in the vicinity of the proposed project site (U.S. Air Force, 2012). However, the USFWS did note in subsequent correspondence that the presence of a juvenile Indiana bat was previously reported during Summer 2010 at a site located less than 5 miles from the proposed project sites (see Appendix A).

Invasive Species

Invasive plants and animals are a threat to both sensitive habitats and sensitive species. Many invasive plants and animals have been identified at numerous locations within the proposed TNARNG training areas. Threats associated with invasive pest plant

(IPP) species at Arnold AFB have received increasing attention since the initiation of ecosystem management on the installation in 1995 (Aerospace Testing Alliance [ATA], 2005). Since 1999, land managers at Arnold AFB have undertaken various interventions designed to control and reduce the occurrence of invasive plants (ATA, 2005). A combination of prevention, manual and mechanical control, chemical control, and prescribed burning have been used successfully to address IPP problems at the base. Each year a combination of these treatments are employed to combat IPP species in priority areas of the base.

In the past numerous IPPs such as bicolor lespedeza, autumn olive, were routinely planted to provide food and cover for wildlife; however, IPP species have not been planted at Arnold AFB for many years. The Arnold AFB *Integrated Pest Management Plan* was approved and initiated in 2003 with the purpose to control and eventually eliminate IPP species from the base (ATA, 2005; U.S. Air Force, 2006). Table 3-4 contains a list of invasive plants and animals identified at Arnold AFB.

It should be noted that pines are considered a priority IPP species at Arnold. Although several pine species are native to much of Tennessee, all pines at the base have been introduced for landscaping or forest management purposes. There are many existing pine plantations at the base, including the proposed TNARNG training areas. Many of these pine plantations are converted to barren habitat following harvest or allowed to regenerate into native hardwood or mixed hardwood-pine communities. However, following harvest many plantations are replanted with pine to achieve various forest management goals.

TABLE 3-4
PRIORITY INVASIVE PEST PLANT SPECIES KNOWN ON ARNOLD AFB
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

Scientific Name	*Common Name*	*AAFB Rank **	*TN-EPPC Rank***
Ailanthus altissima	Tree of heaven	Very High	Severe threat
Broussonetia papyrifera	Paper mulberry	Very High	Significant threat
Paulownia tomentosa	Princess tree	Very High	Severe threat
Populus alba	White poplar	Very High	Significant threat
Pueraria montana	Kudzu	Very High	Severe threat
Albizia julibrissin	Mimosa	High	Severe threat
Lespedeza cuneata	Sericea lespedeza	High	Severe threat
Ligustrum sinense	Chinese privet	High	Severe threat
Ligustrum vulgare	Common privet	High	Severe threat
Rosa multiflora	Multiflora rose	High	Severe threat
Sorghum halapense	Johnsongrass	High	Severe threat
Vinca minor	Periwinkle	High	Significant threat
Wisteria sinensis	Wisteria	High	Alert
Pinus spp.	Pine spp.	High	Not on list
Poncirus trifoliata	Trifoliate orange	High	Not on list
Alliaria petiolata	Garlic mustard	Medium	Significant threat
Elaeagnus umbellata	Autumn olive	Medium	Severe threat
Coronilla varia	Crown vetch	Medium	Alert

TABLE 3-4
PRIORITY INVASIVE PEST PLANT SPECIES KNOWN ON ARNOLD AFB, CONT'D
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

Scientific Name	*Common Name*	*AAFB Rank **	*TN-EPPC Rank***
Lespedeza bicolor	Bicolor lespedeza	Medium	Severe threat
Arthraxon hispidus	Hairy jointgrass	Low	Significant threat
Festuca (Lolium) arundinacea	Fescue	Low	Significant threat
Lonicera japonica	Japanese honeysuckle	Low	Severe threat
Microstegium vimineum	Japan grass	Low	Severe threat
Carduus nutans	Musk thistle	Not Rankable	Significant threat
Verbascum thapsus	Common mullein	Not Rankable	Significant threat
Celastrus orbiculatus	Oriental bittersweet	Did not rank	Severe threat

*Arnold AFB Rank (ATA, 2005 and U.S. Air Force, 2006)
** TN-EPPC, 2008
AFB = Air Force Base; TN = Tennessee; TN-EPPC = Tennessee Exotic Pest Plant Council

3.4 Cultural Resources

3.4.1 Definition of Resource

Cultural resources consist of prehistoric and historic sites, structures, artifacts, and any other physical or traditional evidence of human activity considered relevant to a particular culture or community for scientific, traditional, religious, or other reasons.

Concerning cultural resources Arnold AFB is required to comply with a wide range of federal laws, regulations, and EOs. Both DoDI 4715.3, *Environmental Conservation Program*, and AFI 32-7065, *Cultural Resources Management*, outline proper procedures for cultural resources management at Air Force facilities. Foremost among cultural resources compliance laws is the NHPA of 1966, as amended. Under NHPA, the Air Force is required to consider the effects of its undertakings on historic properties listed or eligible for listing on the National Register of Historic Places (NRHP), and to consult with interested parties regarding potential impacts. Properties listed in the NRHP include districts, sites, buildings, structures, and objects that are significant in American history, architecture, archeology, engineering, and culture.

Additional guidance concerning Air Force interaction with Federally Recognized Tribes includes but is not limited to DoDI 4710.02, DoD Interactions with Federally Recognized Tribes; EO 13175, Consultation and Coordination with Indian Tribal Governments; and the Presidential Memorandum on Government-to-Government Relationship with Tribal Governments, issued on 23 September 1994.

In addition to consultation with the Tennessee State Historic Preservation Officer (SHPO) (i.e., the state agency relegated to administering the provisions of the NHPA within Tennessee), as required by Section 106 of the NHPA, a number of parties are regularly consulted regarding cultural resources at Arnold AFB. Under provisions of Section 106 and 11 existing MOUs, Arnold AFB consults with the following federally

recognized tribes; Alabama-Coushatta Tribe of Texas, Alabama Quassarte Tribal Town, Chickasaw Nation of Oklahoma, Choctaw Nation of Oklahoma, Eastern Band of Cherokee Indians, Kialegee Tribal Town, Muscogee (Creek) Nation of Oklahoma, Poarch Creek Indians, Shawnee Tribe, Thlopthlocco Tribal Town, and the United Keetowah Band of Cherokee. In addition, Arnold AFB also consults with the following three tribes without an MOU; Absentee Shawnee Tribe of Oklahoma, Cherokee Nation of Oklahoma, and Seminole Nation of Oklahoma.

With regards to this Proposed Action the Air Force is the lead agency responsible for protecting cultural resources at proposed locations. An interagency agreement between Arnold AFB and the TNARNG requires the TNARNG to notify AEDC of any inadvertent cultural resource discoveries.

3.4.2 Existing Conditions

MK-19 Range

The area of potential effects (APE) (which is equivalent to the region of influence [ROI]) for cultural resources for field training is depicted in Figure 2-1. Approximately 71 acres are under consideration for development. This area has been previously surveyed for cultural resources (U.S. Air Force, 2007). No archaeological sites, historic structures, historic districts, traditional cultural properties, or cemeteries are located within this Alternative area.

CRCC

The APE for cultural resources for field training is depicted in Figure 2-2. Approximately 18 acres are under consideration for development. All of these areas have been previously surveyed for cultural resources (U.S. Air Force, 2007).

No archaeological sites, historic structures, historic districts, traditional cultural properties, or cemeteries are located within this Alternative area. The closest site is 40FR478, an historic homestead identified as ineligible for the NRHP, is located several hundred feet from the nearest activity area (U.S. Air Force, 2007).

Primary CACTF Range

The APE for cultural resources for field training is depicted in Figure 2-3 and Figure 2-4. Approximately 10 acres are under consideration for development. This area has been previously surveyed for cultural resources (U.S. Air Force, 2007).

No archaeological sites, historic structures, historic districts, traditional cultural properties or cemeteries are located within 0.5 mile to this project area (U.S. Air Force, 2007).

Secondary CACTF Range

The APE for cultural resources for field training is depicted in Figure 2-5 and Figure 2-6. Approximately 250 acres are under consideration for development. This area has been previously surveyed for cultural resources (U.S. Air Force, 2007).

Identified cultural resources within this area consist of one archaeological site. The site, 40CF239 is an unidentified prehistoric artifact scatter considered ineligible for listing on the NRHP. No further work has been recommended for this resource (U.S. Air Force, 2007). No historic structures, historic districts, traditional cultural properties or cemeteries are located within or adjacent to this project area. There are no identified historic resources in the proposed or existing firing range area or drop zone.

M16 Zero Range

The APE for cultural resources for field training is depicted in Figure 2-7. Approximately 1 acre is under consideration for development. This area has been previously surveyed for cultural resources (U.S. Air Force, 2007).

No archaeological sites, historic structures, historic districts, traditional cultural properties or cemeteries are located within 0.75 mile of this project area (U.S. Air Force, 2007).

.50 Caliber Familiarization Range

The APE for cultural resources for field training is depicted in Figure 2-8. Approximately 55 acres are under consideration for development. This area has been previously surveyed for cultural resources (U.S. Air Force, 2007).

No archaeological sites, historic structures, historic districts, traditional cultural properties or cemeteries are located within 0.25 mile of this project area (U.S. Air Force, 2007).

3.5 Geomorphology and Soils

3.5.1 Definition of Resource

Depending on their properties and the topography in which they occur, soils have varying susceptibility to erosion. Soil disturbance associated with development may potentially result in erosion and the transport of eroded soils into nearby drainages.

When undeveloped areas are modified, impervious surfaces (i.e., areas that water cannot seep into, such as roads and paved parking areas) can be created. During rainfall events, water moves across impervious surfaces into seasonal drainages, stormwater drains, and retention basins, and is ultimately transported into local water

bodies. Sediments can affect water clarity, decrease oxygen levels in water, and transport pollutants. As soil quality declines (erosion), adverse impacts to on-site and off-site environments can increase. Therefore, the maintenance of soil quality is important for efficient and productive land management and utilization. Areas most prone to erosion are identified based on slope, soil type, and vegetative cover.

3.5.2 Existing Conditions

Arnold AFB is located within the eastern portion of the Highland rim physiographic province (U.S. Department of Agriculture [USDA], 2006). This area is characterized by extensive forests and elevations ranging from 100 meters (about 328 feet) to 400 meters (about 1,312 feet). The topography of the region is gently rolling to strongly rolling with broad upland flats and shallow basin interruptions.

There are six projects that comprise the Proposed Action on Arnold AFB. Although the topography of these parcels can range from 0 to 15 percent slopes, 82.7 percent or approximately 334 acres of the Proposed Action area is flat to moderately flat with slopes of 0 to 2 percent. Proposed land-clearing and construction activities would be primarily limited to the ground surface, to a depth of several feet for berm construction and leveling activities, etc. Other planned construction activities include clearing trees and vegetation, graveling, and minor road improvements. As a result, underlying geology is not expected to be impacted by the Proposed Action, and this issue was not carried forward for detailed analysis.

The predominant soil type (51.2 percent of total project land area) found within the six proposed project areas is classified as Dickson silt loam, 0-2 percent slopes (USDA, 2010) (Figure 3-4; Table 3-5). Dickson silt loam consists of very deep, moderately well drained soils, with slowly permeable fragipan in the subsoil. These soils are strongly acidic soils formed in a silty mantle 2 to 4 feet thick, with an underlying residuum of limestone. Depth to seasonal water table is approximately 18 to 36 inches to the depth of the fragipan. Silty loam comprises the majority of the entire series; at 0 to 48 inches below the ground (USDA, 2010). Dickson silt loam, 0 to 2 percent slopes have slight erosion potential. Of the total project area under the Proposed Action, an additional 14.6 percent of the area is composed of Dickson silt loam, 2-7 percent soils. Soil characteristics are the same between the two soil types but due to the increased slopes, erosion potential is slightly higher.

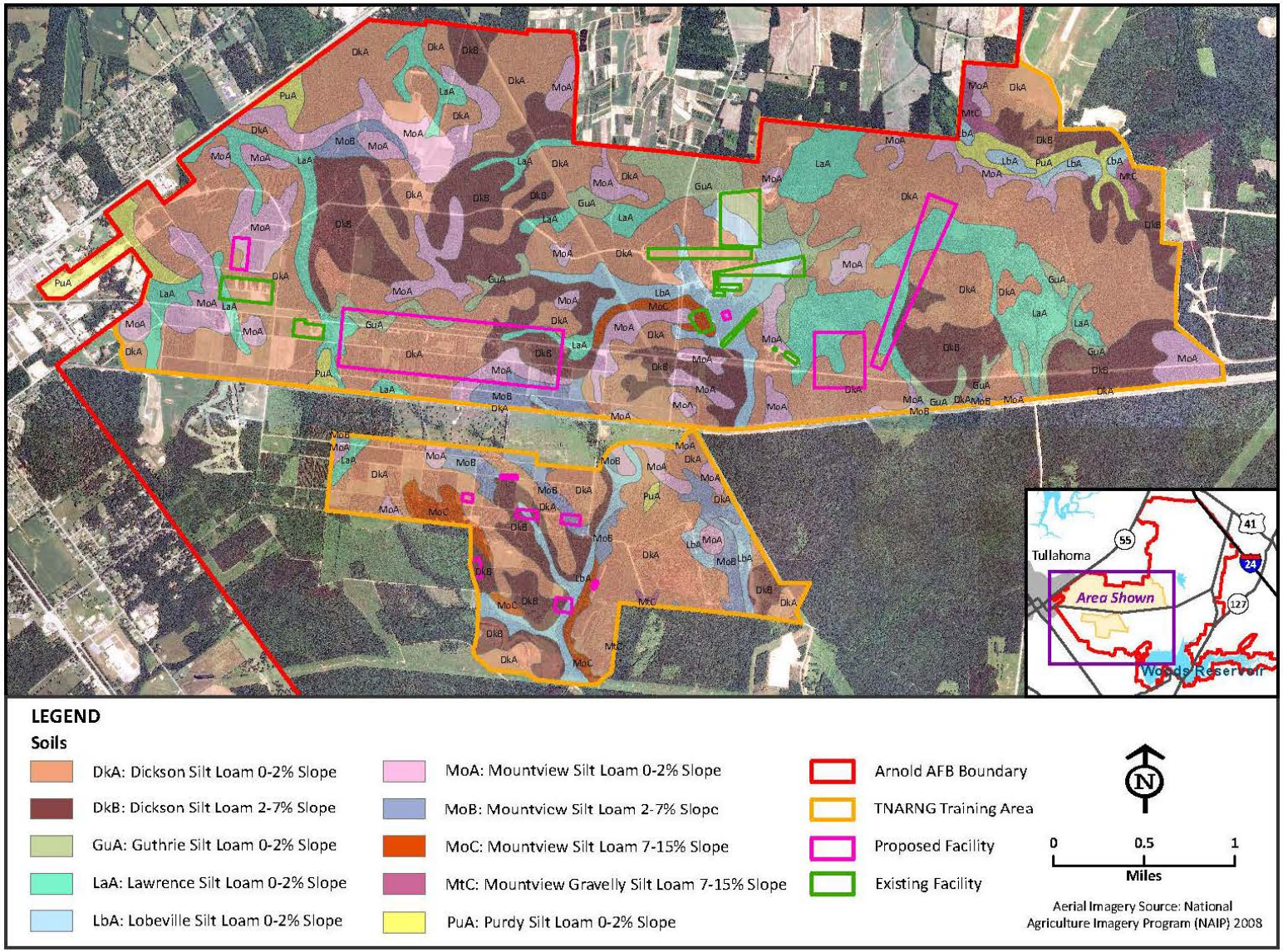

FIGURE 3-4
SOILS NEAR THE PROPOSED ACTION SITES
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

The second soil type in terms of land area covered within the project area (17.9 percent of land area) is Lawrence silt loam, 0-2 percent slopes (USDA, 2010). Lawrence silt loam consists of deep, somewhat poorly drained soils, with slowly permeable fragipan below the surface horizon. Depth to seasonal water table is approximately 12 to 24 inches to the depth of the fragipan. This soil type frequently floods with a flood duration for very brief to brief periods of time (USDA, 2010). Lawrence silt loam, 0 to 2 percent slopes have slight erosion potential. Five remaining soil types comprising 16.2 percent of the total Proposed Action area are; Guthrie silt loam 0-2 percent slope; Lobeville silt loam 0-2 percent slope; Mountview silt loam 0-2 percent; Mountview silt loam 7-15 percent slope; Mountview silt loam 2-7 percent slope. Among these are Guthrie, Lobeville, and Mountview silt loam 0-2 percent, which are considered to have a slight potential for erosion. The Mountview silt loam 7-15 percent slope and Mountview silt loam 2-7 percent slope have moderately high and moderate potential for erosion respectively (USDA, 2010).

MK-19 Range

The MK-19 Range is composed of Dickson silt loam, 0-2 percent slopes (32.5 percent of the total area) and Dickson silt loam, 0-7 percent slopes (10.2 percent of the total area) and Lawrence silt loam, 0-2 percent slopes (57.3 percent of the total area) (Figure 3-4; Table 3-5). The site topography ranges from upland areas to foot slopes. Soils at this site have slow to moderately slow surface runoff and slight to moderate erosion potential.

TABLE 3-5
PROPOSED ACTION AND ALTERNATIVE SOIL TYPES BY TRAINING AREA (IN ACRES)
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

Soil Type	*MK-19 Range*	*CRCC*	*Primary CACTF Site*	*Secondary CACTF Site*	*25-Meter M16 Zero Range*	*.50 Caliber Range*
Dickson Silt Loam 0-2% Slope	22.94	3.57	4.10	139.37		37.02
Dickson Silt Loam 2-7% Slope	7.22	7.41		44.46		
Guthrie Silt Loam 0-2% Slope				15.70		
Lawrence Silt Loam 0-2% Slope	40.39			14.09		17.75
Lobeville Silt Loam 0-2% Slope		3.32			0.92	
Mountview Silt Loam 0-2% Slope			5.62	28.89		
Mountview Silt Loam 2-7% Slope		3.27		7.79		
Mountview Silt Loam 7-15% Slope		0.08				
Total Acres	70.56	17.65	9.72	250.29	0.92	54.77

CACTF = Combined Arms Collective Training Facility; CCRC = Convoy Commanders Reaction Course

CRCC

The CRCC site is composed of Dickson silt loam, 0-2 percent slopes (20.2 percent of the total area) and Dickson silt loam, 0-7 percent slopes (42 percent of the total area), Lobeville silt loam, 0-2 percent slopes (18.8 percent of the total area), Mountview silt loam 2-7 percent slopes (18.5 percent of the total area), and Mountview silt loam

7-15 percent slopes (0.1 percent of the total area) (Figure 3-4; Table 3-5). The site topography ranges from upland areas to foot slopes. Soils at this site have slow to moderate surface runoff and slight to moderately high erosion potential.

Primary CACTF Range

The Primary CACTF site is composed of Mountview silt loam, 0-2 percent slopes (57.8 percent of the total area) and Dickson silt loam, 0-2 percent slopes (42.2 percent of the total area) (Figure 3-4; Table 3-5). The site topography is flat to relatively flat. Soils at this site have slow surface runoff and slight erosion potential.

Secondary CACTF Range

The Secondary CACTF site is composed of Dickson silt loam, 0-2 percent slopes (55.7 percent of the total area) and Dickson silt loam, 0-7 percent slopes (17.8 percent of the total area), Guthrie silt loam, 0-2 percent slopes (6.3 percent of the total area), Lawrence silt loam 0-2 percent (5.6 of the total area), Mountview silt loam 0-2 percent slopes (11.5 percent of the total area), and Mountview silt loam 2-7 percent slopes (3.1 percent of the total area) (Figure 3-4; Table 3-5). The site topography ranges from upland ridges to side slopes. Soils at this site have slow to moderately slow surface runoff and slight to moderate erosion potential.

M16 Zero Range

The 25-meter M16 Zero Range site is composed of Lobeville silt loam, 0-2 percent slopes (100 percent of the total area) (Figure 3-4; Table 3-5). The site topography is flat to relatively flat. Soils at this site have slow surface runoff and slight erosion potential.

.50 Caliber Familiarization Range

The .50 Caliber Range is composed of Dickson silt loam, 0-2 percent slopes (67.6 percent of the total area) and Lawrence silt loam, 0-2 percent slopes (32.4 percent of the total area) (Figure 3-4; Table 3-5). The site topography ranges from upland areas to foot slopes. Soils at this site have slow surface runoff and slight erosion potential.

3.6 Water Quality and Hydrology

3.6.1 Definition of Resource

Surface water resources include lakes, rivers, and streams and are important for a variety of reasons, including irrigation, power generation, recreation, flood control, and human health. Under the CWA, it is illegal to discharge pollutants from a point source into any surface water without a National Pollutant Discharge Elimination System (NPDES) permit. Under the CWA, applicants for a federal license or permit to conduct activities that may result in the discharge of a pollutant into waters of the United States

must obtain certification from the state in which the discharge would originate, or if appropriate, from the interstate water pollution control agency with jurisdiction over the affected waters at the point where the discharge would originate. Therefore, all projects that have a federal component and may affect state water quality (including projects that require federal agency approval, such as issuance of a Section 404 permit) must also receive a Section 401 permit. The State of Tennessee has legal authority to implement and enforce the provisions of the CWA, while the U.S. Environmental Protection Agency (USEPA) retains oversight responsibilities.

In Tennessee, water resources are afforded regulatory protection under TDEC in accordance with the state's stormwater management program and the Tennessee Aquatic Resources Alteration Permit program. Potential impacts to surface waters may result if the Proposed Action triggers permitting requirements under the Section 401 Certification program (40 CFR 230.10(b)). Erosion and sedimentation control regulations were established for controlling erosion and sedimentation from land-disturbing activities, requiring that permits be obtained for land-disturbing activities. Permit applicants must submit an erosion and sedimentation control plan that incorporates specific conservation and engineering practices or mitigations. The permitting process includes special requirements for land-disturbing activities in stream buffer zones. Land-disturbing activities are not allowed within 25 feet of any state waters unless a variance is granted by TDEC for drainage structures. The TDEC Division of Water Pollution Control is responsible for administration of the Tennessee Water Quality Control Act of 1977 (Tennessee Code Annotated [TCA] 69-3- 41 101). On an annual basis, the Division monitors, analyzes, and reports on the quality of Tennessee's water. TDEC uses a watershed approach under the concept that many water quality problems, such as the accumulation of pollutants or nonpoint source pollution, are best managed at the watershed level.

3.6.2 Existing Conditions

Surface Water Resources

Arnold AFB is roughly divided in half from the northeast to the southwest by the Upper Duck River and Upper Elk River Watersheds. The Upper Duck River Watershed, located in middle Tennessee, drains approximately 1,182 square miles and empties into the Lower Duck River Watershed. Notable water bodies in the watershed include the Duck River and Normandy Reservoir (TDEC, 2003). The watershed contains 24 impacted water body segments on the most recent state 303(d) list (TDEC, 2010). The Upper Elk River Watershed, located in middle southern Tennessee, drains approximately 1,277 miles and empties into the Lower Elk River Watershed. Notable water bodies in the watershed include the Elk River, Tims Ford, and Woods Reservoirs (TDEC, 2005). The watershed contains 27 impacted water body segments in the most recent state 303(d) list (TDEC, 2010).

Two notable water bodies are located within the base boundary: Retention Reservoir and Woods Reservoir. Woods Reservoir, a 3,632-acre impoundment located in the southern portion of the base, provides cooling water for test facilities as well as water for air conditioning, fire protection, and potable water. The reservoir also provides recreational activities for base personnel and the surrounding communities (U.S. Air Force, 2006). The man-made 175-acre Retention Reservoir receives cooling water and drainage from the AEDC complex and drains to Rowland Creek, which flows into Woods Reservoir (U.S. Air Force, 2001). Since the Retention Reservoir is a treatment facility, it is not considered a "water of the State" for regulatory purposes.

The northern half of the TNARNG lease area is contained in the Upper Duck River Watershed. Bobo Creek, Hickerson Spring Branch, and Crumpton Creek, are the three primary streams in the Upper Duck River portion of the TNARNG lease area. These streams flow north-northwest before discharging into Normandy Lake, approximately 4 miles to the north. Numerous small, ephemeral or intermittent streams in the TNARNG lease area flow into these larger streams. Figure 3-5 shows water resources within the TNARNG Lease area.

The southern half of the TNARNG lease area is contained in the Upper Elk River Watershed. Spring Creek and Rowland Creek are the primary streams in the Upper Elk River portion of the TNARNG lease area. These streams flow southeast before discharging into the Elk River and Woods Reservoir, respectively, approximately 2 miles to the south (Figure 3-5). Numerous small, ephemeral or intermittent streams in the TNARNG lease area flow into these larger streams. All of the streams in the proposed area are ephemeral or intermittent. These streams and wetlands provide important habitat for a diverse group of amphibians, reptiles, benthic macroinvertebrates, and fish (U.S. Air Force, 2001a; U.S. Air Force, 2006). There are no 303(d) segments found within the TNARNG lease area (TDEC, 2010).

MK-19 Range

The proposed MK-19 Range is entirely within the Upper Elk River Watershed (Figure 3-5). The proposed range is bisected by two unnamed tributaries to Rowland Creek and Woods Reservoir. The combined length of the stream reaches in MK-19 Range is 1.04 miles.

CCRC

The proposed CCRC is almost entirely within the Upper Elk River Watershed (Figure 3-5). There are several unnamed tributaries to Spring Creek, which flow into the Elk River below Woods Dam. A very small portion of the northwest part of the proposed CCRC is in the Upper Duck River Watershed. Drainage in this area would flow into unnamed tributaries to Bobo Creek, which eventually discharges into Normandy Reservoir. In all, there are 6.50 miles of streams in the proposed CCRC.

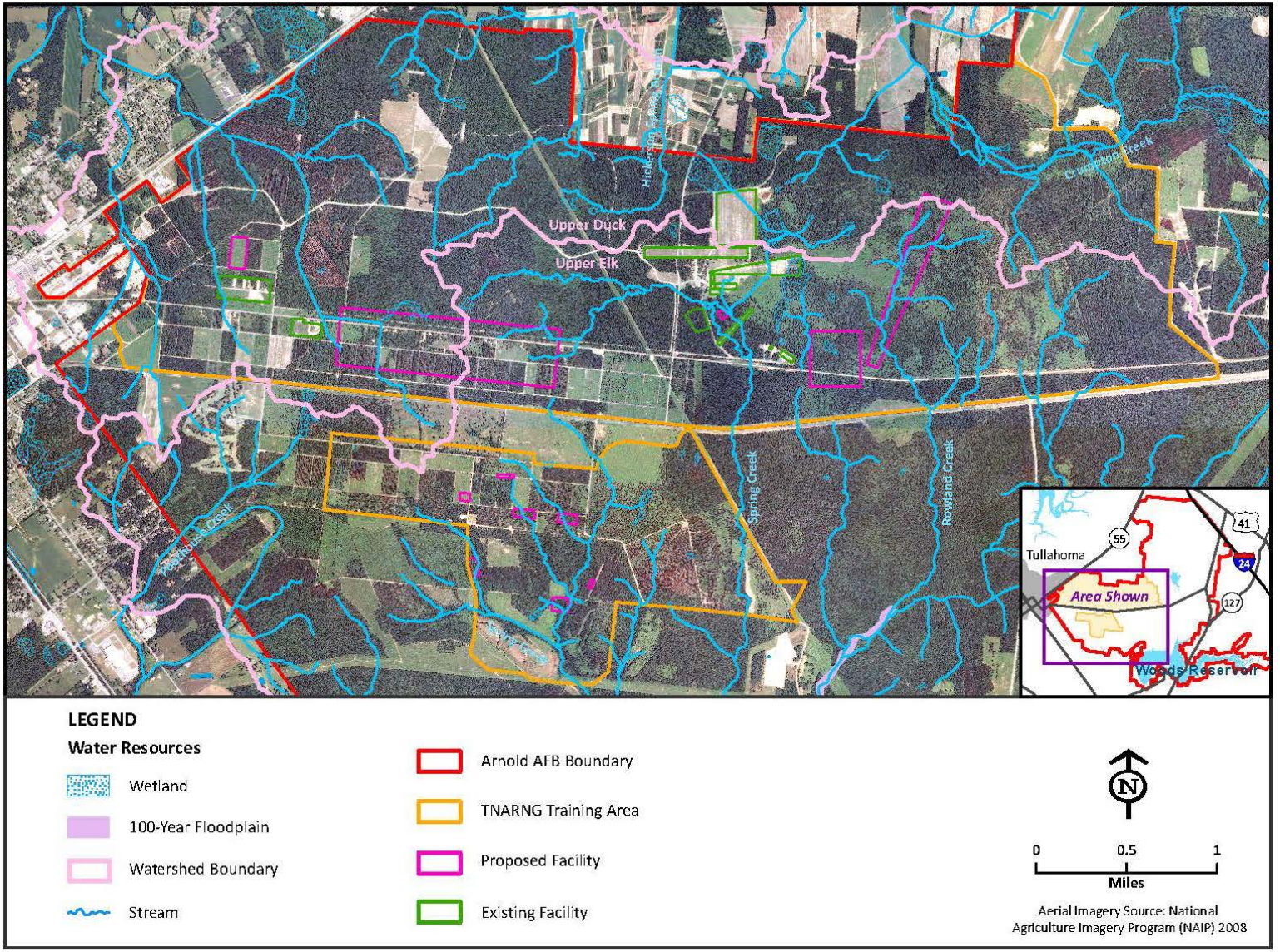

FIGURE 3-5
WATER RESOURCES ASSOCIATED WITH THE PROJECT AREAS
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

Primary CACTF Range

The proposed Primary CACTF Range lies in both the Upper Duck River and Upper Elk River Watersheds (Figure 3-5). The western half of the proposed range includes two unnamed tributaries to Bobo Creek. The eastern half of the proposed Primary CACTF Range includes two unnamed tributaries to Spring Creek, which flows into the Elk River below Woods Dam. The combined length of the four stream reaches in the proposed Primary CACTF Range is 1.20 miles.

Secondary CACTF Range

The proposed Secondary CACTF Range is entirely within the Upper Duck River Watershed (Figure 3-5). There are no mapped streams at the proposed Secondary CACTF Range but drainage in this area would flow into unnamed tributaries to Bobo Creek, which eventually discharges into Normandy Reservoir.

M16 Zero Range

The proposed M16 Zero Range is entirely within the Upper Elk River Watershed (Figure 3-5). There are no mapped streams at the proposed range, but the area is surrounded by unnamed tributaries to Spring Creek.

.50 Caliber Familiarization Range

The proposed .50 Caliber Range is entirely within the Upper Elk River Watershed (Figure 3-5). There are no mapped streams at the proposed range, but the area is surrounded by unnamed tributaries to Rowland Creek, which flows into the Elk River in Woods Reservoir.

Wetlands

Wetlands are defined by the USACE and USEPA as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." Section 404 of the CWA established a program to regulate the discharge of dredged and fill material into waters of the United States, including wetlands.

The USACE, the lead agency in regulating wetland resources, maintains jurisdiction over federal wetlands (33 CFR 328.3) under Section 404 of the CWA and Section 10 of the Rivers and Harbors Act. In addition, EO 11990, Protection of Wetlands, requires federal agencies to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. EO 11990 requires federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable

alternative. TDEC further regulates activities affecting wetlands as part of the Aquatic Resources Alteration Permit program.

There are a total of 1,894 acres of wetlands on Arnold AFB, varying in size from 0.05 acre to 267 acres, the majority of which occur in the northern portion of the base. Prominent on-base wetlands include Sinking Pond, Westall Swamp, Willow Oak Swamp, Tupelo Swamp, and Goose Pond (U.S. Air Force, 2006).

MK-19 Range

There are 1.07 acres of forested jurisdictional wetland in the proposed MK-19 Range (Figure 3-5). This wetland is associated with an unnamed tributary to Rowland Creek (Upper Elk River Watershed).

CCRC

There are six wetlands covering a total of 6.20 acres within the proposed CCRC (Figure 3-5). Four of these wetlands are located in Saltwell Hollow, east of the proposed CCRC. The remaining 1.68 acres include a small headwater wetland on a tributary to Spring Creek and a small isolated wetland affected by one of the existing roads in the former Camp Forrest.

Primary CACTF Range

There are 1.41 acres of forested jurisdictional wetland in the proposed Primary CACTF Range (Figure 3-5). This wetland is associated with an unnamed tributary to Bobo Creek (Upper Duck River Watershed).

Secondary CACTF Range

There are no mapped jurisdictional wetlands at the proposed Secondary CACTF Range (Figure 3-5).

M16 Zero Range

There are no mapped jurisdictional wetlands at the proposed M16 Zero Range (Figure 3-5).

.50 Caliber Familiarization Range

There is a 1.54-acre jurisdictional forested wetland in the proposed .50 Caliber Range (Figure 3-5). This wetland is associated with an unnamed tributary to Spring Creek (Upper Elk River Watershed).

Floodplains

Floodplains are defined by EO 11988, Floodplain Management, as "the lowland and relatively flat areas adjoining inland and coastal waters, including flood-prone areas of offshore islands, including at a minimum, the area subject to a 1 percent or greater chance of flooding in any given year" (that area inundated by a 100-year flood). EO 11988 requires federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative. No floodplains are located within any of the proposed ranges or any other part of the TNARNG lease area (Figure 3-5).

3.7 Air Quality

3.7.1 Definition of Resource

Air quality is determined by the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin and the prevailing meteorological conditions. The levels of pollutants are generally expressed on a concentration basis in units of part per million or micrograms per cubic meter. For this air quality analysis, the ROI is addressed specifically for each Alternative. The ROI used for air quality analysis centers on the county in which the action would take place.

The baseline standards for pollutant concentrations are the National Ambient Air Quality Standards (NAAQS) and state air quality standards. These standards represent the maximum allowable atmospheric concentration that may occur and still protect public health and welfare.

Based on measured ambient air pollutant concentrations, the USEPA designates whether areas of the United States are meeting the NAAQS or not. Those areas demonstrating compliance with the NAAQS are considered "attainment" areas, while those that are not area known as "non-attainment." Those areas that cannot be classified on the basis of available information for a particular pollutant are "unclassifiable" and are treated as attainment until proven otherwise.

For the analysis of the alternatives, a threshold on an individual pollutant-by-pollutant basis was established. The pollutants analyzed are the criteria pollutants: carbon monoxide (CO), nitrogen oxides (NO_x), particulate matter (PM), sulfur dioxide (SO_2), and volatile organic compounds (VOCs). The alternatives are proposed to occur at Arnold AFB. The air quality analysis focuses on the construction and operational aspects of the Proposed Action. The ROI used for the analysis would be Coffee and Franklin Counties in which the action would be occurring.

3.7.2 Existing Conditions

County emissions were obtained from USEPA's 2002 National Emissions Inventory (NEI). These data include emissions data from point sources, area sources, and mobile sources. Point sources are stationary sources that can be identified by name and location. Area sources are point sources whose emissions are too small to track individually, such as a home or small office building or a diffuse stationary source, such as wildfires or agricultural tilling. Mobile sources are any kind of vehicle or equipment with a gasoline or diesel engine, an airplane, or a ship. On-road and non-road are two types of mobile sources. On-road consists of vehicles such as cars, light trucks, heavy trucks, buses, engines, and motorcycles. Non-road sources are aircraft, locomotives, diesel and gasoline boats and ships, personal watercraft, lawn and garden equipment, agricultural and construction equipment, and recreational vehicles (USEPA, 2009).

The proposed actions are to occur on Arnold AFB property, which straddles Coffee and Franklin Counties, Tennessee. Arnold AFB is located in the Tennessee River Valley (Alabama)-Cumberland Mountains (Tennessee) Interstate Air Quality Control Region (AQCR). This analysis uses an ROI of Coffee and Franklin Counties, which are in attainment for all criteria pollutants. The General Conformity Rule requires air emissions impacts to be compared to the AQCR. Although all counties considered in the analysis in are attainment, the General Conformity Rule's impact analysis was utilized to provide a consistent approach to evaluating the impact of construction emissions within the ROI. Baseline emissions for each of the counties are presented in Table 3-6.

TABLE 3-6
BASELINE EMISSIONS FOR COFFEE AND FRANKLIN COUNTIES, TENNESSEE
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

Source Type	*CO*	*NO_x*	*$PM_{2.5}$*	*PM_{10}*	*SO_2*	*VOCs*
Coffee County Emissions Tons/yr						
Area Source	1,042	208	826	3,982	449	1,239
Non-Road Mobile	4,534	565	42	45	56	452
On-Road Mobile	24,374	5,426	82	102	129	1,774
Point Source	143	151	30	39	81	938
Total	30,093	6,350	980	4,169	716	4,403
Franklin County Emissions Tons/yr						
Area Source	1,981	130	1,166	5,116	169	899
Non-Road Mobile	3,223	614	59	62	70	663
On-Road Mobile	10,784	877	15	22	37	870
Point Source	8	27	4	4	0	313
Total	15,995	1,648	1,244	5,204	276	2,744

Source: USEPA, 2002
CO = carbon monoxide; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than 2.5 microns in diameter; PM_{10} = particulate matter less than 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound

Air pollutants are emitted from stationary and mobile source and general maintenance activities, government and privately owned vehicles, jet engine testing, aircraft

operations, prescribed burning, wildfires, and mission test and training operations (U.S. Air Force, 2005). In May 2002 the Tennessee Air Pollution Control Board of the TDEC issued a Title V Operating Permit. This permit covers 26 emission sources currently in compliance (U.S. Air Force, 2005).

3.8 Noise

3.8.1 Definition of Resource

Noise is defined as any unwanted sound. Defining characteristics of noise include sound level (amplitude), frequency (pitch), and duration. Each of these characteristics plays a role in determining the intrusiveness and level of impact of the noise on a noise receptor. The term "noise receptor" is used in this document to mean any person, animal, or object that hears or is affected by noise.

Sound levels are recorded on a logarithmic decibel (dB) scale, reflecting the relative way in which the ear perceives differences in sound energy levels. A sound level that is 10 dB higher than another would normally be perceived as twice as loud while a sound level that is 20 dB higher than another would be perceived as four times as loud. Under laboratory conditions, the healthy human ear can detect a change in sound level as small as 1 dB. Under most nonlaboratory conditions, the typical human ear can detect changes of about 3 dB.

Sound measurement may be further refined through the use of frequency "weighting." The normal human ear can detect sounds that range in frequency from about 20 hertz (Hz) to 20,000 Hz (Federal Interagency Committee on Noise [FICON], 1992). However, all sounds throughout this range are not heard equally well. In "A-weighted" measurements, the frequencies in the 1,000 to 4,000 Hz range are emphasized because these are the frequencies heard best by the human ear. Sound level measurements weighted in this way are termed A-weighted decibels (dBA).

Typically, the sound level at any given location changes constantly; for example, the sound level changes continuously when an aircraft flies by, starting at the ambient (background) level, increasing to a maximum when the aircraft passes closest to the receptor, and then decreasing to ambient levels when the aircraft flies into the distance. The term "maximum sound level" or "L_{max}" represents the sound level at the instant during an aircraft overflight when sound is at its maximum.

Another sound metric used to determine noise exposure is the equivalent sound level (L_{eq}). This is a metric reflecting average continuous sound. The metric considers variations in sound magnitude over periods of time, sums them and reflects, in a single value, the acoustic energy present during the time period considered. Common time periods for averaging are 1-, 8-, and 24-hour periods.

Annoyance is the most common effect of aircraft noise on humans. Aircraft noise often interferes with activities such as conversation, watching television, using a telephone, listening to the radio, and sleeping. This interference often contributes to individuals becoming annoyed. Whether or not an individual becomes annoyed by a particular noise is highly dependent on emotional and situational variables of the listener as well as the physical properties of the noise (Federal Aviation Administration [FAA], 1985). However, when assessed over long periods of time and with large groups of people, a strong correlation exists between the percentage of people highly annoyed by noise and the time-averaged noise exposure level in an area (Finegold et al., 1994). This finding is based on surveys of groups of people exposed to various intensities of transportation noise. A generalized categorization of noise-induced annoyance can be found in Table 3-7.

TABLE 3-7
RELATIONSHIP BETWEEN NOISE LEVEL AND PERCENT OF POPULATION HIGHLY ANNOYED
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

Criteria	*Noise Level*		
A-Weighted Average Noise Levels (Continuous Noise)	< 65 dB	65-75 dB	> 75 dB
C-Weighted Average Noise Levels (Impulsive Noise)	< 62 dBC	62-70 dBC	> 70 dBC
Percent of Population Highly Annoyed	< 15%	15%-39%	>39%

Source: U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), 2005; U.S. Army, 1997
< = less than; > = greater than; dB = decibels; dBC = C-weighted decibels

Based on numerous sociological surveys and recommendations of federal interagency councils, the most common benchmark referred to is the day-night average sound level (DNL) of 65 dBA (Table 3-7). The DNL is a measure of the cumulative noise exposure in a community, with a 10 dB addition to night time (10:00 PM to 7:00 AM) noise levels. This annual average threshold is often used to determine residential land use compatibility around airports, highways, or other transportation corridors.

The USEPA recommends that, to protect public health with an adequate margin of safety, exterior noise levels should not exceed 55 dB DNL and interior noise levels should not exceed 45 dB DNL in noise-sensitive locations (USEPA, 1974). The Federal Interagency Committee on Urban Noise (FICUN) took these recommendations into consideration when developing its recommendations on compatibility of land uses with noise (FICUN, 1980). These recommendations have been adopted, with minor modifications, by the Department of Defense (DoDI 4165.57).

3.8.2 Existing Conditions

The Proposed Action would occur on Arnold AFB, located east of Tullahoma, south of Manchester and northeast of Estill Springs. The ROI for the noise analysis includes Arnold AFB and potential receptors (employees or residents) working or living near the proposed ranges.

Arnold AFB noise environment is made up of natural (e.g., birds or wind) and suburban sounds (e.g., lawn mowing). The airfield at Arnold was reopened in 2000 to support delivery of large test articles and is currently restricted by the Air Installation Compatible Use Zone (AICUZ) to various quantities of specific aircraft for daytime operation. Therefore, aircraft noise is an atypical occurrence (U.S. Air Force, 2005). Vehicular traffic is the dominant source of noise in areas close to arterial and rural roadways (U.S. Air Force, 2001a). In October 1999 ambient noise levels were measured and were found to be 40 dB during daytime and 30 dB or below at night over 24-hour periods at sites west and north of the airfield. Various other locations around Arnold AFB area showed similar levels, with increased noise levels at locations close to rural roads and agricultural activities (U.S. Air Force, 2001a).

Varying levels of noise are generated in the AEDC Industrial Complex area, depending on which test facilities are operating and the types of tests being conducted. Tests generate noise levels ranging from 55 to 122 dBA. Ambient sound environment is typical of urban residential areas (58 to 72 dBA) (U.S. Air Force, 2005). The AEDC generates large noise contours during some of the tests. Sound pressure levels (SPLs) of 100 and 90 dB are contained within the boundaries of Arnold AFB. The 80-dB SPL extends approximately 4 miles from the AEDC Industrial Complex in a circular propagation pattern (U.S. Air Force, 2005). The threshold of discomfort for humans is 120-dB SPL; the average home sound pressure level is 50-dB SPL, and conversational speech is 60-dB SPL. A comparative type of noise at 80-dB SPL would be curbside of a busy road (Tontechnik-Rechner, 2006).

The range area is located approximately 6 miles southwest of the AEDC Industrial Complex and 5 miles southwest of the airfield. Ambient noise levels in this area are approximately 70 dB SPL or less at the various facilities and ranges, and the sound environment consists of occasional gunfire associated with weekend training activities. No complaints associated with gunfire noise have been recorded. Sound levels are primarily natural sounds with upward spikes related to traffic from the nearby Highways 41 and 55 (southwest of the field training site). However, the sound environment is dominated by AEDC activities.

The nearest potential receptors are Spring Creek Baptist Church and a residential area approximately 2 miles southwest of the Primary CACTF site.

3.9 Utility Infrastructure

3.9.1 Definition of Resource

The utilities described and analyzed for potential impact resulting from implementation of the Proposed Action include potable water, wastewater, electricity, and natural gas. The description of each utility and the impact analysis focus on the existing

infrastructure (e.g., wells, water systems, wastewater treatment plants), current utility use, and any pre-defined capacity or limitations as set forth in permits or regulations.

Water that is drinkable by humans is referred to as "potable water." Wastewater is water that has been used and contains dissolved or suspended waste materials. "Electrical supply" refers to the demand on the facilities' electrical substations and distribution system. "Natural gas" refers to the on-base transmission and distribution system and the demand for natural gas to heat facilities.

3.9.2 Existing Conditions

Utility infrastructure at the VTS-T includes electric transmission lines and associated rights-of-way, water, and sewer systems. Electrical, water, and sewer services are provided to the VTS-T cantonment area by the city of Tullahoma Utilities Board (TUB). Natural gas is supplied by the Elk River Public Utilities District.

Electrical power is purchased by TUB from the Tennessee Valley Authority. The TUB provides power through two main 161-kilovolt substations; each main substation has the capacity of 75 megavolt ampere (MVA) and each typically carries a winter peak load of 32 megawatts.

TUB purchases water from the Duck River Utility Commission, whose water source is Normandy Lake. The TUB maintains 260 miles of water mains and eight elevated water storage tanks with a total storage capacity of 4 million gallons. The current water usage for TUB is approximately 2.6 million gallons of water each day.

Wastewater from the VTS-T is discharged to the Tullahoma sanitary sewer system and treated in a wastewater treatment plant operated by the TUB. The plant is designed to receive up to 28 million gallons per day influent flow (with the addition of a 48 million gallons equalization basin) (TUB, 2010).

Electricity and potable water are currently provided to the existing VTS-T firing range complex. Wastewater is discharged into a septic system, and portable toilets are also used.

No specific potable water, wastewater, or energy use is found within the areas proposed for the CACTFs. Electrical transmission lines pass through the area proposed for the CCRC, with at least one facility (Installation Restoration Program [IRP] Solid Waste Management Unit [SWMU] 8) using the electric supply.

3.10 Hazardous Materials / Waste and Solid Waste

3.10.1 Definition of the Resource

Hazardous Materials and Waste Management

Hazardous materials listed under CERCLA and the Emergency Planning and Community Right-to-Know Act (EPCRA) are defined as any substances that, due to quantity, concentration, or physical, chemical, or infectious characteristics, may present substantial danger to public health, welfare, or the environment. Examples of hazardous materials include petroleum products/fuels and paint-related products.

Hazardous wastes listed under the Resource Conservation and Recovery Act (RCRA) are defined as any solid, liquid, or contained gaseous or semisolid waste, or any combination of wastes that pose a substantive present or potential hazard to human health or the environment. In addition, hazardous wastes must meet either a hazardous characteristic of ignitability, corrosivity, toxicity, or reactivity under 40 CFR 261 Identification and Listing of Hazardous Waste or be listed as a waste under 40 CFR 261.

Under the Military Munitions Rule, the USEPA indicates that munitions used for their intended purpose are not considered hazardous waste under RCRA unless the ranges are actively managed and range residue is generated, moved, transported, and/or disposed of.

Affected resources also include the Air Force IRP. The IRP is used by the Air Force to identify, characterize, clean up, and restore sites contaminated with toxic and hazardous substances, low-level radioactive materials, petroleum, oils, lubricants, or other pollutants and contaminants. The IRP has established a process to evaluate past disposal sites, control the migration of contaminants, identify potential hazards to human health and the environment, and remediate the sites.

Solid Waste Management

The affected resources include solid waste generated from range construction activities and metallic debris from range training activities. The primary statute governing solid waste management in Tennessee is the Tennessee Solid Waste Disposal Act, TCA 68-211-101, which establishes the regulation of the collection, transport, storage, separation, processing, recycling, and disposal of solid wastes and requires the development of regulations to govern the listed activities. Air Force regulatory requirements for the management of solid waste are established by the Air Force Policy Directive (AFPD) 32-70 Environmental Quality. This AFPD requires compliance with applicable federal, state, and local environmental laws and standards. For solid waste, AFPD 32-70 is implemented by AFI 32-7042. Additionally, AFI 32-7042 requires that each installation have a solid waste management program that includes a solid waste management plan to address handling, storage, collection, disposal, and reporting of

solid waste. AFI 32-7080 contains the solid waste requirement for preventing pollution through source reduction, resource recovery, and recycling.

3.10.2 Existing Conditions

Hazardous Materials and Waste Management

Arnold AFB is responsible for the management of hazardous materials/waste throughout the installation, including areas outside the established cantonment area. The base has implemented a comprehensive hazardous material management process for the management of hazardous materials. Likewise, the base has implemented a Hazardous Waste Management Plan (HWMP), which establishes the proper procedures for handling, managing, and disposing of all hazardous wastes (U.S. Air Force, 2006a). Munitions residues generated at existing ranges are managed in accordance with the Arnold hazardous waste management requirements as identified in the base HWMP.

Arnold AFB has also developed programs to comply with all federal/state hazardous materials reporting requirements. This effort includes submission to the state and local emergency planning committees/local fire departments of annual Tier II forms, which are updated inventories of hazardous materials (e.g., jet fuel, diesel) or extremely hazardous substances in excess of specific threshold limits.

IRP Sites

Since implementation in 1982, 26 IRP sites have been identified at Arnold AFB. Of those sites, 11 require no further action and are considered closed. Two sites are under investigation, five sites have remedial action underway, and eight of the sites have long-term monitoring and/or Land Use Controls in place (U.S. Air Force, 2005a). IRP sites are regulated under the installation's RCRA Corrective Action Permit and are referred to as SWMUs. The proposed location of the Primary CACTF would be near IRP Sites F1, F2, and F4, while the proposed site of the Secondary CACTF would be located near IRP Sites G6, G14, G8, and G10. The CCRC would be located near SWMU 8, and Sites G18 G19 WP-6 and LF-2 (see Table 3-8 and Figure 3-6). These IRP sites are associated with SWMU 24, the former Camp Forrest Area. Investigations at SWMU 24 have identified numerous areas of soil and groundwater contamination. Corrective measures at these locations include excavation and disposal, groundwater monitoring and institutional controls.

TABLE 3-8
IRP SITES NEAR PROPOSED TRAINING FACILITIES
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

Site	*Description*	*Contaminant of Concern*
Sites G14, G19, F1, F2, F4	Former fuel handling sites with soil contamination only	G14 and G19 had SVOCs in surface soil in excess of cleanup standards. For Sites F1, F2, and F4, the USEPA determined that initial sampling was insufficient. Therefore additional sampling will be conducted to verify site conditions.
Sites G6, G10, G18	Former gas stations with groundwater contamination only	Sites G6, G10, and G18 had benzene in groundwater in excess of cleanup standards.
Site G8	Former gas station with soil and groundwater contamination	G8 had benzene in groundwater and SVOCs in soils in excess of cleanup standards.
LF2	Landfills with soil and source material contamination	LF2 had SVOCs and metals in surface and subsurface soil and sediments in excess of cleanup standards.
SWMU 8	Camp Forrest Water Treatment Plant	Solvents, rocket fuels and acids were released to the subsurface. Groundwater contains chlorinated solvents, with drinking water standards exceeded on-site.
WP-6	Old Camp Forrest Water Treatment Plant	Undergoing Active Remediation Measures for subsurface contamination.

Source: U.S. Air Force, 2006
IRP = Installation Restoration Program; SVOC = semivolatile organic compound; SWMU = solid waste management unit; USEPA = U.S. Environmental Protection Agency

Solid Wastes

Management of solid waste at Arnold AFB is administered under the direction of the AEDC/TSDCA. Collection and disposal of municipal solid waste at this installation is conducted by a private contractor under the direction of the AEDC Contracting Office. The contractor collects and disposes of wastes, at the Middle Point Landfill located in Murfreesboro, Rutherford County, Tennessee, approximately 50 miles from Arnold AFB. Solid waste destined for disposal at the Middle Point Landfill is first transported off-site to a commercially operated transfer station located approximately 11 miles from the base (U.S. Air Force, 2006b). In addition to the management of municipal solid wastes, construction debris from construction and demolition projects is also managed at the base. A construction debris landfill for the disposal of debris from construction and demolition activities is operated on Arnold AFB. The current remaining capacity of this landfill is approximately 48,200 cubic yards (estimated approximately 50,000 tons based on a waste density of approximately 75 pounds per cubic foot for debris disposed) (U.S. Air Force, 2006).

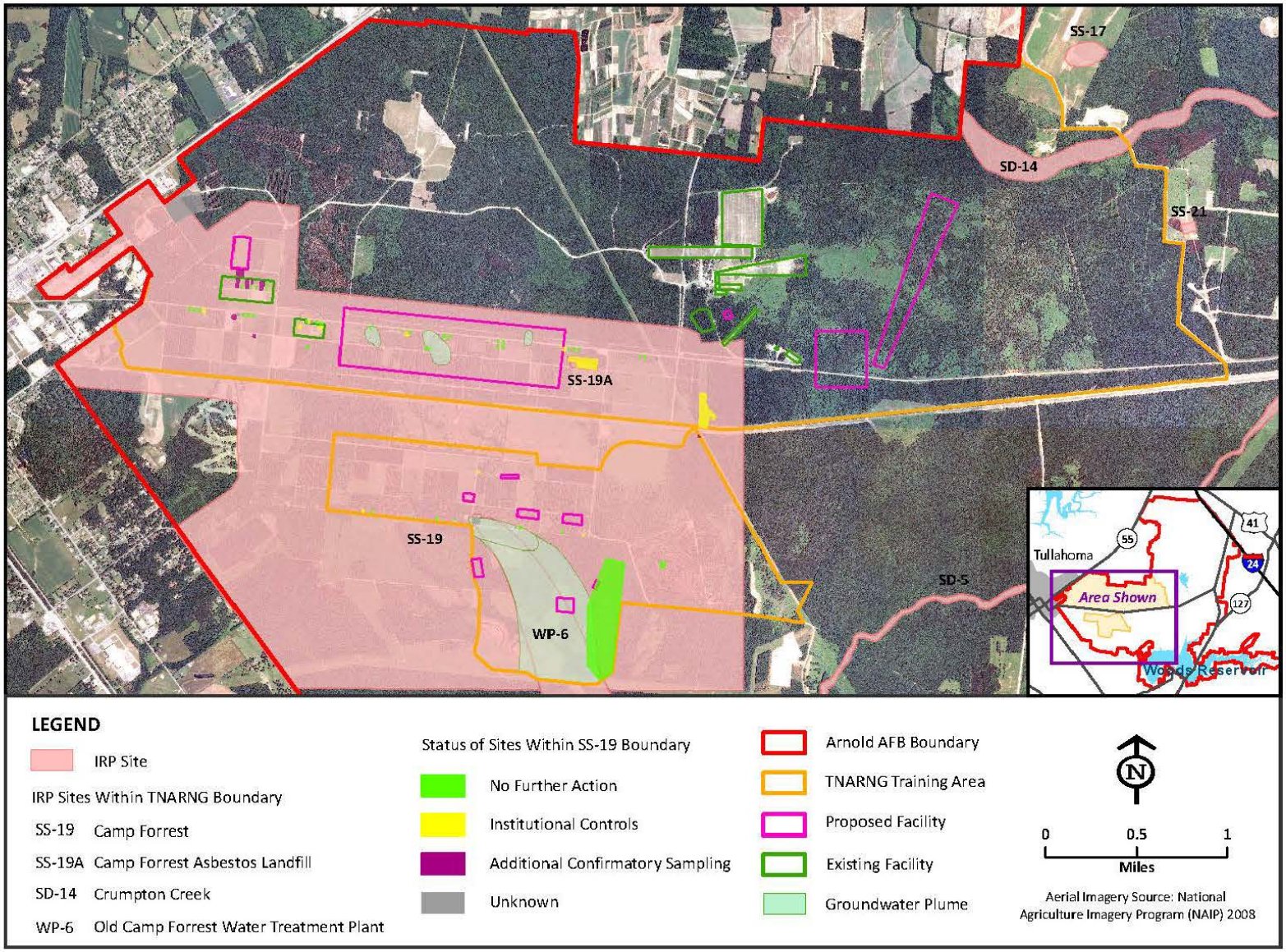

FIGURE 3-6
IRP SITES NEAR PROPOSED TRAINING FACILITIES
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

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4.0 Environmental Consequences

4.1 Land Use

4.1.1 No Action

The No Action Alternative would not result in any additional land use impacts within and adjacent to the proposed six proposed ranges beyond the scope of normal conditions and influences at these locations.

4.1.2 Proposed Action

The Air Force has identified no significant land use impacts from implementation of the Proposed Action.

All of the new training ranges would occur in areas that are relatively undeveloped, and the new activities are not expected to significantly impact land use. The proposed training is consistent with activities associated with military training on, within, or adjacent to existing range areas. The new training areas would continue to be largely unimproved open space with only limited development. Improvements to TNARNG operations would be considered beneficial.

Recreational activities that currently occur in the area may need more management restrictions or may be discontinued. Hunting seasons may be reduced or require areas to be closed off. In addition, restricted access to hunting areas or other recreation sites due to temporary road closures could occur. Since the area that would be potentially affected represents only a small percentage of area currently available for recreational activity the Air Force does not consider these potential restrictions or discontinuations to result in significant impacts due to the large areas that would remain available for recreational purposes.

Direct off-base land use consequences are not anticipated. The nearest off-base land uses are separated by additional VTS-T land and Air Force property and should not be negatively affected. Noise associated with the ranges is not expected to impact land use.

4.1.3 Alternative 1: No Secondary CACTF

Impacts on land use would be similar to those described for the Proposed Action. However, fewer acres of undeveloped open space would be impacted since only the Primary CACTF and the other training ranges would be developed.

4.1.4 Cumulative Impacts

Other than past, present, and continued training by the TNARNG within the leased portion of TNARNG land area, no past, present, or reasonably foreseeable actions have been identified that would interact either spatially or temporally with the land areas or activities associated with the Proposed Action. While other future actions may result in further restrictions or discontinuation of recreational activities on Arnold AFB, the cumulative impact of these restrictions/closures would depend on the scope of the restriction/closure and size of the area. At this time the Air Force anticipates that, since the potential restrictions/closures associated with the Proposed Action are not significant, the Proposed Action would not contribute in any significant manner to incremental recreational restrictions/closures in the future.

4.2 Safety and Occupational Health

4.2.1 No Action

Under the No Action Alternative, Arnold AFB would continue to operate as it does currently, and impacts to safety from the establishment of the proposed range and training facilities would not occur.

4.2.2 Proposed Action

Based on analysis presented below, the Air Force has identified no significant safety or occupational health impacts associated with the Proposed Action.

Range Operations

As part of the Proposed Action, construction of new firing ranges would incorporate appropriate security and safety features in accordance with AFI 32-1023 and AFI 36-2226. These would include controlling and preventing access to restricted areas by unauthorized persons, construction of barriers (e.g., fences), limiting personnel and vehicle access to designated entrances/exits, the use of personnel identification and control systems, and the employment of security forces as appropriate. The SDZs associated with the firing ranges would be contained entirely within the base boundary. Additionally, munitions storage associated with proposed training activities would be accommodated by existing explosives storage facilities on the base and would be in compliance with all established safety standards. Range design would require coordination with Arnold AFB Fire Emergency Services to determine requirements for fire support services. Implementation of these established measures would minimize the potential for any adverse impacts, and the Air Force does not anticipate any significant impacts associated with range operations.

Construction Safety and Occupational Health

Several facilities would be constructed as part of the Proposed Action, including building and parking areas. All actions would be accomplished by technically qualified personnel and would be conducted in accordance with applicable Air Force safety requirements, approved technical data, and AFOSH standards. No unique construction practices or materials are required to construct these facilities. During construction, standard industrial safety standards and best management practices (BMPs) would be followed. These would include: implementing procedures to ensure that guards, housekeeping, and personal protective equipment are in place; establishing programs and procedures for lockout, right-to-know, hearing conservation, forklift operations, etc.; conducting employee safety orientations and performing regular safety inspections; and developing a plan of action for the correction of any identified hazards. No unusual safety risks are expected from these activities.

Proposed construction activities would not occur in areas of Arnold AFB known to be historic impact areas; minimizing the potential for encountering munitions residue or UXO. However, to further mitigate any potential adverse impacts from UXO, consultation and coordination with range safety personnel would be required before beginning land-clearing or construction activities. In addition, if UXO or other potential hazards were discovered during construction, activities in that area would be stopped immediately and the Safety Office would be contacted. Consequently, no significant adverse impacts would be expected.

4.2.3 Alternative 1: No Secondary CACTF

The environmental consequences for projects associated with the Alternative 1 would be the same as those described under the Proposed Action. As such, no significant adverse impacts would occur.

4.2.4 Cumulative Impacts

Other than past, present, and continued training by the TNARNG within the leased portion of TNARNG land area, no past, present, or reasonably foreseeable actions have been identified that would interact either spatially or temporally with the land areas or activities associated with the Proposed Action. The Proposed Action would contribute to the inherent safety risks associated with firing ranges and training activities at Arnold AFB; however, these risks are not expected to cause significant impacts to safety since there are standard controls in place. Therefore, no significant adverse cumulative safety impacts are expected with the implementation of the Proposed Action.

4.3 Biological Resources

4.3.1 No Action

The No Action Alternative would not result in any additional impacts to the environment within and adjacent to the proposed TNARNG range locations beyond the scope of normal conditions and influences at these locations.

4.3.2 Proposed Action

Based on analysis presented below, the Air Force has identified no significant impacts from the Proposed Action to biological resources.

Development of the Proposed Ranges

Development of the proposed MK-19 Range and associated infrastructure could require clearing as much as 70.58 acres of existing habitat to accommodate the new range facilities and gravel parking area for loading/unloading soldiers. All of the area is sensitive habitat (global rank G1, G2, or G3). This represents approximately 1.5 percent of the total sensitive habitat within the TNARNG leased area. To the extent practicable ground disturbance would be minimized, and only large tree removal would occur to allow for clear line of site to target areas. This would serve to minimize impacts to this area. While there would be adverse impacts to this sensitive habitat, impacts are not expected to be significant given the relatively large areas of sensitive habitat located on the installation.

Development of the proposed CCRC and associated infrastructure could require clearing as much as 17.65 acres of existing habitat to accommodate the new target facilities. This includes 10.46 acres of pine plantations and 7.19 acres of sensitive forest and woodland habitat (global rank G1, G2, or G3). This represents less than 1 percent of the total sensitive habitat within the TNARNG leased area. To the extent practicable proposed target areas would be placed to avoid disturbance to these sensitive communities. As a result, significant impacts are not expected at this area.

Development of the proposed Primary CACTF and associated infrastructure could require clearing as much as 9.72 acres of existing pine plantation to accommodate the new range facilities and roads. There is no sensitive habitat present at the Primary CACTF Range. Impacts to wildlife species (such as deer and squirrels) in the area are not expected to be significant; the proposed land area is not quality habitat and is small,

given the large land area available for species to migrate to. Any animals that currently reside in the proposed Primary CACTF area would migrate to other locations at Arnold AFB.

Development of the proposed Secondary CACTF Range and associated infrastructure could require clearing as much as 2 to 3 acres of existing pine plantation and previously disturbed lands to accommodate the new target facilities. No nearby sensitive communities, wetlands, or streams would be adversely impacted by these activities. Impacts to wildlife species (such as deer and squirrels) in the area are not expected to be significant; the proposed land area is not quality habitat and is small, given the large land area available for species to migrate to. Any animals that currently reside in the proposed Secondary CACTF area would migrate to other locations at Arnold AFB.

Development of the proposed M16 Zero Range and associated infrastructure could require clearing as much as 1 acre of existing habitat to accommodate the new range facilities and gravel parking area for loading/unloading soldiers. All of the area is sensitive habitat (global rank G3). This represents less than 1 percent of the total sensitive habitat within the TNARNG leased area. Ground disturbing activities in this area would be minimized to the extent practicable to lessen impacts to sensitive habitat. No significant impacts are anticipated.

Development of the proposed .50 Caliber Range would disturb approximately 2.5 acres of relatively undisturbed hardwood forest. All of the area is sensitive habitat (global rank G1, G2, or G3). This represents less than 1 percent of the total sensitive habitat within the TNARNG leased area. Ground disturbing activities in this area would be minimized to the extent practicable to minimize impacts to sensitive habitat, and no significant impacts are anticipated.

Some sensitive species and general wildlife in the areas to be cleared could be killed or injured during range construction, especially if mechanized equipment is used. Animals like northern pine snake and slender glass lizard would be at greatest risk. These instances of injury or mortality would be expected to be limited in occurrence and would not contribute to the decline of any sensitive species populations and are not considered significant. A training program for construction crews and military users of CCRC and other TNARNG facilities identifying sensitive species avoidance and encounter minimization procedures could further minimize adverse impacts to sensitive animal and plant species. Signage could also be used to alert and remind course participants about the presence of sensitive species such as northern pine snake and glass lizard.

Stream habitat for the flame chub is identified in Crumpton Creek, Spring Creek, and their larger tributaries. Part of the proposed MK19 Range includes several hundred feet of an intermittent tributary to Spring Creek. At least five of the proposed target locations at the CCRC also straddle or are located adjacent to small tributaries to Spring Creek. Range development within these areas could result in erosion impacts to the

waterways, thus adversely impacting the flame chub's habitat. However, any construction in or near these areas would require special considerations to minimize any indirect impacts, such as erosion and runoff (further discussed in the Soils and Water Quality sections). Other RTE occurrences, as well as flame chub habitat, also require a 30-meter buffer per the Arnold AFB INRMP. Range development in or near these water bodies would be avoided as part of the Proposed Action in order to minimize any potential direct adverse impacts to the species and its habitat. As a result, no significant impacts are anticipated.

Based on previous and current Arnold AFB sensitive species survey and monitoring results, the Air Force does not anticipate any impacts to sensitive species. As stated in Chapter 3, the USFWS identified concerns regarding potential impacts to the Indiana bat since the area falls within the bat's suitable habitat range. In addition, the USFWS noted that the presence of a juvenile Indiana bat was previously reported during the summer of 2010 at a site located less than 5 miles away from the proposed project sites (see Appendix A). Arnold AFB conducted a species survey and demonstrated the probable absence of Indiana bats within the proposed project areas (U.S. Air Force, 2012). Nevertheless, the USFWS recommends that the removal of trees within the project areas be accomplished during the species' hibernation season (between 15 October and 31 March) to avoid a potential adverse impact to the species during roosting season. The Air Force will implement this recommendation.

Impacts to fish like the flame chub would be controlled by locating range facilities away from riparian zones and restricting stream crossings to existing culverted locations within Crumpton Creek, Spring Creek, and their tributaries in order to protect flame chub habitat.

There is a slight risk that sparks from mechanized equipment used to clear the ranges and parking areas could start a wildfire in times of high fire danger. This risk would be controlled by standard Arnold AFB protocols ensuring that all mechanized equipment and military vehicles have fully functional mufflers, spark arrestors, or the equivalent, and that clearing is not done during times of high fire danger. As a result, this risk is considered insignificant.

There is a moderate risk that IPP species could be introduced into areas disturbed by construction of the range system and associated facilities. Standard Arnold protocol requires all military vehicles, construction vehicles, trailers, and towing vehicles to be clean and free of soil and IPP seeds and parts before they come on base. As a result, this risk is considered insignificant.

Operation

Impacts associated with operation of ranges would be similar to, but of smaller in scope, for the impacts described for construction. Increased vehicular traffic would increase risks of mortality to sensitive species, especially animals like northern pine

snake and slender glass lizard that may occasionally stray onto roads and be run over by military vehicles. While this risk is hard to quantify and likely not significant, a training program to increase awareness of sensitive animal and plant species for military users of CCRC and other TNARNG facilities could further minimize adverse impacts to these sensitive species. The potential for an animal strike from firing activities, the probability of which is difficult to quantify, is anticipated to be insignificant; most animals would tend to avoid the area once firing activities commence, and the chance of a strike is less than significant.

There may be slight wildfire risks associated with military vehicle operation on ranges. Wildfire risks would be controlled by ensuring that all military vehicles have functional mufflers, spark arrestors, or the equivalent, and that operation of military vehicles during times of high fire danger is restricted or otherwise monitored closely. Given that TNARNG and Arnold AFB have protocols in place for addressing wildfire risk, the potential for adverse impacts associated with wildfire is anticipated to be insignificant.

There is a moderate risk that IPP species could be introduced into areas disturbed by the range traffic. Standard Arnold AFB protocols requiring all military vehicles, trailers, and towing vehicles to be clean and free of soil and IPP seeds and parts before they come on base would reduce this risk to less than significant. As part of the Arnold AFB INRMP protocols, Arnold would conduct periodic monitoring to identify whether IPP species are invading the ranges, etc.

Maintenance

Impacts from maintenance would be similar to those described from construction and operation of the range systems and associated parking areas. Consequently, no significant impacts have been identified.

4.3.3 Alternative 1: No Secondary CACTF

Alternative 1 is the same as the Proposed Action, with the exception of the Secondary CACTF, which would not be developed. Thus, the impacts would be similar to those described for the Proposed Action with the exception that no training or development would occur in the proposed Secondary CACTF Range area. Impacts associated with construction of the proposed ranges would be similar to those described for the Proposed Action. However, total area disturbed would be less since the Secondary CACTF Range would not be developed. No significant impacts associated with Alternative 1 have been identified.

4.3.4 Cumulative Impacts

Cumulatively, the Proposed Action has the potential to result in the disturbance 81.27 acres of sensitive habitat (global rank G1, G2, or G3). This represents approximately less than 2 percent of the total sensitive habitat within the TNARNG

leased area at Arnold AFB. No other activities disturbing sensitive habitat within the TNARNG leased area or at Arnold AFB as a whole. As a result, no cumulative impacts to sensitive species or habitat are anticipated.

4.4 Cultural Resources

4.4.1 No Action

The No Action Alternative would not result in any additional impacts to the environment within and adjacent to the proposed TNARNG range locations beyond the scope of normal conditions and influences at these locations.

4.4.2 Proposed Action

The Air Force has not identified any impacts to cultural resources. All areas have been surveyed within areas proposed for TNARNG range expansion and no sites determined to be eligible or potentially eligible for the NRHP have been identified within the APE (U.S. Air Force, 2007). Therefore, the Air Force has determined that there would be no impact to cultural resources. As part of the NHPA Section 106 process, on 10 June 2011 the Air Force notified the Tennessee SHPO of the intended project and the Air Force's determination that no historic properties would be affected. The SHPO concurred with this finding on 15 June 2011. Additionally, the Air Force provided copies of the Draft EA to the Native American Tribes for review indicating that no historic properties are affected. The following Native American Tribes responded that no impacts to religious, cultural, or historical assets of the associated tribes would be affected: Alabama-Coushatta Tribe of Texas; Choctaw Nation of Oklahoma; Chickasaw Nation of Oklahoma; and Eastern Band of Cherokee Indians. SHPO correspondence and tribal correspondence received on the EA is included in Appendix A.

As per 36 CFR 800.13, in the event that historic resources are discovered during construction or subsequent training activities, the Arnold AFB Cultural Resources Manager and the Cultural Resources Division must be notified immediately and all activities must cease in the immediate vicinity until further determination is made by the Arnold AFB Cultural Resources Manager and appropriate consultation requirements with the SHPO are completed. Additionally, as per the ICRMP for Arnold AFB (U.S. Air Force, 2007), under Standard Operating Procedure (SOP) #6, should human remains or associated or unassociated cultural objects be inadvertently discovered, all work shall cease immediately, and the site supervisor would notify the base Cultural Resources Manager to determine if the Native American Graves Protection and Repatriation Act applies.

4.4.3 Alternative 1: No Secondary CACTF

Under Alternative 1, projects under consideration are the same as the Proposed Action with the exclusion of the Secondary CACTF. As no NRHP-eligible resources are located in any of the project areas described in detail in the Proposed Action section, no adverse effects to cultural resources would be expected as a result of Alternative 1. Provisions for consultation efforts and unexpected discoveries are identical to those discussed under the Proposed Action.

4.4.4 Cumulative Impacts

No impacts to cultural resources would occur from the Proposed Action or alternatives. As a result, the Proposed Action would not contribute in any cumulative manner to other projects in the area that may result in impacts to cultural resources at Arnold AFB. For any activity, Arnold AFB would be notified through the EIAP process and proper prior action would be taken to prevent or minimize impacts to cultural resources.

4.5 Geomorphology and Soils

4.5.1 No Action

Under the No Action Alternative, none of the actions described in the Proposed Action or Alternative 1 would occur. Any other future projects proposed for these areas would follow BMPs as discussed in Chapter 5.0. As a result, no impacts to geology or soils would be expected under the No Action Alternative.

4.5.2 Proposed Action

The six projects that comprise the Proposed Action would not result in any significant impact to soil resources.

No impact to underlying geology would result from the Proposed Action. The moderately permeable Dickson soils and relatively flat terrain at the project site minimize potential erosion. Soil excavations, removal of vegetation and trees, graveling, grading, and construction activities have the potential to disturb soil stability and increase the susceptibility of soil particles to suspension and transport by wind and water. However, the distance of the proposed project from major waterways in conjunction with the well vegetated landscape surrounding the project area serves to minimize the potential for the sedimentation of area streams. It is expected that natural areas disturbed during construction would be landscaped or returned to a natural state within one year. Several proposed ranges are over 1 acre in size and would therefore require a NPDES permit for land-clearing activities. As a result, land clearing and site preparation would be required to follow permit-related BMPs as part of the Proposed

Action. These permit-related BMPs are discussed in Chapter 5.0. Consequently, the Air Force does not anticipate significant impacts to soils from the Proposed Action.

4.5.3 Alternative 1: No Secondary CACTF

Under Alternative 1, the array of projects is the same as the Proposed Action with the exclusion of the Secondary CACTF. As a result of less project footprints, reduced ground disturbance would occur and no impacts would be expected to occur to geology or soils.

4.5.4 Cumulative Impacts

Cumulative impacts with regard to soil compaction, disturbance, and erosion would be minimal. The Proposed Action involves land disturbance, clearing of vegetation, and exposure of soils to increased erosion potential. Requirements for containing soil erosion have been identified for these actions. No other projects have been identified in close proximity to the Proposed Action or as having a cumulative impact on soils. Any future planned projects would need to follow Management Practices as per the Tennessee Erosion and Sediment Control Handbook (TDEC, 2002) to prevent future or cumulative impacts to soils.

4.6 Water Quality and Hydrology

4.6.1 No Action

The No Action Alternative would not result in any additional impacts to the environment within and adjacent to the proposed six proposed ranges beyond the scope of normal conditions and influences at these locations.

4.6.2 Proposed Action

No significant impacts to water quality and hydrology have been identified as a result of activities associated with the Proposed Action.

Land-clearing for the proposed ranges may require removing large trees and other vegetation which, in turn, could result in saturated surface soils at times of heavy precipitation, especially during wet seasons. However, implementation of standard Arnold AFB INRMP protocols during range development and maintenance would reduce these impacts to less than significant. Such protocols require that as much native, herbaceous vegetation as possible be left, subject to periodic and timely mowing coordinated with Air Force natural resource conservation staff. Proposed range development and maintenance would also emphasize the retention of compatible native vegetation to avoid conditions where bare ground and subsoil are constantly exposed. The use of heavy equipment operation in all wetlands and seasonally wet areas would

be avoided since even ruts can change local hydrology in such areas of very low topographic relief. As discussed in Section 4.5, as part of the Proposed Action an NPDES permit would be required for clearing areas greater than or equal to 1 acre in size, and BMPs would be required to prevent stormwater and soil erosion runoff from construction sites into streams and wetlands.

MK-19 Range

The proposed construction of new roads and training facilities for the MK-19 Range would disturb approximately 2.5 acres of relatively undisturbed hardwood forest. Because the proposed area of disturbance is more than 1 acre in size, development would require an NPDES construction permit through coordination with TDEC. TNARNG would need to submit an erosion and sedimentation control plan (Chapter 5.0) that incorporates specific conservation and engineering practices or mitigations. Implementation of required permit conditions under the Proposed Action would ensure that no significant impacts occur.

There are 1.04 miles of streams and 1.07 acres of forested jurisdictional wetlands in the proposed MK-19 Range. No construction or training activities would occur in streams or wetlands. However, these areas may be periodically mowed for range maintenance activities as is typically done on Arnold AFB. These activities would not constitute dredge and fill activities and would therefore not require a wetland permit and would not significantly impact these areas.

CCRC

No new roads are proposed within the proposed CCRC. The proposed construction of new target facilities for the CCRC would likely disturb less than 1 acre of existing vegetation. Because the proposed area of disturbance is less than 1 acre in size, development would likely not require an NPDES construction permit through coordination with TDEC. Nevertheless it would be advisable for TNARNG to prepare an erosion and sedimentation control plan that incorporates specific conservation and engineering practices or mitigations to avoid impacts to streams and wetlands.

As noted in Section 3.6, there are a combined total of 6.50 miles of streams and 6.20 acres of wetlands in the proposed CCRC; these would not be directly affected by the Proposed Action. No streams or wetlands are located in areas that would be disturbed to construct any new training facilities. In all, there are nine stream crossings on the proposed CCRC route. All proposed training would utilize existing roads; no new roads would be constructed. Similarly all stream crossings utilize existing culverts, and no additional stream alteration would be needed. Nevertheless, uncontrolled erosion from disturbed areas could migrate into nearby streams and wetlands resulting in indirect impacts through sedimentation. Implementation of standard Arnold AFB

INRMP protocols, such as stream and wetland buffer zones, would minimize or prevent these impacts. As a result, the Air Force does not anticipate any significant impacts.

Primary CACTF Range

The proposed construction of new roads and training facilities for the Primary CACTF Range would disturb approximately 2 to 3 acres of existing pine plantation and previously disturbed lands. Because the proposed area of disturbance is more than 1 acre in size, development would require an NPDES construction permit through coordination with TDEC. TNARNG would need to submit an erosion and sedimentation control plan that incorporates specific conservation and engineering practices or mitigations.

As noted in Section 3.6, there are 1.20 miles of streams and 1.41 acres of wetlands in the proposed Primary CACTF Range. No streams or wetlands are located in areas that would be disturbed to construct any new training facilities. All proposed training would utilize existing roads; no new roads would be constructed. Similarly all stream crossings utilize existing culverts and no additional stream alteration would be needed. However, uncontrolled erosion from disturbed areas could migrate into nearby streams and wetlands resulting in indirect impacts through sedimentation. Implementation of standard Arnold AFB INRMP protocols, such as stream and wetland buffer zones, would minimize or prevent these impacts. Therefore, the Air Force does not anticipate any significant impacts.

Secondary CACTF Range

The proposed construction of new roads and training facilities for the proposed Secondary CACTF Range would disturb approximately 3.5 acres of existing pine plantation. Because the proposed area of disturbance is more than 1 acre in size, development would require an NPDES construction permit through coordination with TDEC. TNARNG would need to submit an erosion and sedimentation control plan that incorporates specific conservation and engineering practices or mitigations.

As noted in Section 3.6, there are no streams or wetlands in the proposed Secondary CACTF Range area. Nevertheless, uncontrolled erosion from disturbed areas could migrate into nearby streams and wetlands resulting in indirect impacts through sedimentation. Implementation of standard Arnold AFB INRMP protocols such as stream and wetland buffer zones will minimize or prevent these impacts. Consequently, the Air Force does not anticipate any significant impacts.

M16 Zero Range

The proposed construction of new roads and training facilities for M16 Zero Range would disturb approximately 2.5 acres of relatively undisturbed hardwood forest.

Because the proposed area of disturbance is more than 1 acre in size, development would require an NPDES construction permit through coordination with TDEC. TNARNG would need to submit an erosion and sedimentation control plan that incorporates specific conservation and engineering practices or mitigations.

There are no streams or wetlands at the proposed M16 Zero Range. However, there are portions of two unnamed tributaries to Spring Creek that surround the proposed range. Any uncontrolled erosion from disturbed areas could migrate into nearby streams, resulting in indirect impacts from sedimentation. Implementation of standard Arnold AFB INRMP protocols, such as stream and wetland buffer zones, would minimize or prevent these impacts. As a result, the Air Force does not anticipate any significant impacts.

.50 Caliber Familiarization Range

The proposed construction of new roads and training facilities for the .50 Caliber Range would disturb approximately 2.5 acres of relatively undisturbed hardwood forest. Because the proposed area of disturbance is more than 1 acre in size, development would require an NPDES construction permit through coordination with TDEC. TNARNG would need to submit an erosion and sedimentation control plan that incorporates specific conservation and engineering practices or mitigations.

There are no streams at the proposed .50 Caliber Range, but there is one forested wetland at the site. The wetland would be avoided during construction of the proposed facility. During training exercises and range maintenance activities, the use of heavy equipment operation in all wetlands would be avoided since even ruts can change local hydrology in such areas of very low topographic relief. There is a portion of an unnamed tributary to Rowland Creek west of the proposed range. Any uncontrolled erosion from disturbed areas could migrate into nearby streams or wetlands. Implementation of standard Arnold AFB INRMP protocols, such as stream and wetland buffer zones, would minimize or prevent these impacts. Therefore, the Air Force does not anticipate any significant impacts.

4.6.3 Alternative 1: No Secondary CACTF

Alternative 1 is the same as the Proposed Action, with the exception of the Secondary CACTF Range, which would not be developed. Thus, the impacts would be similar to those described for the Proposed Action with the exception that no training or development would occur in the proposed Primary CACTF Range area.

4.6.4 Cumulative Impacts

None of the Proposed Action activities would result in any adverse impacts to water resources at Arnold AFB. As a result, the Proposed Action would not contribute in a cumulative manner to other activities on or near Arnold AFB that may affect water resources.

4.7 Air Quality

In order to evaluate the air emissions and their impact to the overall ROI, the emissions associated with the project activities were compared to the total emissions on a pollutant-by-pollutant basis for the ROI's 2002 NEI data. Potential impacts to air quality are identified as the total emissions of any pollutant that equals 10 percent or more of the ROI's emissions for that specific pollutant. The 10-percent criterion approach is used in the General Conformity Rule as an indicator for impact analysis for non-attainment and maintenance areas. Although all counties considered in the analysis are attainment, the General Conformity Rule's impact analysis was utilized to provide a consistent approach to evaluating the impact of construction emissions. To provide a more conservative evaluation, the impacts screening in this analysis used a more restrictive criteria than required in the General Conformity Rule. Rather than comparing emissions from construction, field training activities, and additional personnel (increased vehicular emissions) to regional inventories (as required in the General Conformity Rule), emissions were compared only to the appropriate counties in which the actions occur and may potentially be impacted, which is a smaller area.

A DoD-developed model, the Air Conformity Applicability Model (ACAM), used by the Air Force for conformity evaluations was utilized to provide a level of consistency with respect to emissions factors and calculations. Air emissions estimated using ACAM were compared to the established 10-percent criterion for the appropriate counties as represented in the USEPA 2002 NEI (USEPA, 2002). Air quality analysis focused on emissions associated with the construction activities, field training, and the increase in personnel generated by the Proposed Action and Alternatives.

The analysis for each of the Alternatives includes emissions from land-clearing/grading activities, construction, vehicle emissions from training activities, and munitions emissions. For the analysis of the Proposed Action, a threshold on an individual pollutant-by-pollutant basis has been established.

4.7.1 No Action

Under the No Action Alternative new or increased training would not occur at Arnold AFB; thus, the air quality in the ROI would not change from current levels. No impacts to air quality would occur.

4.7.2 Proposed Action

No significant air quality impacts have been identified under the Proposed Action.

MK-19 Range

The MK-19 Range would be constructed in two phases: grading and land clearing during Phase I and construction of structures would occur in Phase II. Emissions for the MK-19 Range are divided into construction emissions during Phase I and II, vehicle emissions, and munitions emissions (Table 4-1). All emissions are compared against both Coffee and Franklin County emissions because the range is right along the county lines. Emissions would be greatest from Phase I grading activities for particulate matter less than 10 microns in diameter (PM_{10}), causing a temporary, short-term increase of 5 and 6 percent for Franklin and Coffee Counties respectively. Emissions were calculated assuming no dust control measures would be used. Once grading and land disturbance is completed, the particulate matter is expected to return to baseline levels. Overall emissions from construction, vehicles, and munitions associated with the MK-19 Range would be less than significant and have little effect on air quality in the ROI.

TABLE 4-1
MK-19 RANGE EMISSIONS
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

Source Category	*Pollutants (tons/year)*					
	CO	*NO_x*	*$PM_{2.5}$*	*PM_{10}*	*SO_2*	*VOCs*
Coffee County	30,093	6,350	980	4,169	716	4,403
Franklin County	15,995	1,648	1,244	5,204	276	2,744
Construction Emissions Phase I						
Grading Equipment	2.503	9.419	--	0.774	0.956	1.001
Grading Operations	0.000	0.000	--	276.185	0.000	0.000
Total	2.503	9.419	0.000	276.959	0.956	1.001
Percent Coffee County	*0.01%*	*0.15%*	*0.00%*	*6.64%*	*0.13%*	*0.02%*
Percent Franklin County	*0.02%*	*0.57%*	*0.00%*	*5.32%*	*0.35%*	*0.04%*
Construction Emissions Phase II						
Mobile Equipment	0.023	0.055	--	0.004	0.007	0.005
Non-Residential Arch. Ctgs	0.000	0.000	--	0.000	0.000	0.015
Stationary Equipment	0.155	0.004	--	0.000	0.000	0.006
Workers' Trips	0.002	0.000	--	0.000	0.000	0.000
Facility Heating	0.001	0.001	--	0.000	0.000	0.000

TABLE 4-1
MK-19 RANGE EMISSIONS, CONT'D
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

Total	0.182	0.060	0.000	0.005	0.007	0.026
Percent Coffee County	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
Percent Franklin County	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
Vehicle Emissions						
HMMWV (1-1/4 Ton)	0.000	0.001	0.000	0.001	0.000	0.001
Percent Coffee County	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*
Percent Franklin County	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*
Munition Emissions						
40mm Practice Grenade	0.052	0.194	0.002	0.003	0.000	0.000
Percent Coffee County	*0.000%*	*0.003%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*
Percent Franklin County	*0.000%*	*0.012%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*

Arch. ctgs = architectural coatings; CO = carbon monoxide; HMMWV = high-mobility multipurpose wheeled vehicle; mm = millimeters; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than 2.5 microns in diameter; PM_{10} = particulate matter less than 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound

CCRC

This course would utilize existing infrastructure, so no construction or clearing would be necessary. Emissions for the use of high-mobility multipurpose wheeled vehicles (HMMWVs) or M998 trucks and 5.56-mm blank munitions were calculated and compared to the county emissions (Table 4-2). Operational emissions from the CCRC would have a less than significant impact on air quality.

TABLE 4-2
CCRC AIR QUALITY EMISSIONS
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

Source Category	*Pollutants (tons/year)*					
	CO	*NO_x*	*$PM_{2.5}$*	*PM_{10}*	*SO_2*	*VOCs*
Coffee County	30,093	6,350	980	4,169	716	4,403
Franklin County	15,995	1,648	1,244	5,204	276	2,744
Vehicle Emissions						
HMMWV (1-1/4 Ton)	0.011	0.008	0.003	0.008	0.001	0.005
Percent Coffee County	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*
Percent Franklin County	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*
Munition Emissions						
5.56-mm Blank	0.09	0.0028	0.002	0.002	0.000	0.000
Percent Coffee County	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*
Percent Franklin County	*0.001%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*

CO = carbon monoxide; HMMWV = high-mobility multipurpose wheeled vehicle; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than 2.5 microns in diameter; PM_{10} = particulate matter less than 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound

Primary and Secondary CACTF Ranges

To implement the CACTF Ranges, some grading and land clearing would be required to create the road network and gravel pads for the prefabricated buildings, including

the 12 SEVAN sites. Vehicle and munitions emissions were also calculated and are summarized in Table 4-3. Emissions would be greatest for particulate matter from grading operations. Grading operations would cause short-term and temporary increases in dust in the area, which would return to baseline levels once grading is complete. Emissions resulting from the development and operation of the Primary and Secondary CACTF ranges would not be significant.

TABLE 4-3
CACTF AIR QUALITY EMISSIONS
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

Source Category	*Pollutants (tons/year)*					
	CO	*NOx*	*$PM_{2.5}$*	*PM_{10}*	*SO_2*	*VOCs*
Coffee County	30,093	6,350	980	4,169	716	4,403
Franklin County	15,995	1,648	1,244	5,204	276	2,744
Construction Emissions Phase I						
Grading Equipment	0.551	2.072	0.000	0.170	0.210	0.220
Grading Operations	0.000	0.000	0.000	60.761	0.000	0.000
Total	0.551	2.072	0.000	60.931	0.210	0.220
Percent Coffee County	*0.00%*	*0.03%*	*0.00%*	*1.46%*	*0.03%*	*0.01%*
Percent Franklin County	*0.00%*	*0.13%*	*0.00%*	*1.17%*	*0.08%*	*0.01%*
Vehicle Emissions						
HMMWV (1-1/4 Ton)	0.000	0.008	0.003	0.008	0.001	0.005
Percent Coffee County	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*
Percent Franklin County	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*
Munition Emissions						
5.56-mm Blank	0.09	0.0028	0.002	0.002	0.000	0.000
Percent Coffee County	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*
Percent Franklin County	*0.001%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*

CACTF = Combined Arms Collective Training Facility; CO = carbon monoxide; HMMWV = high-mobility multipurpose wheeled vehicle; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than 2.5 microns in diameter; PM_{10} = particulate matter less than 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound

M16 Zero Range

The M16 Zero Range construction would require both site preparation (land clearing and grading) and construction activities. Vehicle use primarily would consist of transporting personnel to and from the range. The use of 5.56-mm ball ammunition emissions were calculated and summarized along with the construction and vehicle emissions in Table 4-4. Grading operations would cause the greatest emissions for PM_{10}. Emissions during the construction and/or operation of the M16 Zero Range would not exceed the 10-percent criterion and would therefore not result in significant impacts to air quality.

TABLE 4-4
M16 ZERO RANGE AIR QUALITY EMISSIONS
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

Source Category	Pollutants (tons/year)					
	CO	***NO_x***	***$PM_{2.5}$***	***PM_{10}***	***SO_2***	***VOCs***
Coffee County	30,093	6,350	980	4,169	716	4,403
Franklin County	15,995	1,648	1,244	5,204	276	2,744
Construction Emissions Phase I						
Grading Equipment	0.150	0.565	0.000	0.046	0.057	0.060
Grading Operations	0.000	0.000	0.000	16.571	0.000	0.000
Total	0.150	0.565	0.000	16.618	0.057	0.060
Percent Coffee County	*0.00%*	*0.01%*	*0.00%*	*0.40%*	*0.01%*	*0.00%*
Percent Franklin County	*0.00%*	*0.03%*	*0.00%*	*0.32%*	*0.02%*	*0.00%*
Construction Emissions Phase II						
Mobile Equipment	0.023	0.055	0.000	0.004	0.007	0.005
Non-Residential Arch. Ctgs	0.000	0.000	0.000	0.000	0.000	0.015
Stationary Equipment	0.155	0.004	0.000	0.000	0.000	0.006
Workers' Trips	0.002	0.000	0.000	0.000	0.000	0.000
Facility Heating	0.001	0.001	0.000	0.000	0.000	0.000
Total	0.182	0.060	0.000	0.005	0.007	0.026
Percent Coffee County	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
Percent Franklin County	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
Vehicle Emissions						
HMMWV (1-1/4 Ton)	0.000	0.001	0.000	0.001	0.000	0.001
Percent Coffee County	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*
Percent Franklin County	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*
Munition Emissions						
5.56-mm Ball	0.0042	0.0003	0.000	0.000	0.000	0.000
Percent Coffee County	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*
Percent Franklin County	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*

Arch. ctgs = architectural coatings; CO = carbon monoxide; HMMWV = high-mobility multipurpose wheeled vehicle; mm = millimeters; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than 2.5 microns in diameter; PM_{10} = particulate matter less than 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound

.50 Caliber Familiarization Range

The .50 Caliber Range would require land clearing, grading, and construction activities. Vehicles would be utilized to transport personnel to and from the range, and .50-caliber ball ammunition would be used. Table 4-5 summarizes the emissions from construction and operations and compares the emissions to the ROI counties. Emissions from grading and construction would cause the greatest increases in air emissions temporarily. Emissions during the construction and/or operation of the M16 Zero Range would not exceed the 10-percent criterion and would, therefore, not result in significant impacts to air quality.

TABLE 4-5
.50 CALIBER FAMILIARIZATION RANGE AIR QUALITY EMISSIONS
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

Source Category	Pollutants (tons/year)					
	CO	**NO_x**	**$PM_{2.5}$**	**PM_{10}**	**SO_2**	**VOCs**
Coffee County	30,093	6,350	980	4,169	716	4,403
Franklin County	15,995	1,648	1,244	5,204	276	2,744
Construction Emissions Phase I						
Grading Equipment	0.050	0.188	0.000	0.015	0.019	0.020
Grading Operations	0.000	0.000	0.000	5.524	0.000	0.000
Total	0.050	0.188	0.000	5.539	0.019	0.020
Percent Coffee County	*0.00%*	*0.00%*	*0.00%*	*0.13%*	*0.00%*	*0.00%*
Percent Franklin County	*0.00%*	*0.01%*	*0.00%*	*0.11%*	*0.01%*	*0.00%*
Construction Emissions Phase II						
Mobile Equipment	0.004	0.009	0.000	0.001	0.001	0.001
Non-Residential Arch. Ctgs	0.000	0.000	0.000	0.000	0.000	0.006
Stationary Equipment	0.026	0.001	0.000	0.000	0.000	0.001
Workers' Trips	0.000	0.000	0.000	0.000	0.000	0.000
Facility Heating	0.000	0.000	0.000	0.000	0.000	0.000
Total	0.030	0.010	0.000	0.001	0.001	0.008
Percent Coffee County	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
Percent Franklin County	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
Vehicle Emissions						
HMMWV (1-1/4 Ton)	0.000	0.001	0.000	0.001	0.000	0.001
Percent Coffee County	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*
Percent Franklin County	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*
Munition Emissions						
.50 Caliber Ball	0.024	4.95E-05	0.001	0.001	0.000	0.000
Percent Coffee County	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*
Percent Franklin County	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*	*0.000%*

CACTF = Combined Arms Collective Training Facility; CO = carbon monoxide; HMMWV = high-mobility multipurpose wheeled vehicle; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than 2.5 microns in diameter; PM_{10} = particulate matter less than 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound

4.7.3 Alternative 1: No Secondary CACTF

This alternative would have the same impacts as described under the Proposed Action except that the Secondary CACTF would not be constructed. Therefore, the construction emissions would be slightly lower than with the Proposed Action (Table 4-6). Particulate matter emissions would reduce by 45 percent from the Proposed Action. Emissions would be below the 10-percent criterion and no significant impacts to air quality would occur.

TABLE 4-6
CACTF CONSTRUCTION EMISSIONS FOR ALTERNATIVE 1
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

Source Category	Pollutants (tons/year)					
	CO	**NO_x**	**$PM_{2.5}$**	**PM_{10}**	**SO_2**	**VOCs**
Coffee County	30,093	6,350	980	4,169	716	4,403
Franklin County	15,995	1,648	1,244	5,204	276	2,744
Construction Emissions Phase I						
Grading Equipment	0.250	0.942	0.000	0.077	0.096	0.100
Grading Operations	0.000	0.000	0.000	27.619	0.000	0.000
Total	0.250	0.942	0.000	27.696	0.096	0.100
Percent Coffee County	*0.00%*	*0.01%*	*0.00%*	*0.66%*	*0.01%*	*0.00%*
Percent Franklin County	*0.00%*	*0.06%*	*0.00%*	*0.53%*	*0.03%*	*0.00%*

CACTF = Combined Arms Collective Training Facility; CO = carbon monoxide; NO_x = nitrogen oxides; $PM_{2.5}$ = particulate matter less than 2.5 microns in diameter; PM_{10} = particulate matter less than 10 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound

4.7.4 Cumulative Impacts

Project emissions would result in a cumulative increase in air emissions when considered with other activities within the region that occur at the same time. However, since emissions from the Proposed Action are expected to be short-term and minimal in nature, project emissions are not expected to result in any significant long-term adverse cumulative impact to air emissions within the ROI.

4.8 Noise

Concerns regarding noise relate to certain potential impacts such as hearing loss, nonauditory health effects, annoyance, speech interference, and sleep interference. Impact analysis evaluated construction and munitions noise using a representative maximum noise scenario based on the upper-range housing unit density of six units per acre. Residential noise also represents a long-term change to the existing noise environment. Analysis evaluated potential impacts to the existing noise environment associated with additional residential noise using this scenario. Impact analysis considered and compared with current conditions the noise associated with operational activities, human presence at the installation, transportation related noise, and construction and demolition activities associated with the alternatives.

Construction and site clearing would occur over a multiyear period, and at any one time, a few projects at multiple locations would be expected to be underway simultaneously. Therefore, the Air Force expects the noise associated with active construction sites to be intermittent and transitory over time. The analysis assumed that the primary sources of noise during these activities would be truck and vehicle

traffic, heavy earth-moving equipment, and other construction equipment or infrastructure powered by internal combustion engines used on-site.

Using the Roadway Construction Noise Model, construction equipment was assumed for demolition and construction activities to give noise levels at various distances from the project site. Noise levels were calculated as an equivalent noise level (average acoustic energy) over an eight-hour period ($L_{eq(8)}$). The maximum sound level (L_{max}) shows the sound level of the loudest piece of equipment, which is generally the driver of the $L_{eq(8)}$ sound level. Table 4-7shows the noise levels expected at receptor distances at 100-feet increments.

TABLE 4-7
CONSTRUCTION SITE NOISE
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

Receptor Distance (feet)	*Max Sound Level (dBA)*	*Sound Level (dBA) ($L_{eq(8)}$)*
100	79.2	80.2
200	73.1	74.2
300	69.6	70.7
400	67.1	68.2
500	65.2	66.2

dBA = A-weighted decibels; $L_{eq(8)}$ = equivalent sound level

4.8.1 No Action

The No Action Alternative would not require any new construction or training operations; therefore, current noise levels would continue. No adverse impacts would occur to potential receptors from noise under the No Action Alternative.

4.8.2 Proposed Action

No significant noise impacts from implementation of the Proposed Action have been identified.

MK-19 Range

The MK-19 Range would require some construction, which would cause a temporary increase in noise within 500 feet of the proposed site. This noise is not expected to affect potential receptors located off-base. Those operating the equipment would require proper hearing protection as required under OSHA regulations.

Firing of the MK-19 (40-mm practice grenades) has an impulse noise of 145 dB unweighted (peak) (dBP) measured at the gunner position. The range is situated so that the noise propagation would diminish to low levels prior to reaching potential receptors. However, there may be receptors that are annoyed by the noise depending on the time of day and the weather (which may cause noise to attenuate less). Even so,

these additional training activities should not result in any significant impacts, since noise is regularly generated at adjacent TNARNG ranges and the expected increase in noise events would likely not be perceptible.

Construction noise is not expected to have significant effects on any sensitive receptors. Training operations may cause annoyance if weather conditions (high winds and low pressure) result in noise carrying farther than expected; however, this annoyance would be short-term and temporary and would not result in any significant impact to potential receptors.

CCRC

This course would utilize HMMWVs, laser and simulation training devices, and blank ammunition. Blank ammunition and vehicle use would be the primary sources of noise. Small arms firing with blank ammunition can produce high peak noise levels at distances up to 3,000 feet and may remain audible at distances up to 1.5 miles. The maximum noise level from blank ammunition is typically about 71 to 78 dBA (1/8 second measurement) at 2,000 feet and 50 to 57 dBA at 1 mile. Noise levels from firing blank small arms ammunition generally drop below levels that cause annoyance at distances of 2,500 to 3,000 feet (USACE, 2004).

A church and residential area are located approximately 2 miles southwest of the proposed CCRC. The noise from blank ammunition firing would be reduced to levels that would not affect these receptors. Vehicle noise from the M998 trucks would not attenuate beyond the base boundaries and is not expected to affect sensitive receptors. No impacts from noise to sensitive receptors are expected from CCRC operations.

Primary and Secondary CACTF Ranges

The proposed CACTF ranges may require the use of land clearing and grading equipment, which would cause a short-term increase in noise in the area. Noise would be below the 65 dBA threshold 500 feet from the construction site. There are no receptors within 500 feet of the proposed construction area.

Vehicles and munitions would also be part of the training activities. The M998 trucks have measured sound levels of 78 dBA at idle and 84 dBA when operating at 48 miles per hour, at the crew positions (U.S. Army Center for Health Promotion and Preventive Medicine [USACHPPM], 2006). These are relatively noisy vehicles for the operators, passengers, and personnel working in the vicinity of the truck. Potential receptors associated with each location are approximately 2 miles away and vehicle noise would have no impacts on sensitive receptors.

As discussed under the CCRC, blank ammunition noise would decrease to levels that would not cause significant annoyance at distances of 2,500 to 3,000 feet. There are no

sensitive receptors that would be affected from construction and operational noise pertaining to the CACTF Ranges.

M16 Zero Range

This range would require land clearing/grading as well as construction. These activities would cause a temporary increase in noise. The noise levels would be below 65 dBA at 500 feet (see Table 4-7) and would not affect any receptors.

To calibrate M16/M4 rifles, 5.56-mm live ammunition would be used. 5.56-mm ammunition creates a peak sound level of 157 dBP as measured at the shooter position (USACHPPM, 2006). The existing firing ranges in the area currently have elevated noise levels when in use. The addition of these training activities would increase the frequency in which elevated noise levels would occur. The primary impacts from impulse noises such as small arms fire are annoyance and startle response. There are no known sensitive receptors or residential areas within 2 miles of the proposed firing range. No impacts from noise are expected with the implementation of the M16 Zero Range.

.50 Caliber

Construction of the .50 Caliber Range would cause a temporary increase to baseline noise in the area (primarily natural sounds and other military operation/training activities). Construction noise would not cause adverse effects to receptors beyond 500 feet of the site. The primary cause of noise is the firing of .50 caliber M2 machine guns (.50-caliber ball ammunition). Noise levels at the gunner position are 153 dBP. These noise levels would diminish with distance and would be minimized with the addition of the tube-baffle noise attenuation. There are no known sensitive receptors or residential areas within 2 miles of the proposed firing range. Noise is not expected to affect receptors located off-base. Those operating the guns would require hearing protection to avoid hearing loss. No impacts to potential receptors from construction and operation noise are expected.

4.8.3 Alternative 1: No Secondary CACTF

This alternative would have much the same impacts as described under the Proposed Action. However, construction and operation noise would be less than under the Proposed Action given the absence of the Secondary CACTF. Therefore, no adverse impacts to potential receptors are expected under Alternative 1.

4.8.4 Cumulative Impacts

Range operations associated with the Proposed Action would result in an incremental increase in the noise environment at Arnold AFB when aggregated with other similar

training activities conducted by TNARNG. However, the Proposed Action is not expected to result in any significant impacts, and the Air Force believes that the Proposed Action would not result in any perceptible increase in cumulative noise events.

4.9 Utility Infrastructure

4.9.1 No Action

The No Action Alternative would result in no impacts to utility infrastructure.

4.9.2 Proposed Action

The anticipated demand for utilities services to support construction and operation of the new training ranges would not require any system upgrades and have no major impact on the capacity demands of the service providers. In fact, the proposed ranges would require no support infrastructure in the way of power or water. Power, if necessary, would be supplied by generators, and potable water would be brought to the ranges when they are being used. Portable toilets would be also be available for use and a contractor would provide pump-out and disposal service. As a result, no impacts to utilities would occur.

4.9.3 Alternative 1: No Secondary CACTF

Alternative 1 is similar to the Proposed Action, with the elimination of the Secondary CACTF. Consequently, no utility infrastructure impacts would occur as a result of Alternative 1.

4.9.4 Cumulative Impacts

No impacts associated with utility infrastructure have been identified. As a result, no cumulative impacts to the utility infrastructure serving the VTS-T or Arnold AFB have been identified.

4.10 Hazardous Materials / Waste and Solid Waste

The analyses focus on how and to what degree the Alternatives affect hazardous materials usage and management, and hazardous or solid waste generation and management. Potential impacts related to hazardous materials and hazardous and solid wastes were analyzed based on the following criteria:

- Generation of hazardous waste types/quantities or solid waste quantities that could not be accommodated by the current management system. The analysis methodology identified processes and activities associated with the Proposed Action and, using process knowledge or other available data, predicted the type and quantity of hazardous waste that would likely be generated from these processes/activities. These data were compared to current generation rates, waste types, and base/public landfill capability for managing hazardous wastes.
- Result in adverse impacts to an existing IRP site, as could be caused by disturbing the ground in a site identified as having contaminated soil, or by causing damage to existing site remediation infrastructures (e.g., pumps, tanks) from proposed activities. The analysis methodology identified existing IRP sites and compared the location of these sites with the location of proposed activities. Where overlaps occurred, IRP site-specific conditions, such as existence of land use controls, were analyzed against proposed construction/training activities to assess potential impacts.

4.10.1 No Action

Under the No Action Alternative, Arnold AFB would continue to operate as it does currently and impacts to hazardous materials and hazardous and solid wastes from the establishment of the proposed range and training facilities would not occur.

4.10.2 Proposed Action

Hazardous Materials and Waste Management

New buildings and pavements would be constructed utilizing normal construction methods, which would limit, to the extent possible, the use of hazardous materials. Petroleum products and other hazardous materials (e.g., paints and solvents) would be used during construction and renovation activities. These materials would be stored in proper containers, employing secondary containment as necessary to prevent and limit accidental spills. All spills and accidental discharges of petroleum products, hazardous materials, or hazardous waste would be reported and mitigated. Construction activities would not be expected to generate hazardous wastes.

IRP Sites

As Table 4-8 indicates, no impacts are anticipated from the presence of IRP sites. Planned construction or training activities would avoid these sites. Regardless, should any unusual odor, soil, or groundwater coloring be encountered during development activities in any areas, construction would cease and Environmental Management would be contacted immediately.

TABLE 4-8
REQUIRED MITIGATIONS FOR IRP SITES NEAR PROPOSED TRAINING FACILITIES
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

Site	*Description*	*Required Mitigations*
Sites G14, G19, F1, F2, F4	Former fuel handling sites with soil contamination only	None expected for Sites G14, and G19. No land use restrictions are required after excavation and disposal have occurred. Sites F1, F2, and F4 would be avoided during construction/training activities.
Sites G6, G10, G18	Former gas stations with groundwater contamination only	Sites would be avoided during construction/training activities.
Site G8	Former gas station with soil and groundwater contamination	Site would be avoided during training activities.
LF2	Landfills with soil and source material contamination	Site would be avoided during construction/training activities.
SWMU 8	Camp Forrest Water Treatment Plant	Site would be avoided during training activities.
WP-6	Old Camp Forrest Water Treatment Plant	Site would be avoided during training activities.

Source: U.S. Air Force, 2006

Solid Wastes

Munitions Debris – Metallic residues would be generated from munitions training activities (Table 4-9) (for chemical releases to air from training activities, refer to Section 4.7, Air Quality). The quantities presented in the table were calculated based on the type and quantity of munitions used, combined with chemical composition data obtained from the Toxic Release Inventory-Data Delivery System (TRI-DDS). The TRI-DDS database, which is a product of the Joint Service EPCRA Workgroup, is intended to provide a consistent method to assess chemical constituent data that may be used by DoD installations when reporting chemical releases and waste management practices.

TABLE 4-9
ESTIMATED QUANTITY OF METALLIC DEBRIS FROM TRAINING ACTIVITIES
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

	5.56-mm Blank	*5.56-mm Ball*	*.50-Caliber Ball*	*40-mm Practice Grenade*	*Total (pounds)*
# of Rounds	100,000	30,000	3,000	40,000	-
Chemical					
Barium				6	6
Chromium				52	52
Copper	1013	362	371	3694	5,441
Lead		1591	36		195
Manganese				181	181
Zinc	432	133	119	111	795

Source: TRI-DDS (https://dod-tridds.org/tri-web/)
mm = millimeters
Note: The following Department of Defense Identification Codes (DODICs) were used in the analysis: 5.56-mm Blank (DODIC A080); 5.56-mm Ball (DODIC A066); .50-caliber Ball (DODIC A556); 40-mm Practice Grenade (DODIC B480)

Metallic residues listed in the table would result from brass and bullets associated with gun-fired ammunition, as well as from metals contained within the 40mm practice grenade. Brass ammunition casings would be collected immediately after training, demilitarized, and then be recycled and not released to the environment. Lead bullets and other metallic debris would be collected through the use of bullet traps or during routine range clearing operations. All collected materials would be demilitarized and then recycled through a qualified recycling vendor. No significant impacts have been identified associated with releases to the environment from munitions training.

An unknown percentage of bullets may go beyond the target area and berms into the SDZ. However, this percentage is expected to be small, and given the size of the SDZ and the dispersion of the small number of bullets that would enter the area, the Air Force does not anticipate significant impacts resulting from stray bullets.

Chemicals in munitions utilized during training require reporting to the USEPA under the EPCRA Toxic Release Inventory (TRI) program. Arnold AFB has developed procedures to comply with TRI reporting requirements and has reported for lead and lead compounds (reporting threshold of 100 pounds) in prior years. For example, for calendar years 2007 and 2008, Arnold AFB reported total releases of lead compounds of 14,421 pounds and 8,021 pounds, respectively (USEPA, 2010). The installation would continue to track munitions use associated with the proposed alternatives and would report for any chemicals exceeding threshold requirements. Use of the firing ranges may result in the generation of RCRA-regulated hazardous waste, depending on whether range residues are generated and managed. These wastes would be managed in accordance with the Arnold hazardous waste management requirements as identified in the base HWMP, and consequently no significant impacts would be anticipated.

Construction and Demolition (C&D) Debris – Construction activities associated with the Proposed Action would result in the generation of solid wastes including building construction materials and concrete and asphalt rubble. Sampling studies in Estimating Building-Related Construction and Demolition Amounts (USEPA, 2003) document the following solid waste generation rates during nonresidential construction:

- Nonresidential construction: [(4.34 pounds/square feet [ft^2]) x (square footage)] ÷ 2,000 pounds = C&D waste (in tons)

Estimates of C&D debris generation rates from pavement construction were not available; therefore, the analyses assumed that pavement construction would generate 10 percent of construction and demolition debris generated during construction (i.e., 0.434 pounds/ft^2). The total quantity of construction debris from the full implementation of the Proposed Action (Phase II completion) was used in determining the quantity of C&D wastes generated and requiring disposal. Resulting quantities of C&D debris are summarized in Table 4-10.

TABLE 4-10
C&D DEBRIS FROM IMPLEMENTATION OF PROPOSED ACTION
Tennessee Army National Guard Range Expansion at Arnold Air Force Base, Tennessee

Proposed Project	*Pavement Construction (square meter)*	*Pavement Construction (square feet)*	*Building Construction (square meter)*	*Building Construction (square feet)*	*Total C&D Debris (Tons)*
MK-19 Range					
Firing Point Area	10	108	20	215	0.5
Gravel Road Improvement	5,100	54,876			11.9
Gravel Parking	2,000	21,520	10	108	4.9
Gravel Firing Line	500	5,380			1.2
CACTF (Primary)					
Road Network	1,800	19,368			4.2
Gravel Pads	800	8,608			1.9
M-16 Zero Range					
Firing Point Area	500	5,380	20	215	1.6
Gravel Parking	2,500	26,900	10	108	6.1
.50 Caliber Range					
Firing Point Area	75	807			0.2
Gravel Parking	250	2,690			0.6
Elevated Berm	500	5,380			1.2
				Total C&D Debris (Tons)	34.2

CACTF = Combined Arms Collective Training Facility; C&D =construction & demolition

As the table indicates, construction and demolition activities would generate approximately 34 tons of C&D debris. Either the on-base landfill or a local landfill can be used for disposal of C&D debris; project planners would determine which landfill would be utilized. The amount of C&D debris represents less than one-tenth of 1 percent of the capacity of the on-base C&D landfill, with this amount being even smaller for local landfills. As a result, no significant adverse impacts are anticipated from generation of C&D debris.

Land Clearing Debris – Another aspect of solid waste generation associated with the construction of range facilities is the debris generated from land-clearing activities prior to construction. In evaluation of this debris, it was assumed that standard waste management and construction techniques would be used in managing this material. Using these assumptions, no debris from land-clearing activities is expected to require disposal in a landfill. It is assumed soils generated from grubbing activities would be used as fill during the construction projects and woody wastes would be: (1) used by the wood or wood pulp industry, (2) chipped and reused as mulch or compost, or (3) burned in place under an open burning permit. No significant adverse impacts are anticipated from the generation of land-clearing debris, since the amount of waste generated would be minimal.

4.10.3 Alternative 1: No Secondary CACTF

The environmental consequences for projects associated with the Alternative 1 would be the same as those described under the Proposed Action, although the quantity of C&D debris generated under Alternative 1 would be less that that associated with the Proposed Action. As such, no significant adverse impacts would occur.

4.10.4 Cumulative Impacts

No cumulative impacts from hazardous material and hazardous waste management are anticipated. The installation has developed programs and procedures to comply with all federal/state hazardous materials and hazardous waste management and reporting requirements. Hazardous and non-hazardous waste would be generated from planned operations; however, the anticipated type and quantity of these hazardous wastes would pose no adverse cumulative impacts on the current waste management system. Coordination with installation personnel would be performed to ensure that construction and training activities would avoid existing IRP sites.

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5.0 Plan, Permit, and Management Requirements

Implementation of the following plans, permits, and management requirements will require TNARNG coordination with Arnold AFB conservation staff throughout construction and maintenance, particularly for mitigating possible effects on biological resources such as sensitive species and habitats, as well as invasive pest plants.

An NPDES permit for construction activities would be required for land disturbance of more than 1 acre. While it is unknown at this time what mitigations would be developed through the NPDES permitting process for construction of the proposed ranges, potential mitigations based on typical permit requirements are identified below:

- Installation and maintenance of permanent sediment runoff control measures for heavy storm events
- Inspection and maintenance of sediment runoff control measures after rain events
- Stabilization of disturbed areas as soon as possible
- Timing of activities to minimize impacts from seasonal climate changes and weather events
- Construction of stormwater infiltration/collection measures
- Minimization of soil disturbance and leaving of vegetation in place whenever and wherever possible
- The proponent would ensure that the construction contractor implements the following soils BMPs in addition to other situation-appropriate methods as per the *Tennessee Erosion and Sediment Control Handbook* (TDEC, 2002):
    - Implement silt fences and hay bales construction to avoid soil run-off into the nearby drainage.
    - Inspect BMPs on a weekly basis and after rain events. Replace fencing as needed.
    - In permits and site plan designs, include site-specific management requirements for erosion and sediment control.

The Proposed Action would include implementation of the following BMPs and management actions identified in the Arnold AFB INRMP:

- Construction of new roads or facilities in wetlands is prohibited by numerous federal, state, and DoD regulations and is to be directly avoided. A 50-meter buffer zone around all wetland areas has been identified as an avoidance area for new development outside of existing firebreaks/forestry roadways. Existing firebreaks/forestry roadways in these areas are suitable for vehicle use; however,

restrictions would be required to minimize indirect impacts such as erosion and sedimentation. As suggested in the base INRMP (U. S. Air Force, 2006), new roads or facilities should not be developed within 250 meters of identified wetlands where practicable. Any new development within 200 meters of the 50-meter avoidance zone and outside existing firebreaks/forestry roadways would require extensive erosion control measures, monitoring, and maintenance activities to ensure minimization of direct and indirect adverse impacts. Such restrictions would include limiting use during wet/rainy periods and poor road conditions.

- Ensure vehicle use is limited to existing roads.
- Routinely inspect roads that pass near wetlands and at stream crossings.
- Avoid to the greatest extent possible any range development within 30 meters of flame chub habitat (Spring Creek and its upper tributaries).
- Site parking areas and as much of the range system in areas currently planted with pine and avoiding or minimizing disturbance to natural hardwood forest, woodland, and grassland vegetation types.
- Avoid development within 30 meters of RTE occurrences; signs should be posted at the edges of these buffers to warn users to stay out of the area.
- Minimize fire risk by ensuring that all equipment and military training vehicles have functional mufflers, spark arrestors, or the equivalent, and that development of ranges and operation of military training vehicles during times of high fire danger is restricted or otherwise monitored closely.
- Require all military vehicles and construction equipment, and other vehicles to be clean and free of soil and IPP seeds and parts before they come on-base.
- Periodically monitor the ranges for RTE or IPP species occurrences.
- Conduct thorough zoological and botanical surveys prior to construction and avoid any RTE animals and plants. A protocol survey performed under the direction of a permitted Indiana bat biologist would be conducted in the area during the time from 15 May to 15 August to determine if the bat is present. If there is a positive survey (i.e., bats are observed), then the USFWS would be consulted and a Biological Opinion would be issued before any clearing can take place.
- Educate range users regarding sensitive habitat and species avoidance areas as part of training activities.
- To the extent possible the new ranges would be operated in a manner that is compatible with the natural resource management goals as described in the Arnold AFB INRMP (U.S. Air Force, 2006):
    - Military mission (unpredictable)

- Hunting (known seasons)
- Forest management activities (thinning, harvest, planting, prescribed burns—described in Work Plans published each year for a two-year planning period; could be other unpredictable activities following extreme weather such as ice storms, tornadoes, etc.)
- Other management activities (natural resource monitoring, habitat improvement, utility rights-of-way above and below ground)

The following BMP would be implemented at the recommendation of the USFWS to minimize potential impacts to the Indiana bat:

- Removal of trees would be accomplished between 15 October and 31 March to avoid a potential adverse impact to the species during roosting season.

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6.0 Persons and Agencies Contacted

Richard McWhite (AEDC/TSDCA)

Heidi Mowery (AEDC/TSDCA)

Stephen Farrington (AEDC/ATA)

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Captain Stacy Kunz (TNARNG)

Department of Environment and Conservation (TDEC) Office of General Counsel

Tennessee Historical Commission

TDEC Division of Natural Heritage

TDEC Division of Solid Waste Management

TDEC Division of Water Pollution Control

Tennessee Wildlife Resources Agency

U.S. Fish and Wildlife Service

Alabama-Coushatta Tribe of Texas

Alabama Quassarte Tribal Town

Chickasaw Nation of Oklahoma

Choctaw Nation of Oklahoma

Eastern Band of Cherokee Indians

Kialegee Tribal Town

Muscogee (Creek) Nation of Oklahoma

Poarch Creek Indians

Shawnee Tribe

Thlopthlocco Tribal Town

United Keetowah Band of Cherokee

Absentee Shawnee Tribe of Oklahoma

Cherokee Nation of Oklahoma

Seminole Nation of Oklahoma

7.0 List of Preparers

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B.A. Liberal Arts
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8.0 References

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APPENDIX A
PUBLIC INVOLVEMENT

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The Air Force published a public notice in the *Tullahoma News*, *Herald Chronicle,* and *Manchester Times* once per week for four weeks starting on 1 July 2011 notifying the public of the Air Force's intent to sign a Finding of No Significant Impact (FONSI). The Air Force also provided copies of the EA to the following agencies for review and comment:

- TDEC Office of General Counsel
- Tennessee Historical Commission
- TDEC Division of Natural Heritage
- TDEC Division of Solid Waste Management
- TDEC Division of Water Pollution Control
- TDEC Division of Air Pollution Control
- Tennessee Wildlife Resources Agency
- U.S. Fish and Wildlife Service (USFWS)

The Air Force notified the following Native American tribes of a "No Historic Properties Affected" on the proposed action:

- Alabama-Coushatta Tribe of Texas
- Alabama Quassarte Tribal Town
- Chickasaw Nation of Oklahoma
- Choctaw Nation of Oklahoma
- Eastern Band of Cherokee Indians
- Kialegee Tribal Town
- Muscogee (Creek) Nation of Oklahoma
- Poarch Creek Indians
- Shawnee Tribe
- Thlopthlocco Tribal Town
- United Keetowah Band of Cherokee
- Absentee Shawnee Tribe of Oklahoma
- Cherokee Nation of Oklahoma
- Seminole Nation of Oklahoma

The public comment and agency review period ended on 1 August 2011.

The Tennessee Historical Commission, State Historic Preservation Office (SHPO), provided concurrence on 15 June 2011 and 18 July 2011 that no historic or archaeological resources would be affected by the Proposed Action. The USFWS also replied, indicating concerns over potential alteration of suitable roosting habitat for the federally endangered Indiana bat. The U.S. Air Force conducted the requested surveys and coordinated with the USFWS regarding the results. Consequently, the USFWS

provided no objection to the Proposed Action or Alternatives. Information regarding the USFWS correspondence is provided in Section 4.3 of the Final EA.

The following Native American tribes responded that no impacts to religious, cultural, or historical assets of the associated tribes would be affected: Alabama-Coushatta Tribe of Texas; Choctaw Nation of Oklahoma; Chickasaw Nation; and Eastern Band of Cherokee Indians.

No other public or agency comments were received during the Draft EA review period (1 July 2011 through 1 August 2011). All agency and tribal correspondence received is provided below.

Notice of Intent to Sign a Finding of No Significant Impact

for the Environmental Assessment of

TN Army National Guard Range Expansion

Arnold AFB completed an environmental assessment (EA) of the proposed range expansion for TN Army National Guard (TNARNG) Volunteer Training Site - Tullahoma (VTS-T), situated on Arnold AFB. The EA complies with Public Law 91-190, 42 U.S. Code, Sections 4321-4347, *National Environmental Policy Act (NEPA) of 1969* (as amended); 40 Code of Federal Regulation (CFR) Part 1500-1508, *Council on Environmental Quality Regulations Implementing NEPA*; and 32 CFR Part 989, *Air Force Environmental Impact Analysis Process*. The EA represents a conscientious, realistic identification and evaluation of the proposed action, an alternative to the proposed action, and the no-action alternative to determine any significant impacts to the environment or public health and safety.

The Proposed Action involves expansion and modernization of existing VTS-T training areas and facilities to meet increased TNARNG training mission needs. The preferred alternative proposes development of six training ranges within the existing TNARNG leasehold area on Arnold AFB, to include: (1) an MK-19, 40-mm Grenade Machine Gun Range; (2) a Convoy Commanders Reaction Course (CCRC); (3) a Primary Combined Arms Collective Training Facility (CACTF) Range; (4) a Secondary CACTF Range; (5) an M-16 calibration ("zero") range; and (6) a .50-caliber familiarization range. All proposed development is within or adjacent to the existing TNARNG range complex, north of Wattendorf Highway, except the CCRC, which would be developed south of Wattendorf Highway using existing roadways. An alternative to the Proposed Action is similar to the Proposed Action, with the exception of developing only one CACTF.

Based on the EA findings, Arnold AFB determined there are no significant environmental, health, or safety impacts associated with the proposed action or alternatives. In accordance with the cited statutes, Arnold AFB drafted a Finding of No Significant Impact (FONSI), which documents this determination.

The public is hereby provided 30 days to comment on the proposed action. Contact Arnold AFB Public Affairs Office to obtain copies of the EA and draft FONSI. Written comments should be submitted to:

AEDC/TSDCA
ATTN: Ms. Heidi Mowery, Environmental Planner
100 Kindel Drive, Suite A-115
Arnold AFB, TN 37389-1115

Arnold AFB intends to sign the FONSI no earlier than 30 July 2011.

TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
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June 15, 2011

Ms. Pamela King
Headquarters Arnold Engineering Development Center
Arnold Air Force Base Tennessee
704 CES/CEA
100 Kindel Drive, Suite B305
Arnold AFB, Tennessee 37398-2307

RE: DOD, AEDC/TNARNG/TRAINING RANGE EXPANS., TULLAHOMA, COFFEE COUNTY

Dear Ms. King:

The Tennessee State Historic Preservation Office has reviewed the above-referenced undertaking received on Friday, June 10, 2011 for compliance by the participating federal agency or applicant for federal assistance with Section 106 of the National Historic Preservation Act. The Procedures for implementing Section 106 of the Act are codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

After considering the documentation submitted, we concur that there are no National Register of Historic Places listed or eligible properties affected by this undertaking. This determination is made either because of the location, scope and/or nature of the undertaking, and/or because of the size of the area of potential effect; or because no listed or eligible properties exist in the area of potential effect; or because the undertaking will not alter any characteristics of an identified eligible or listed property that qualify the property for listing in the National Register or alter such property's location, setting or use. Therefore, this office has no objections to your proceeding with the project.

If your agency proposes any modifications in current project plans or discovers any archaeological remains during the ground disturbance or construction phase, please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act. You may direct questions or comments to Jennifer M. Barnett (615) 741-1588, ext. 105. This office appreciates your cooperation.

Sincerely,

E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

EPM/jmb

TENNESSEE HISTORICAL COMMISSION
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
2941 LEBANON ROAD
NASHVILLE, TN 37243-0442
(615) 532-1550

July 18, 2011

Ms. Pamela King
Headquarters Arnold Engineering Development Center
Arnold Air Force Base Tennessee
704 CES/CEA
100 Kindel Drive, Suite B305
Arnold AFB, Tennessee 37398-2307

RE: DOD, AEDC/TNARG RANGE EXPANSION/VTS-T, TULLAHOMA, COFFEE COUNTY

Dear Ms. King:

The Tennessee State Historic Preservation Office has reviewed the above-referenced undertaking received on Friday, July 1, 2011 for compliance by the participating federal agency or applicant for federal assistance with Section 106 of the National Historic Preservation Act. The Procedures for implementing Section 106 of the Act are codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

After considering the documentation submitted, we concur with your agency that there are no National Register of Historic Places listed or eligible properties affected by this undertaking. This determination is made either because of the location, scope and/or nature of the undertaking, and/or because of the size of the area of potential effect; or because no listed or eligible properties exist in the area of potential effect; or because the undertaking will not alter any characteristics of an identified eligible or listed property that qualify the property for listing in the National Register or alter such property's location, setting or use. Therefore, this office has no objections to your proceeding with the project.

If your agency proposes any modifications in current project plans or discovers any archaeological remains during the ground disturbance or construction phase, please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act. You may direct questions or comments to Jennifer M. Barnett (615) 741-1588, ext. 105. This office appreciates your cooperation.

Sincerely,

E. Patrick McIntyre, Jr.

E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

EPM/jmb

Choctaw Nation of Oklahoma

P.O. Box 1210 • Durant, OK 74702-1210 • (580) 924-8280

Gregory E. Pyle
Chief

Gary Batton
Assistant Chief

July 22, 2011

AEDC/TSDCA
100 Kindel Drive, Suite A-115
Arnold AFB TN 37389-2327

Dear Pamela F. King:

We have reviewed the following proposed project (s) as to its effect regarding religious and/or cultural significance to historic properties that may be affected by an undertaking of the projects area of potential effect.

RE: ***Draft Environmental Assessment of Finding of No Significant Impact for the proposed TNAGNG range expansion at Volunteer Training Site – Tullahoma (VTS-T), located on the Arnold Air Force Base, Tennessee***

Comments: After further review of the above mentioned project (s), and based on the information provided we are deferring to other consulted tribes. However, should construction expose buried archaeological or building materials such as chipped stone, tools, pottery, bone, historic crockery, glass or metal items, or should it uncover evidence of buried historic building materials such as rock foundations, brick, or hand poured concrete, this office should be contacted immediately @ 1-800-522-6170 ext. 2137.

Sincerely,

Terry D. Cole
Tribal Historic Preservation Officer
Choctaw Nation of Oklahoma

By: _____
Caren A. Johnson
Administrative Assistant

Choctaws...growing with pride, hope and success!

ALABAMA-COUSHATTA TRIBE OF TEXAS
571 State Park Road 56 • Livingston, Texas 77351 • (936) 563-1100

July 25, 2011

Arnold Air Force Base
AEDC/TSDCA Cultural Resources
Attn: Heidi Mowery
100 Kindel Drive, Suite A-115
Arnold AFB, TN 37389-2327

Dear Ms. Mowery:

On behalf of Mikko Oscola Clayton Sylestine and the Alabama-Coushatta Tribe, our appreciation is expressed on your efforts to consult us regarding Environmental Assessment and Finding of No Significant Impact (FONSI) statement for the TNARNG range expansion at Volunteer Training Site - Tullahoma.

Our Tribe maintains ancestral associations within the state of Tennessee despite the absence of written records to completely identify Tribal activities, villages, trails, or grave sites. However, it is our objective to ensure significances of Native American ancestry including the Alabama-Coushatta Tribe are administered with the utmost regard.

Upon review of your July 1, 2011 submission, no impacts to religious, cultural, or historical assets of the Alabama-Coushatta Tribe will occur in conjunction with this proposal. Therefore, we concur with your FONSI recommendation.

Should you require further assistance, please do not hesitate to contact us.

Respectfully submitted,

Bryant J. Celestine
Historic Preservation Officer

Telephone: 936 – 563 – 1181 celestine.bryant@actribe.org Fax: 936 – 563 – 1183

Eastern Band of Cherokee Indians
Tribal Historic Preservation Office
P.O. Box 455
Cherokee, NC 28719
Ph: 828-554-6852 Fax 828-488-2462

DATE: July 26, 2011

TO: Ms. Heidi Mowery, AEDC
Cultural Resource Manager
100 Kindel Drive, Suite A-115
Arnold AFB, TN 37389-2327

PROJECT(s): **Comments concerning the proposed range expansion at TN Army National Guard Volunteer Training Site-Tullahoma located on Arnold Air Force Base.**

The Tribal Historic Preservation Office of the Eastern Band of Cherokee Indians (EBCI THPO) would like to thank you for the opportunity to comment on this proposed section 106 activity under §36 C.F.R. 800.

The EBCI THPO concurs with the archeologist's recommendations that no sites eligible for inclusion on the National Register of Historic Places were encountered during the recent phase I archaeological field survey. As such, the EBCI THPO believes that the proposed project may proceed as planned. In the event that project plans change, or cultural resources or human remains are discovered, all work should cease, and this office should be contacted to continue government to government consultation as defined under Section 106 of the National Historic Preservation Act of 1966, as amended.

If we can be of further service, or if you have any comments or questions, please feel free to contact me at (828) 554-6852.

Sincerely,

Tyler B. Howe
Tribal Historical Preservation Specialist
Eastern Band of Cherokee Indians

the Chickasaw Nation HEADQUARTERS
Arlington at Mississippi / Box 1548 / Ada, OK 74821-1548 / (580) 436-2603

Bill Anoatubby
Governor
Jefferson Keel
Lieutenant
Governor

August 4, 2011

Ms. Heidi Mowery
AED Cultural Resources Manager
ATTN: AEDC/TSDCA
100 Kindel Drive, Suite A-115
Arnold AFB, TN 37389-2327

Dear Ms. Mowery:

Thank you for providing us with an Executive Summary of the Cultural and Natural Resource sections of the Draft Environmental Assessment and Finding of No Significant Impact for the proposed TNARNG range expansion at Volunteer Training Site-Tullahoma (VTS-T), located on Arnold Air Force Base, Tennessee (AAFB).

After reviewing the Draft Environmental Assessment and Finding of No Significant Impact we are in agreement with the assessment and have no objections to the proposed undertaking. We concur with your finding of no adverse effect to historic properties and we accept the special conditions set forth in this report. We do not presently know of any specific historic properties or properties of significant religious or sacred value. In the event your agency becomes aware of the need to enforce other statutes we request to be notified under NEPA, NAGPRA, AIRFA and ARPA.

If you have any questions, please contact Ms. LaDonna Brown, historic preservation officer at (580)272-5593, Ladonna.brown@chickasaw.net or Mr. Kevin Scrivner, historic preservation and repatriation manager at (580)559-0825, Kevin.scrivner@chickasaw.net.

Sincerely,

Jefferson Keel, Lt. Governor
The Chickasaw Nation

God Bless America!

United States Department of the Interior

FISH AND WILDLIFE SERVICE
446 Neal Street
Cookeville, TN 38501

July 29, 2011

AEDC/TSDCA
ATTN: Ms. Heidi Mowery, Environmental Planner
100 Kindel Drive, Suite A-115
Arnold AFB, Tennessee 37389-1115

Subject: Draft EA and FONSI for Expansion and Modernizing the Volunteer Training Site-Tullahoma, Arnold Air Force Base, Tennessee.

Dear Ms. Mowery:

Thank you for your correspondence of July 1, 2011, concerning the draft environmental assessment (EA) and Finding of No Significant Impact for the proposed Tennessee Army National Guard range expansion at the Volunteer Training Site - Tullahoma (VTS-T) located on Arnold Air Force Base, Tennessee. Under the proposed action, the existing VTS-T training ranges would be expanded and modernized. Once complete, the VTS-T would be the only training site in Tennessee to support the Combat Arms, Combat Support, and Combat Service Support requirements under the Army Forces Generation Model. Fish and Wildlife Service personnel have reviewed the information submitted and we offer the following comments.

Information provided indicates that suitable roosting habitat for the federally endangered Indiana bat (*Myotis sodalis*) may exist within the project area and would likely be altered by the proposed action. The draft EA indicates that a protocol survey would be performed under the direction of a permitted Indiana bat biologist during the time from May 15 to August 15 in order to determine if the bat is present. We request that the bat survey plan be sent to our office for review and comment prior to any surveys taking place.

Our database indicates that several state-listed and deemed in need of management plants and animals occur near or within the area of potential impact. One of the plant species includes the Eggert's sunflower (*Helianthus eggertii*) which was recently removed from the federal list of protected plant species. As indicated in the draft EA, this species was delisted due largely in part to conservation efforts and commitments at Arnold Air Force Base. The draft EA indicates that thorough zoological and botanical surveys would be conducted prior to construction in order to avoid any impacts to rare, threatened, or endangered species. Our agency requests that the results of any surveys be sent to our office in order to be added to our database.

Without survey results, we are unable to adequately comment on the proposal or concur with your findings. Once the results of the Indiana bat surveys, as well as the zoological and botanical surveys are sent to our office for review, we can provide appropriate comments.

Please contact Robbie Sykes (telephone 931/525-4979) of my staff if you have questions regarding the information provided in this letter.

Sincerely,

Mary E. Jennings

Mary E. Jennings
Field Supervisor

From: David_Pelren@fws.gov
Sent: Tuesday, September 18, 2012 3:13 PM
To: Elkins, Michael C Civ USAF AFMC AEDC/TSDCA
Cc: Robbie_Sykes@fws.gov; Mary_E_Jennings@fws.gov; rob.todd@tn.gov
Subject: Re: FW: TNARNG Range Expansion/ IBat survey results
Attachments: Copperhead_TNARNG_AAFB Memo.pdf

Chris -

Fish and Wildlife Service (Service) biologists have reviewed the bat survey results that you provided with the 08/08/2012 e-mail below. The survey was conducted in an effort to demonstrate the apparent absence of Indiana bats at a proposed National Guard range expansion site, as described in a draft environmental assessment (EA) for the project. The mist net and acoustic bat survey did not result in documentation of the presence of this species in the vicinity of the proposed project site. We understand that you, therefore, propose the removal of trees in preparation for range expansion without requirements to mitigate for potential impacts to the Indiana bat or its habitat.

In cases where bat surveys are conducted without documentation of the presence of Indiana bats, the removal of trees during any season without mitigation for impacts to the Indiana bat is often justified. It is the position of the Service that removal of trees without compensatory mitigation is appropriate in this case. However, the presence of a juvenile Indiana bat has been recently documented during summer at a site located less than five miles from the range expansion project site. Therefore, we recommend that the removal of trees be accomplished during the species' hibernation season (i.e., between October 15 and March 31 at this site).

We understand that you will incorporate measures into the EA in an effort to account for possible effects to the Indiana bat and its habitat. We would then respond to you in response to revision of the EA. Please provide a copy of the EA to Mary Jennings or Robbie Sykes for comment.

Thank you for coordinating with us regarding potential impacts to the Indiana bat. Feel free to contact me if you have questions about these comments.

David Pelren
Fish and Wildlife Biologist
Ecological Services
U.S. Fish and Wildlife Service
446 Neal St.
Cookeville, TN 38501
office phone: 931-525-4974
cell phone: 931-261-5844