Final Environmental Assessment

Conversion of Forest Land to Road Right-of-Way

Arnold Air Force Base, Tennessee

Prepared for:

DEPARTMENT OF THE AIR FORCE
Arnold Air Force Base, Tennessee

April 2005

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Finding of No Significant Impact:
Arnold Air Force Base, Tennessee
Conversion of Forest Land to Road Right-of-Way

Arnold Air Force Base (Arnold AFB) has prepared an Environmental Assessment (EA) (April 2005) that evaluates the potential environmental and socioeconomic impacts associated with widening the cleared area adjacent to roads through conversion of forest land to road right-of-way.

Description of the Proposed Action

The Proposed Action is to remove trees, primarily pine, located along Wattendorf Highway, Arnold Center Road, South Hap Arnold Drive and a limited portion of Northshore Road. Removal would extend 75 feet from the edge of the pavement on both sides of the aforementioned roads, excluding the east side of Wattendorf Highway surrounding Goose Pond. Shoulders on approximately 17.5 miles of roadway would be cleared to 75 feet, although a substantial portion of this roadway already has shoulders cleared to distances ranging from 25 feet to more than 75 feet. The total area that would be cleared is 194 acres.

Each area proposed for tree removal would be surveyed in advance of removal to determine the best location for a decking area. The decking area is where timber would be loaded onto trucks. Establishing the decking area in advance of equipment mobilization would reduce the need for extensive best management practices (BMPs) to minimize erosion and control runoff from the site. Disturbance of riparian zones would be minimized to the extent practicable. Where streams cross the roads, tree removal would be limited to pine trees, with hardwood species left undisturbed.

The cleared area would be converted to semi-improved land over a 2- to 3-year period. All tree removal would be accomplished using standard industry equipment. Stumps would be sheared at ground level 18 to 24 months after tree removal. Stump tops and other logging debris would be raked and disposed of in appropriate solid waste areas. The semi-improved land would be maintained by periodic (once or twice a year) bush-hogging. This project would reduce the potential risk of treefall across well-traveled roads and improve the ability of drivers to avoid animal collisions along these roads.

Alternative Action

The Alternative Action would be to remove trees at the same locations along designated roads as in the Proposed Action, but to remove trees from a 50-foot corridor on each side of the roads. This would produce a 91-acre area cleared of trees. All removal activities would be the same as for the Proposed Action. Maintenance of the cleared areas would be the same as described for the Proposed Action. The benefits of the Alternative Action would be similar to those for the Proposed Action, but the reduction in risk of treefall across the roadway and vehicle animal collisions would be less.

No-Action Alternative

In the No-Action Alternative, existing conditions would be maintained along the four roads and no tree removal would be conducted. The substantial risk of treefall across one or more of these roads would remain. Treefall would present the potential for traffic disruption and personal health risks. These potential issues would extend beyond Arnold AFB and disrupt or pose threats to the surrounding community. The No-Action Alternative does not meet the stated project goals.

Environmental Consequences

No significant negative environmental or socioeconomic consequences were identified in the EA for the Proposed Action or the Alternative Action. Tree clearing presents an occupational health risk to the individuals involved in the activity. A job safety analysis (JSA) has been developed for the tree clearing operations. Personnel participating in each event must read, understand, and sign the JSA before conducting work. Cultural resource surveys would be conducted prior to work and appropriate measures implemented to avoid impact to any discovered resources. Implementation of the Proposed Action would improve traffic safety through elimination and reduction of risks. The view along the roads would change, and different observers may interpret the change as a negative or positive aesthetic impact.

Conclusion

The attached EA was prepared pursuant to 32 Code of Federal Regulations (CFR) 989 and U.S. Council on Environmental Quality (CEQ) regulations (Title 40, U.S. Code, Parts 1500-1508) for implementing the procedural requirements of the National Environmental Policy Act (NEPA). The finding of this EA is that the Proposed Action would have no significant impact on the human or natural environment. Notification was provided in local newspapers from 10-May-2005 through 11-Jul-2005 with no response from the public. Therefore, a Finding of No Significant Impact (FONSI) is issued for the Proposed Action and no Environmental Impact Statement (EIS) is required.

Restrictions

No restrictions are necessary for the Proposed Action.

Date: 22 Jul 2005

Charles H. King
Chief, Environmental Management Division
Arnold AFB, TN

Contents

Figures

Tables

Appendices

Acronyms and Abbreviations

AEDC	Arnold Engineering Development Center
AF	Air Force
AFB	Air Force Base
AFI	Air Force Instruction
AFMC	Air Force Materiel Command
AFOSH	Air Force Environmental and Occupational Safety
AICUZ	Air Installation Compatible Use Zone
ARAP	Aquatic Resource Alteration Permit
BMP	Best Management Practice
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CWA	Clean Water Act
DoD	Department of Defense
DoDI	Department of Defense Instruction
EA	Environmental Assessment
EHR	Eastern Highland Rim
EO	Executive Order
ESA	Endangered Species Act
ESHQ	Environmental Safety, Health, and Quality
FMP	Forest Management Plan
IEMP	Integrated Ecosystem Management Plan
IRP	Installation Restoration Program
JSA	Job Safety Analysis
MU	Management Unit

NCGP	No Consumption-General Public
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
OSHA	Occupational Safety and Health Administration
PCBs	Polychlorinated Biphenyls
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
ROW	Right-of-Way
SARA	Superfund Amendments and Reauthorization Act
SCS	Soil Conservation Service
SHPO	State Historic Preservation Office
SMZ	Streamside Management Zone
SVOCs	Semivolatile Organic Compounds
SWMU	Solid Waste Management Unit
TDEC	Tennessee Department of Environment and Conservation
TDF	Tennessee Division of Forestry
TSCA	Toxic Substances Control Act
TWQCA	Tennessee Water Quality Control Act
TWRA	Tennessee Wildlife Resources Agency
USAF	United States Air Force
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USC	U.S. Code
USFWS	United States Fish and Wildlife Service
VOCs	Volatile Organic Compounds
WPC	Division of Water Pollution Control
WQA	Water Quality Act

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. Arnold AFB is approximately 70 miles southeast of Nashville, the state capitol. Positioned 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, which contains approximately 26 billion gallons of water. Woods Reservoir is the source of drinking water for the Base and provides cooling water for facilities in the industrial area. On Arnold AFB, there are 5,785 acres of cultivated pine forests and 23,492 acres of hardwood forests. Grasslands and early-successional habitats in utility rights-of-way (ROWs) occupy 1,479 acres on the installation and provide habitat for numerous rare species (Call, 2003).

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 53 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 20.

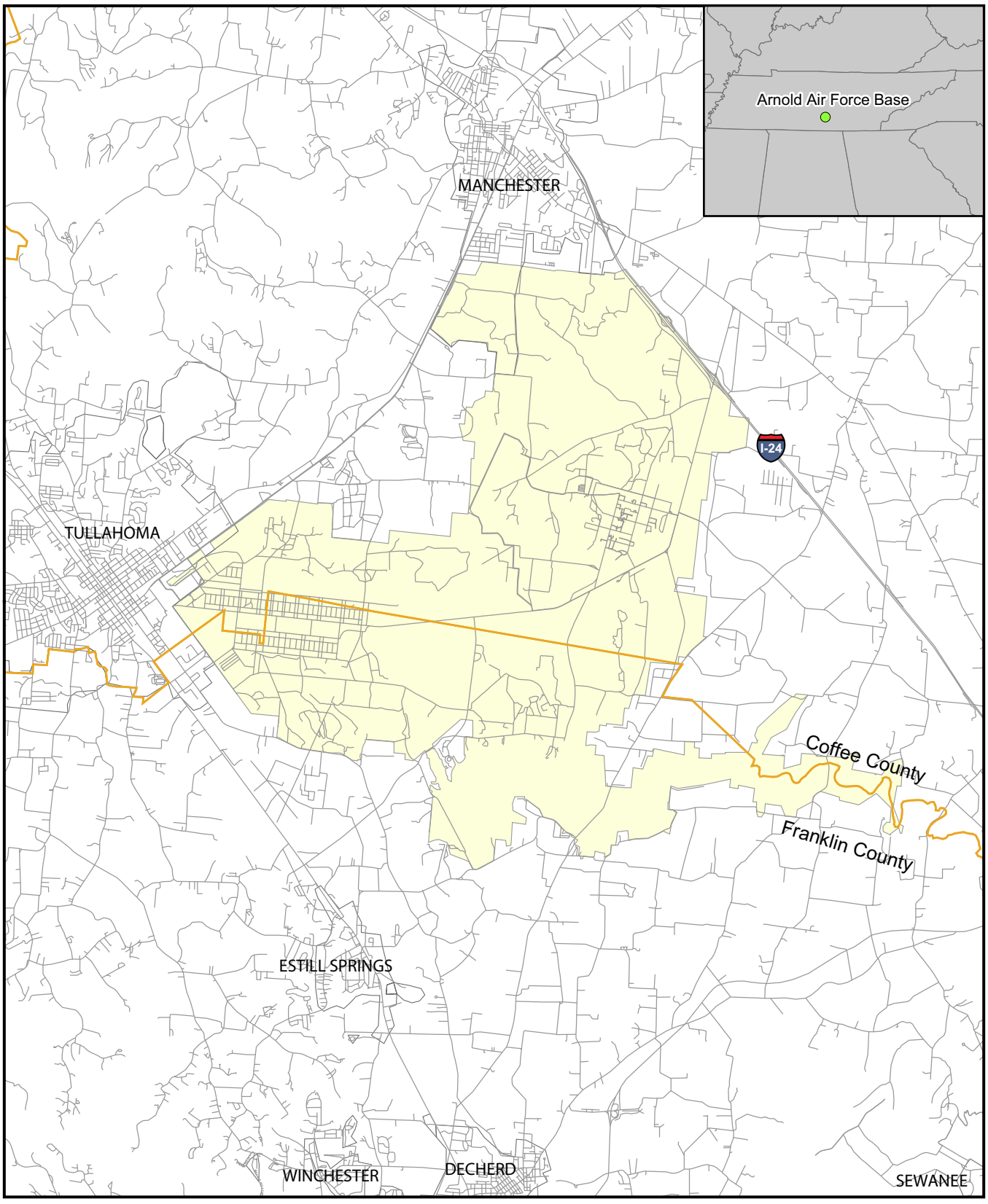
1.1.2 History

Arnold AFB is named for the late General Henry H. "Hap" Arnold, Commander of the Army Air Forces. In 1949, Congress authorized $100 million for the construction of AEDC. On 25 June 1951, 1 year after General Arnold's death, President Harry S. Truman dedicated the AEDC.

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.

The Department of Defense (DoD) mission requires that natural and cultural resources be managed to provide for the environmental security necessary to support the military mission of national defense. By conserving biodiversity, ecosystem management contributes to national security by helping maintain the natural resources upon which this country's strength depends. Ecosystem management also helps maintain natural landscapes for military training. Combat readiness is founded on the ability of the armed forces to sustain realistic military training now and into the future. DoD is also a



Legend

- Arnold AFB Boundary
- Road Centerline
- County Boundaries

Figure 1-1

Arnold Air Force Base and General Vicinity

Conversion of Forest Land to Road Right-of-Way

Final Environmental Assessment

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steward of significant cultural resources that provide information on the development of DoD and the country.

1.2 Proposed Action

The Proposed Action is to remove pine and other trees located along Wattendorf Highway, Arnold Center Road, Pumping Station Road, and Northshore Road on Arnold AFB. Activities would entail removing trees within a defined corridor on either side of these roads converting tree area to semi-improved lands, resulting in a total of 194 acres of converted land. The goals of the Proposed Action are to:

- Promote public safety by removing trees along the roadside that are susceptible to ice storm damage and could fall onto roadways.
- Reduce the frequency of conflicts between large animals (especially deer) and vehicles by expanding the field of vision of motorists so that they can see the animals in time to avoid accidents.

1.3 Need for Proposed Action

Tree removal on several heavily traveled roads is being proposed based upon historical problems encountered on the Base. For example, trees and limbs are susceptible to ice storm and heavy wind damage and have affected traffic on the roads. In addition, the heavily forested roadside obscures motorists' field of vision for recognizing large animals (e.g., deer) that may run into the path of a vehicle from the side of the road. This increases the opportunity for vehicle and large animal accidents. A larger cleared corridor would allow a greater field of vision for drivers and deer and has been shown to reduce the number of deer-vehicle collisions with proper vegetation management (Jaren et al., 1991; Putnam et al., 2004; Rea, 2003; Staines et al., 2001). A wider cleared area would also serve as a larger firebreak during prescribed burning activities conducted on-Base. Public safety along these roads is the main purpose for removing these trees.

1.4 Related Environmental Documents

The following documents were used in the preparation of this Environmental Assessment (EA):

- *Two Year Forest Management Plan, 2005-2006*. March 2004, prepared by ATA Conservation.
- *Integrated Ecosystem Management Plan 2003*, Arnold Engineering Development Center, Arnold Air Force Base, Tennessee, for Arnold Air Force Base, prepared by Geoff Call, Restoration Ecologist ACS Environmental Services, Conservation.
- *Historic Building Survey and Evaluation, Arnold Air Force Base, Coffee and Franklin Counties, Tennessee, Draft Report*. December 2001, submitted by TRC Garrow Associates, Inc., Atlanta, Georgia, and CH2M HILL, Atlanta, Georgia; M. Todd

Cleveland, Architectural Historian and Author, Jeffrey L. Holland, Historian and Author.

1.5 Decision to Be Made

A decision is required regarding the impacts of conducting tree removal and converting these areas to semi-improved lands along Wattendorf Highway, Arnold Center Road, Pumping Station Road, and Northshore Road. The decision to be made is whether to clear a 75-foot-wide corridor along both sides of these roads, clear a narrower corridor 50 feet wide, or conduct no tree removal in these areas.

1.6 Applicable Regulatory Requirements, Permits, and Coordination

The following regulations, permits, or coordination may be applicable to an Alternative Action as described in this EA:

- The National Environmental Policy Act (NEPA) of 1969, 42 U.S. Code (USC) 4321-4347, as amended
- Title 40 of the Code of Federal Regulations (CFR), Parts 1500-1508 (40 CFR 1500-1508), Council on Environmental Quality (CEQ) - Regulations for Implementing NEPA
- 32 CFR 989, Environmental Impact Analysis Process (EIAP)
- DoD Directive 6050.1 (32 CFR 214), Environmental Considerations in DoD Actions
- Air Force Instruction (AFI) 32-7064, Integrated Natural Resources Management
- Executive Order (EO) 11514, Protection and Enhancement of Environmental Quality (amended by EO 11991)
- The Endangered Species Act (ESA)of 1973 (16 USC 1531-1543),
- The Fish and Wildlife Coordination Act, (16 USC 661, et seq.),
- The Migratory Bird Treaty Act (16 USC 701, et seq.)
- The Clean Water Act (CWA) of 1977 and the Water Quality Act (WQA) of 1987 (33 USC 1251 et seq., as amended)
- EO 11990, Protection of Wetlands
- EO 12372, Intergovernmental Review of Federal Programs
- The Farmland Protection Act of 1981 (7 USC 4201 et. seq., as amended)
- DoD 4165.57, Air Installation Compatible Use Zone (AICUZ)

- The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 (as amended by the Superfund Amendments and Reauthorization Act [SARA] of 1986)
- The Resource Conservation and Recovery Act (RCRA) of 1976
- The Toxic Substances Control Act (TSCA)
- The National Historic Preservation Act (NHPA) of 1966 (16 USC 470 et seq., as amended)
- The Protection of Historic Properties (36 CFR 800) Act
- The Archeological Resources Protection Act of 1979
- EO 11988, Floodplain Management
- The Clean Air Act (CAA) (42 USC 7401 et seq., as amended)
- The Noise Control Act of 1972
- EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations
- EO 13045, Protection of Children from Environmental Health Risks and Safety Risk

1.7 Authority and Scope of the Environmental Assessment

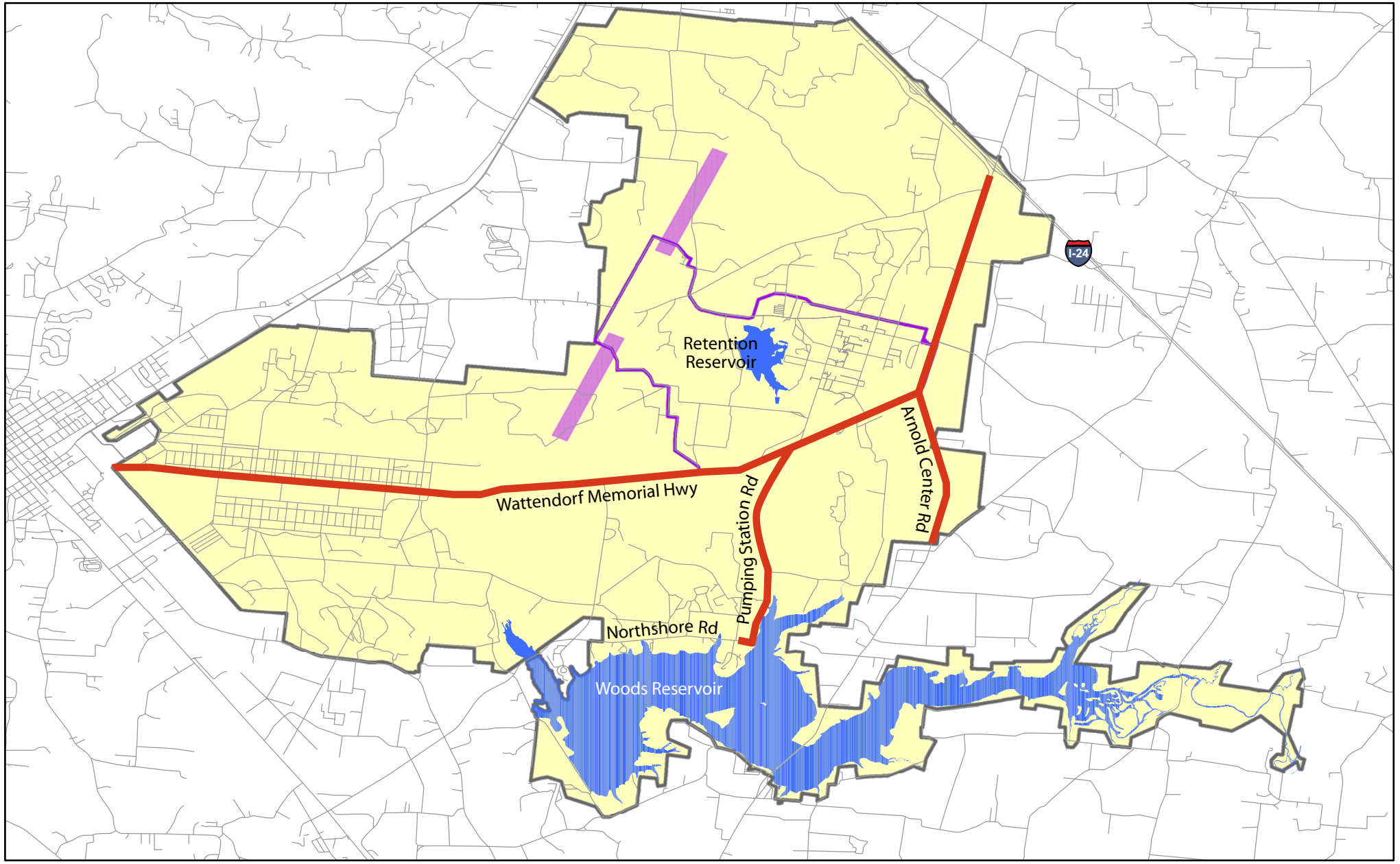
This document was prepared in accordance with the requirements of the NEPA of 1969, the CEQ regulations of 1978, and 32 CFR Part 989. To initiate the environmental analysis, the proponent (Arnold AFB) submitted an Air Force (AF) Form 813 – Request for Environmental Impact Analysis (Appendix A).

1.7.1 Issues Eliminated from Detailed Analysis

The Proposed Action would not have the potential for significant impacts to a variety of resource issues on Arnold AFB. Consequently, the resource issues identified below have been eliminated from analysis in this document.

1.7.1.1 Air Installation Compatible Use Zones

Arnold AFB has an active airfield and an exemption from HQ Air Force Materiel Command (AFMC) for AICUZ because of the limited number and type of flying operations. The components of the Proposed Action are not within any accident potential zones, do not encroach on the airfield, and would not impact airfield operations (Figure 1-2).



Legend

- Base Boundary
- AEDC Boundary
- Air Accident Potential Zones
- Reservoirs
- Roads
- Tree Removal Locations

N

0 0.5 1 2 3 4 Miles

Figure 1-2

Location of Tree Removal Activities near Accident Potential Zones

Conversion of Forest Land to Road Right-of-Way
Final Environmental Assessment

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habitat consistent with the effort underway to restore a barrens mosaic to portions of Arnold AFB.

1.7.1.2 Noise

The Proposed Action requires the use of heavy equipment to remove the trees. Potential noise impacts would be related to the use of logging equipment. However, tree removal would occur only during regular working hours, and workers would use proper hearing protection. Other potential sensitive receptors would be exposed to logging noise only for brief intervals while moving among buildings or from buildings to vehicles. Impacts would be similar to those analyzed in a previous EA (CH2M HILL, 2004a). This analysis found no significant adverse impacts from noise resulting from these short-duration events.

1.7.1.3 Air Quality

Tree removal activities under the Proposed Action would result in very limited generation of fugitive dust (particulate matter) and combustive emissions. Particulate matter would occur from the felling of trees and grinding of remains, but would be limited to normal working hours. Impacts would be similar to those analyzed in a previous EA (CH2M HILL, 2004a). The earlier analysis found no significant adverse impacts to air quality resulting from these short-duration events separated from other removal areas by time and distance.

1.7.1.4 Geology

No activities conducted under the Proposed Action would affect the underlying geologic features of Arnold AFB.

1.7.1.5 Socioeconomic Factors

Socioeconomic factors are associated with the human environment, including demographics, community infrastructure and services, employment and wages, recreation, and environmental justice. The Proposed Action would have no significant effect on socioeconomic factors. There would be temporary employment from the awarding of tree removal contracts, but these effects would be minor within the regional economy. There would be no increase or loss in permanent staffing positions on Arnold AFB, nor would there be any gain or loss of permanent employment in the surrounding region. There would be no change in demand for recreational facilities/opportunities and no change in recreational facilities/opportunities available to the staff of Arnold AFB or residents of the region. The planned tree removal would not cause people to move into or out of the area. With no change in population, the Proposed Action would not result in a change in demand for community infrastructure and services (fire, police, medical, housing, schools, etc.).

1.7.1.6 Environmental Justice and Protection of Children

The removal areas are on Arnold AFB and the proposed tree removal would not impact minority or low income population groups. The areas proposed for tree removal are unpopulated and tree removal activities would not create environmental health or safety risks for children.

1.7.1.7 Floodplains

None of the timber stands alongside the four roads proposed for tree removal are located in the floodplain. No impacts to floodplain contours or topography are expected to occur.

1.7.2 Issues Studied in Detail

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

- Land Use
- Occupational Health and Safety
- Geomorphology
- Hydrology and Water Quality
- Non-Sensitive Biological Resources
- Sensitive Species
- Sensitive Habitats
- Hazardous Materials and Installation Restoration Program (IRP)
- Aesthetics
- Cultural Resources

1.8 Document Organization

This EA follows the organization established by the CEQ regulations (40 CFR, Parts 1/500-1508). 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 Affected Environment
4.0 Environmental Consequences
5.0 Plan, Permit, and Management Requirements
6.0 List of Preparers
7.0 List of Contacts
8.0 References
Appendix A

2.0 Description of Proposed Action and Alternatives

As required by federal regulation, this EA addresses the possible environmental impacts of the Proposed Action and a No-Action Alternative. This section provides a summary of the issues and potential impacts associated with the Proposed Action and No-Action Alternative.

2.1 Proposed Action (Preferred Alternative)

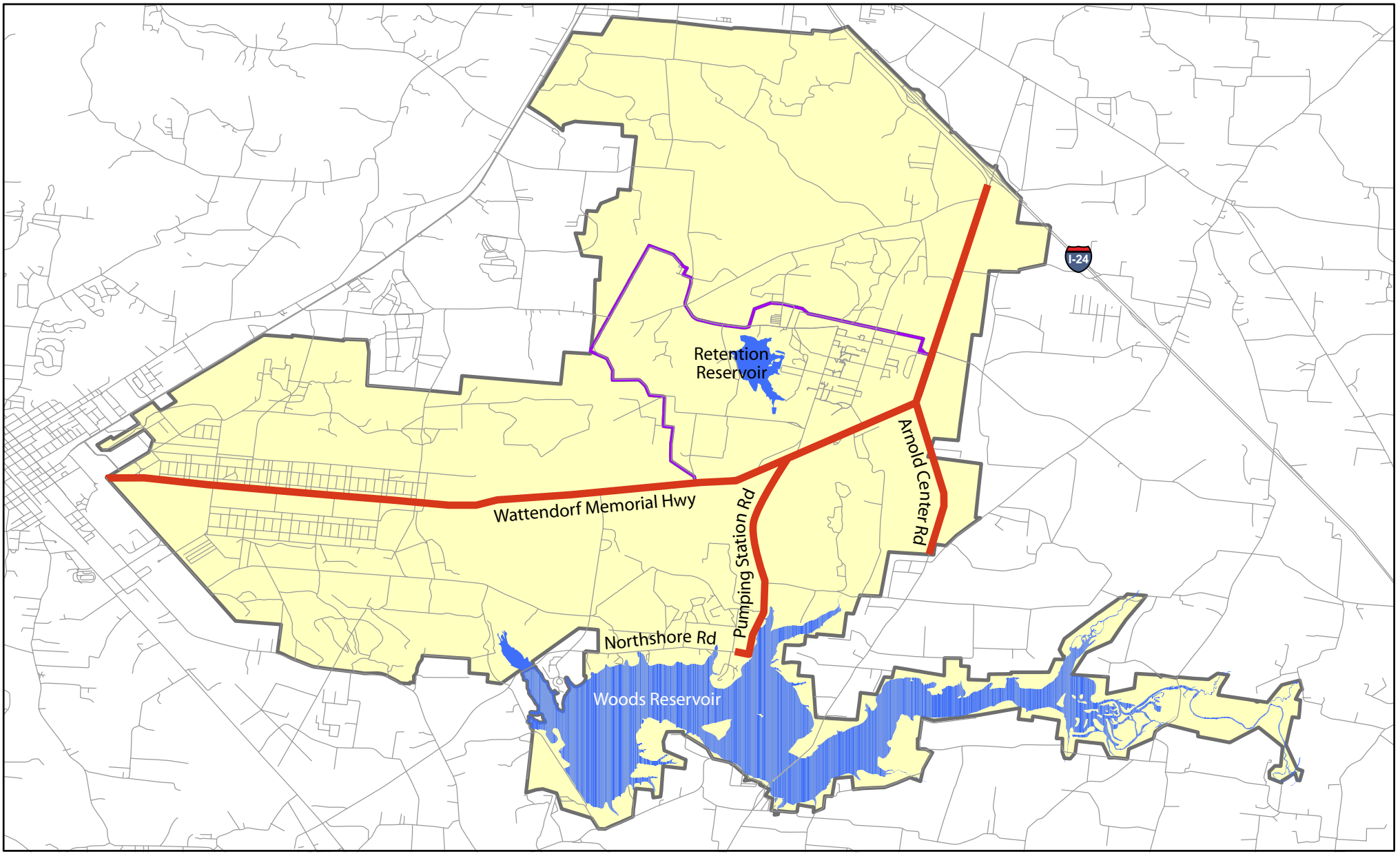
The Proposed Action is to remove trees, primarily pine, located along Wattendorf Highway, Arnold Center Road, Pumping Station Road, and a short portion of Northshore Road (Figure 2-1). Exact locations of the proposed tree removal corridors are presented on Figures 2-2 through 2-9. Removal would extend 75 feet from the edge of the pavement on both sides of the aforementioned roads. When finished, approximately 17.5 miles of roadway would have shoulders cleared to 75 feet, although a substantial portion of this roadway already has shoulders cleared to distances ranging from 25 feet to more than 75 feet. The total area that would be cleared is 194 acres.

Each area proposed for tree removal would be surveyed in advance of removal to determine the best location for a decking area. The decking area is where timber would be loaded onto trucks. Establishing the decking area in advance of equipment mobilization would reduce the need for extensive best management practices (BMPs) to minimize erosion and control runoff from the site.

Disturbance of riparian zones would be minimized to the extent practicable. Where streams cross the roads, tree removal would be limited to pine trees, with hardwood species left undisturbed.

The cleared area would be converted to semi-improved land over a 2- to 3-year period. All logging deck and harvest area limbs and debris would be chipped or removed from the roadway ROW and disposed of out of sight from these public roads. All tree removal would be accomplished using equipment similar to that used in the timber harvesting effort conducted in 2004 (CH2M HILL, 2004a). Stumps would be sheared at ground level 18 to 24 months after tree removal. Stump tops and other logging debris would be raked and disposed of in appropriate solid waste areas. The semi-improved grounds would be maintained by periodic (once or twice a year) bush-hogging (Mark Moran, ATA personal communication, 2005). There would be no change to the mowing frequency on areas that are already maintained as grass.

The preferred alternative is the Proposed Action, as described above. The Proposed Action would reduce the potential risk of treefall across well-traveled roads and improve ability of drivers to see animals and avoid animal collisions along these roads (Jaren et al., 1991; Putnam et al., 2004; Rea, 2003; Staines et al., 2001).



Legend

- Base Boundary
- AEDC Boundary
- Reservoirs
- Roads
- Tree Removal Locations

N

0 0.5 1 2 3 4 Miles

Figure 2-1

Proposed 2005 Tree Removal Locations on Arnold Air Force Base

Conversion of Forest Land to Road Right-of-Way
Final Environmental Assessment

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Legend

- 75 ft Tree Removal Corridor
- Current Semi-Improved Grounds Maintenance
- Base Boundary

N

0 1,000 2,000 3,000 4,000 Feet

Figure 2-2

Proposed 2005 Tree Removal - Western

Conversion of Forest Land to Road Right-of-Way

Final Environmental Assessment

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Legend

75 ft Tree Removal Corridor

Current Semi-Improved Grounds Maintenance

N

0 1,000 2,000 3,000 4,000

Feet

Figure 2-3

Proposed 2005 Tree Removal - West Central

Conversion of Forest Land to Road Right-of-Way

Final Environmental Assessment

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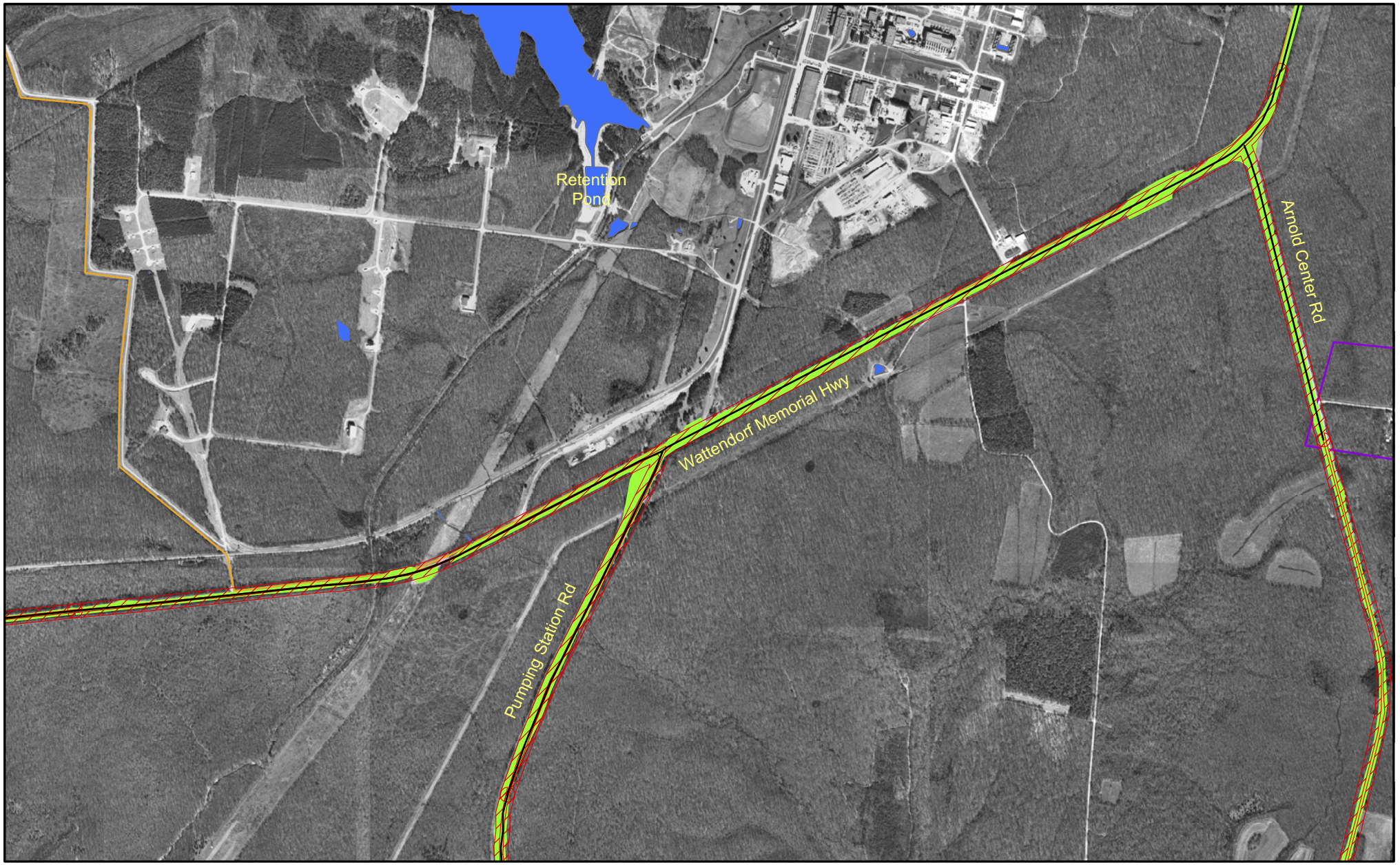

Legend

- 75 ft Tree Removal Corridor
- Current Semi-Improved Grounds Maintenance
- Water Body
- Base Boundary
- AEDC Boundary

N

0 1,000 2,000 3,000 4,000 Feet

Figure 2-4

Proposed 2005 Tree Removal - Central

Conversion of Forest Land to Road Right-of-Way
Final Environmental Assessment

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Legend

- 75 ft Tree Removal Corridor
- No Clearing
- Current Semi-Improved Grounds Maintenance
- Water Body
- AEDC Boundary
- Base Boundary

N

0 1,000 2,000 3,000 4,000 Feet

Figure 2-5

Proposed 2005 Tree Removal - North Central

Conversion of Forest Land to Road Right-of-Way
Final Environmental Assessment

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Legend

- 75 ft Tree Removal Corridor
- Current Semi-Improved Grounds Maintenance
- Water Body
- Base Boundary

N

0 1,000 2,000 3,000 4,000 Feet

Figure 2-6

Proposed 2005 Tree Removal - Northern

Conversion of Forest Land to Road Right-of-Way
Final Environmental Assessment

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Legend

- 75 ft Tree Removal Corridor
- Current Semi-Improved Grounds Maintenance
- AEDC Boundary

N

0 1,000 2,000 3,000 4,000 Feet

Figure 2-7

Proposed 2005 Tree Removal - South Central

Conversion of Forest Land to Road Right-of-Way
Final Environmental Assessment

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Legend

- 75 ft Tree Removal Corridor
- Current Semi-Improved Grounds Maintenance
- Base Boundary
- Water Body

N

0 1,000 2,000 3,000 4,000 Feet

Figure 2-8

Proposed 2005 Tree Removal - Southern

Conversion of Forest Land to Road Right-of-Way
Final Environmental Assessment

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Legend

- 75 ft Tree Removal Corridor
- Current Semi-Improved Grounds Maintenance
- Water Body
- Base Boundary
- AEDC Boundary

N

0 1,000 2,000 3,000 4,000 Feet

Figure 2-9

Proposed 2005 Tree Removal - Southeastern

Conversion of Forest Land to Road Right-of-Way
Final Environmental Assessment

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2.2 Alternative Action

The Alternative Action would be to remove at the same locations along designated roads as in the Proposed Action, but to remove trees from a 50-foot corridor on each side of the roads. This would produce a 91-acre area cleared of trees. All removal activities would be the same as for the Proposed Action.

2.3 No-Action Alternative

In the No-Action Alternative, existing conditions would be maintained along the four roads and no tree removal would be conducted. Under the No-Action Alternative, the substantial risk of treefall across one or more of these roads would remain. Treefall would present the potential for traffic disruption and personal health risks. These potential issues would extend beyond Arnold AFB and disrupt or pose threats to the surrounding community. The No-Action Alternative does not meet the stated project goals.

2.4 Comparison of Alternatives

The Proposed Action, Alternative Action, and the No-Action Alternative are compared in Table 2-1.

TABLE 2-1
Comparison of Impacts of the Proposed Action, Alternative Action, and No-Action Alternative
Conversion of Forest Land to Road Right-of-Way Final Environmental Assessment

Resource Area	Proposed Action	Alternative Action	No-Action Alternative
Land Use	Short-term land use impacts from conversion of forested areas to maintained road ROW. Conversion of lands would not change management practices for the Base.	Short-term land use impacts from conversion of forested areas to maintained road ROW. Conversion of lands would not change management practices for the Base.	No Impacts.

TABLE 2-1
Comparison of Impacts of the Proposed Action, Alternative Action, and No-Action Alternative
Conversion of Forest Land to Road Right-of-Way Final Environmental Assessment

Resource Area	Proposed Action	Alternative Action	No-Action Alternative
Occupational Health and Safety	Long-term safety benefit to AEDC and the surrounding community from the removal of trees that overhang the roads, thus minimizing hazards from falling trees. Also improves the field of vision to avoid large animal impacts (Jaren et al., 1991; Putnam et al., 2004; Rea, 2003; Staines et al., 2001) and creates a larger corridor for prescribed fire activities on-Base. Use of appropriate procedures and personal protective equipment by workers would minimize the potential for accidental injury of persons conducting tree removal.	Long-term safety benefit to AEDC and the surrounding community from the removal of trees that overhang the roads, thus minimizing hazards from falling trees. Also improves the field of vision to avoid large animal impacts (Jaren et al., 1991; Putnam et al., 2004; Rea, 2003; Staines et al., 2001) and creates a slightly larger corridor for prescribed fire activities on-Base. Use of appropriate procedures and personal protective equipment by workers would minimize the potential for accidental injury of persons conducting tree removal.	Potential negative impacts by leaving overhanging trees that could result in adverse effects due to inclement weather. Also, due to the proximity of the trees, the inadequate field of vision to avoid large animals crossing the roads would remain.
Geomorphology	Limited short-term impacts would occur in removal and staging areas; soils would be stabilized following tree removal and restored through managed and unmanaged revegetation processes. No soil impacts from stump shearing at the soil surface.	Limited short-term impacts would occur in removal and staging areas; soils would be stabilized following tree removal and restored through managed and unmanaged revegetation processes. No soil impacts from stump shearing at the soil surface.	No impacts.
Hydrology	A short-term increase in runoff could occur. Onsite BMPs would control runoff to avoid/minimize impacts during and immediately following felling activities.	A short-term increase in runoff could occur. Onsite BMPs would control runoff to avoid/minimize impacts during and immediately following felling activities.	No impacts.
Water Quality	Short-term impacts to streams could occur from inputs of sediment and spilled fuel/petrochemicals. BMPs during and following removal activities would minimize or avoid potential for impacts.	Short-term impacts to streams could occur from inputs of sediment and spilled fuel/petrochemicals. BMPs during and following removal activities would minimize or avoid potential for impacts.	No impacts.

TABLE 2-1
Comparison of Impacts of the Proposed Action, Alternative Action, and No-Action Alternative
Conversion of Forest Land to Road Right-of-Way Final Environmental Assessment

Resource Area	Proposed Action	Alternative Action	No-Action Alternative
Non-Sensitive Biological Resources	Localized short-term impacts would occur from removal and displacement of species that use forest habitat	Localized short-term impacts would occur from removal and displacement of species that use forest habitat.	Potential impacts to the large animal community that would cross the road. With the inadequate field of vision for drivers along these roads, these animals would be more readily struck by passing vehicles.
Sensitive Species	No direct impacts from felling would occur. No long-term impacts would result. Federal and state protected species occur in the area proposed for clearing. Mitigation measures would be implemented to minimize impacts.	No direct impacts from felling would occur. No long-term impacts would result. Federal and state protected species occur in the area proposed for clearing. Mitigation measures would be implemented to minimize impacts.	No impacts.
Sensitive Habitats	Tree removal operations would be managed to minimize impacts to sensitive habitats, including avoidance of areas near Goose Pond.	Tree removal operations would be managed to minimize impacts to sensitive habitats, including avoidance of areas near Goose Pond.	No impacts.
Hazardous Materials and IRP	Potential for limited impacts near IRP sites. Activities would not interfere with soils or cause contamination.	Potential for limited impacts near IRP sites. Activities would not interfere with soils or cause contamination.	No impacts.
Aesthetics	Impacts would result from tree removal. Different observers may view the change as positive or negative once semi-improved grounds are established.	Impacts would result from tree removal. Different observers may view the change as positive or negative once semi-improved grounds are established.	No impacts.

TABLE 2-1
Comparison of Impacts of the Proposed Action, Alternative Action, and No-Action Alternative
Conversion of Forest Land to Road Right-of-Way Final Environmental Assessment

Resource Area	Proposed Action	Alternative Action	No-Action Alternative
Cultural Resources	No significant impacts to cultural resources. Felling locations within pine plantations have been reviewed and cleared during site-specific surveys. Hardwood sites and planted pine strips along the highway require review. A Phase I survey would be performed prior to tree removal in hardwood areas. If any sites that are eligible or potentially eligible for inclusion on the National Register of Historic Places (NRHP) are discovered, State Historic Preservation Office (SHPO) coordination and appropriate mitigation would be implemented to protect/preserve these resources.	No significant impacts to cultural resources. Felling locations within pine plantations have been reviewed and cleared during site-specific surveys. Hardwood sites and planted pine strips along the highway require review. A Phase I survey would be performed prior to tree removal in hardwood areas. If any sites that are eligible or potentially eligible for inclusion on the NRHP are discovered, SHPO coordination and appropriate mitigation would be implemented to protect/preserve these resources.	No impacts.

3.0 Affected Environment

This section describes those portions of the natural and human environment at Arnold AFB that could be impacted by the considered alternatives.

3.1 Land Use

Arnold AFB occupies 39,081 acres including the 3,632-acre Woods Reservoir. Woods Reservoir provides cooling water and drinking water for facilities in the industrial area. Cultivated pine forests total approximately 5,785 acres and hardwood forests total 23,492 acres. There are grasslands and early-successional habitats in utility ROWs that occupy roughly 1,479 acres on the installation and provide habitat for numerous rare species. In addition, 4,683 acres of the installation are occupied by wildlife food plots, buildings/structures, mowed/bush hog areas, and other open areas, such as landfills, roads, etc. (Call, 2003). Current ROW areas have trees within close proximity (30 ft) to the roadway. These trees have historically posed road safety hazards along these road corridors and are being addressed by the Proposed Project. This includes the likelihood of collision with deer and other road hazards from fallen trees in the roadway as well as downed powerlines.

3.2 Occupational Health and Safety

The Air Force Safety Center develops Air Force Environmental and Occupational Safety (AFOSH) standards. These standards implement Occupational Safety and Health Administration (OSHA) rules directed by Department of Defense Instruction (DoDI) 6055.1 and AFI 91-302. The Branch also develops other guidance to supplement the AFOSH standards and ensure their availability at the supervisor and worker level. The goal is to ensure 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 necessary to prevent mishaps (United States Air Force [USAF], 2004).

The Environmental Safety, Health, and Quality (ESHQ) team is responsible for environmental and occupational safety at Arnold AFB. The ESHQ team ensures that workers are informed about potential hazards from chemicals and materials that may be encountered on the Base and that work areas have proper lighting and ventilation for work tasks to be performed.

Job Safety Analyses (JSAs) are prepared for all operational activities on the Base. The JSAs for tree removal were identified and described in a previous EA (CH2M HILL, 2004a).

Deer-vehicle collision data are available for Arnold AFB for the period since 1987 (Table 3-1). On Arnold AFB, most deer-vehicle collisions occur in fall and winter (Table 3-1). The data indicate a trend of decreasing collisions per year.

TABLE 3-1
Yearly Total and Monthly Average Deer-Vehicle Collisions on Arnold AFB
Conversion of Forest Land to Road Right-of-Way Final Environmental Assessment

Year	Deer-Vehicle Collisions	Month	Average Deer-Vehicle Collisions
1987	94	January	7.9
1988	60	February	5.2
1989	67	March	5.3
1990	68	April	4.2
1991	88	May	2.9
1992	84	June	2.4
1993	67	July	2.4
1994	653	August	2.8
1995	58	September	3.6
1996	55	October	6.4
1997	60	November	9.6
1998	47	December	7.7
1999	61		
2000	34	Yearly Total	60.4
2001	51		
2002	54		
2003	44		
2004	42		

Unpublished data provided by Mark Moran and Phillip Sherrill

Historically, trees that have fallen during inclement weather events have caused traffic problems such as road closures from downed powerlines and trees in the roadway that pose safety hazards. This is primarily due to their close proximity to the roadway. Trees along roadways can fall during thunderstorms, as well as snow and ice storms. In falling, these trees also could cause above-ground utility lines to fall. Downed trees and utility infrastructure can obstruct roadways, create obstacles to traffic, and increase the potential for traffic accidents. Falling trees can also hit vehicles and result in injures or fatalities.

3.3 Physical Resources

Physical resources include the atmosphere (air quality, climate, and meteorology), geomorphology (landforms, terrain, topography, and soils), geology (underlying land formations), and hydrology (surface- and groundwaters, including water quality). Analyses in this area focus on identifying those resources that would be impacted by the

alternatives and the resulting consequences to the quality and utility of those resources. Physical resource areas pertinent to this analysis include geomorphology, hydrology, and water quality.

3.3.1 Geomorphology

Geomorphology, as discussed here, refers to landforms, slopes (topography/relief), and soils at the Arnold AFB area. A detailed discussion of the geomorphology occurring on Arnold AFB was presented in a previous EA (CH2M HILL, 2004a). Analysis of this feature helps to establish the relationships between various elements of the environment (geology, hydrology, vegetation, and wildlife). The topography at Arnold AFB ranges from relatively flat with poor surface drainage in the northern portion of the installation to moderately rolling with defined stream channels in the southern section.

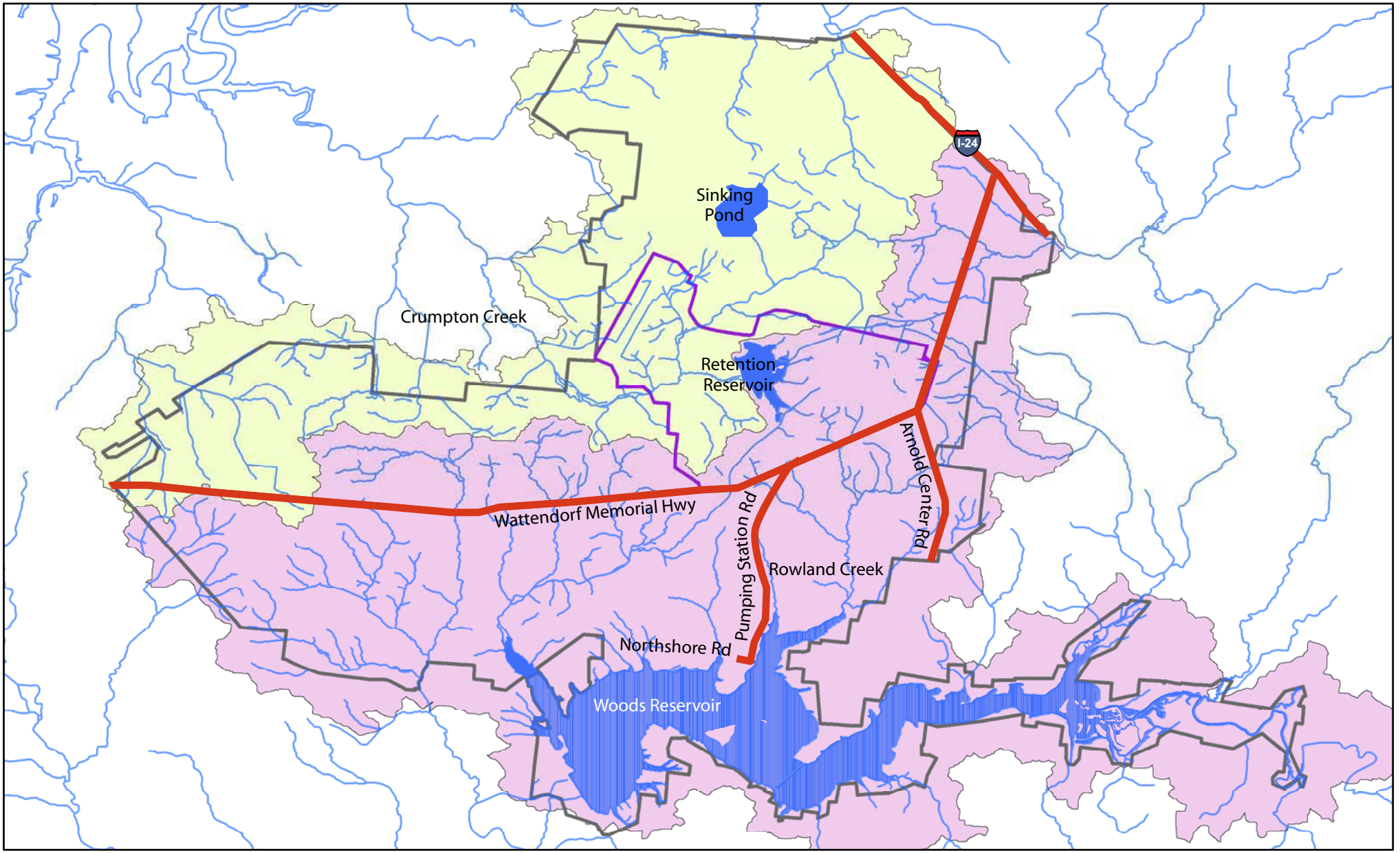
Arnold AFB lies within the Eastern Highland Rim (EHR) physiographic region of Tennessee (Miller, 1974). Elevations range from about 1,100 feet above sea level at the drainage divide to 890 feet above sea level in the valleys. In the areas north and northeast of Arnold AFB, there are many swamps and internally drained depressions. Stream channels there are poorly defined and remain dry through much of the summer and fall (Haugh and Mahoney, 1994).

Soils on Arnold AFB primarily belong to the Dickson-Mountview-Guthrie Association (Love et al., 1959; Springer and Elder, 1980; Patterson, 1989). The Dickson silt loam and Mountview silt loam are the most important soils on well-drained slopes and ridges. The Dickson soil has a discontinuous fragipan (relatively impermeable layer) that restricts subsoil drainage (Love et al., 1959). The fragipan layer contributes to the patterns of seasonal flooding observed at Arnold AFB by restricting drainage during the wet winter months and by limiting the upward movement during the dry summer months.

The Dickson-Baxter-Greendale soil association also occurs on Arnold AFB. It is an extensive soil association on the Highland Rim and occupies 13.3 percent of Coffee County. Typical relief for this association includes large, almost level or undulating areas with steeper slopes near drainageways. The drainage pattern is dendritic, but streams are neither numerous nor well-entrenched. Imperfectly and moderately drained soils predominate (United States Department of Agriculture [USDA] Soil Conservation Service [SCS], 1949).

3.3.2 Hydrology

Hydrological features consist of surface waters (lakes, rivers, streams, and springs) and groundwater. Arnold AFB lies within the Duck River and the Elk River basins. The drainage divide between these two watersheds extends southwest to northeast through the AEDC Industrial Area (Figure 3-1). The Duck River basin lies to the north of the divide and receives drainage from Hunt, Huckleberry, Wiley, Crumpton, and Bobo Creeks and the Hickerson Spring Branch. The Elk River basin is to the south of the divide and collects surface drainage, primarily from Bradley, Brumalow, and Rowland Creeks. Smaller creeks such as Dry Creek, Hardaway Branch, Saltwell Hollow Creek, Spring Creek, and Poorhouse Creek also contribute to the Elk River (Call, 2003).



Legend

- Base Boundary
- AEDC Boundary
- Reservoirs
- Duck River Basin
- Elk River Basin
- Roads
- Tree Removal Locations

N

0 0.5 1 2 3 4 Miles

Figure 3-1

Watersheds on Arnold Air Force Base

Conversion of Forest Land to Road Right-of-Way
Final Environmental Assessment

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Regional groundwater resources include the Mississippi Carbonate (karst) aquifer (recently re-named the Highland Rim aquifer). This aquifer consists of flat-lying carbonate rocks of Mississippian age and underlies the Highland Rim physiographic province. Well yields commonly range from 5 to 50 gallons per minute (Tennessee Department of Environment and Conservation [TDEC], 2002a).

Karst areas are characterized by sinkholes, springs, disappearing streams and caves, and by rapid, highly directional groundwater flow in discrete channels. Since water can travel rapidly over long distances through conduits that lack natural filtering processes of soil and bacteria, karst systems are easily contaminated.

Floodplains have been defined at several locations on Arnold AFB. These areas are located near Sinking Pond and the inlet to Woods Reservoir at considerable distance from the proposed activities.

The climate of the EHR varies by season, with generally mild winters and warm summers. Rainfall averages between 50 and 55 inches per year and is heaviest in late winter and early spring. The average yearly temperature is about 60 degrees Fahrenheit, but is variable from place to place (Smith, 2004). Precipitation is fairly evenly distributed throughout the year, with slightly less in fall and slightly more in winter. August is typically the driest month (3.4 inches of precipitation) and February has the highest average precipitation (6.8 inches) (www.noaa.gov).

3.3.3 Water Quality

Arnold AFB straddles the Upper Elk River and the Duck River basins. Within the Duck River basin there are only two streams that do not fully meet their designated uses. Both the Duck River and the Little Duck River have elevated bacteria levels near the City of Manchester, attributed to failing sewage collection systems within the city and general urban runoff (TDEC, 2002b).

Within the Upper Elk River basin 12 waterbodies are on the Section 303(d) list as failing to meet their designated uses (United States Environmental Protection Agency [USEPA], 2004) Woods Reservoir, located in the project area, is listed as not supporting its designated uses because of polychlorinated biphenyls (PCBs) impairment of sediments resulting from historical PCB releases from AEDC into Woods Reservoir. A No Consumption-General Public (NCGP) fishing advisory has been issued for catfish (TDEC, 2002b).

3.4 Biological Resources

Biological resources include the native and introduced terrestrial plants and animals around Arnold AFB. The land areas at Arnold are home to unusually diverse biological resources including several sensitive species, habitats, and wetlands. Arnold AFB developed a system of ecological associations based on floral, faunal, and geophysical characteristics. These ecological associations are described in the Arnold AFB Integrated Ecosystem Management Plan (IEMP) (Call, 2003). A comprehensive review of the important species has been presented in previous EAs (CH2M HILL, 2004a, 2004b). Therefore, only summary information is provided below.

3.4.1 Eastern Highland Rim Ecological Association

The EHR region is part of the Mississippian Plateau section of the Western Mesophytic Forest region, supporting a mixed oak-tulip-chestnut forest with accessory stands of beech and hemlock. Relic stands of mixed hardwood-white pine occur on some bluffs above streams. The Barrens of the EHR is linked to the karst topography and was once an area of tallgrass prairies.

3.4.2 Wildlife Species

Wildlife species at Arnold AFB are those common to the central southeastern United States. A total of 412 vertebrate species have been documented on Arnold AFB, including 226 bird species, 83 fish species, 26 amphibian species, 35 reptile species, and 42 mammal species (J.W. Lamb, unpublished data). These counts are discussed fully in a previous EA (CH2M HILL, 2004c). In addition, AEDC Conservation staff have documented 226 species of birds on Arnold AFB (J.W. Lamb, unpublished data).

3.4.3 Plant Species

The plant species found at Arnold AFB are those common to the EHR Ecological Association. Oak-hickory forest, cedar glades, and a mosaic of bluestem prairie and oak-hickory forest dominate this association. The predominant vegetation form is temperate low land and submontane broad-leaved cold-deciduous forest. Oaks (*Quercus* spp.) are the dominant canopy species. Hickories (*Carya* spp.), including pignut (*C. glabra*), mockernut (*C. tomentosa*), shagbark (*C. ovata*), and bitternut (*C. cordiformis*), form a common but minor component (McNab and Avers, 1994).

Numerous wetlands occur across the Base, with prevailing vegetation ranging from grassland to closed-canopy forest. Several hundred acres of open, prairie-like Barrens occur primarily near the airfield and along electric power and railroad ROWs. The Nature Conservancy and the Tennessee Division of Natural Heritage classified and mapped 33 plant associations on Arnold AFB. Seventeen of the 33 plant associations found on Arnold AFB are considered "imperiled" community types.

Present vegetation on Arnold AFB is predominantly upland and swamp oak forest. Of the forested areas, 23,492 acres are in native hardwoods and 5,785 acres are in planted, non-native pines. Forested areas are most frequently characterized by closed canopies dominated by various oaks. Dry sites are dominated by post oak (*Q. stellata*), blackjack oak (*Q. marilandica*), scarlet oak (*Q. coccinea*), southern red oak (*Q falcata*), and black oak (*Q. velutina*). Wet sites are dominated by white oak (*Q. alba*), willow oak (*Q. phellos*), water oak (*Q. nigra*), and overcup oak (*Q. lyrata*). Understories include a wide variety of species such as dogwoods (*Cornus* spp.), maples (*Acer* spp.), sassafras (*Sassafras albidum*), sourwood (*Oxydendrum arboreum*), and blueberries (*Vaccinium* spp.).

3.4.4 Sensitive Species

Sensitive species include those with federal endangered or threatened status, species proposed for listing as federal threatened or endangered, state endangered and threatened species, and state species of special concern status. 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 in the future throughout all or a significant portion of its range due to loss of habitat, anthropogenic effects, or other causes.

AF projects that could affect federally protected species and species proposed for federal listing are subject to the ESA. The ESA requires designation of critical habitat for federally listed species. However, no areas on Arnold AFB are designated as critical habitat under the ESA. The species present on Arnold AFB that are protected under the ESA are summarized below. A more thorough discussion of each species has been presented in previous EAs (CH2M HILL, 2004a, 2004b).

In addition to consideration of potential impacts to federally protected species, this EA also considers potential impacts to the rough rattlesnake-root (*Prenanthes aspera*), classified as endangered in Tennessee with only five known population locations.

3.4.4.1 Gray Bat *(Myotis grisescens*)

A gray bat colony resides on Arnold AFB at Woods Reservoir Dam and is listed as a Priority 2 maternity colony in the United States Fish and Wildlife Service (USFWS) Gray Bat Recovery Plan (1982). It is one of very few maternity colonies that have been identified as using manmade structures for a maternity roost (Lamb, 2003).

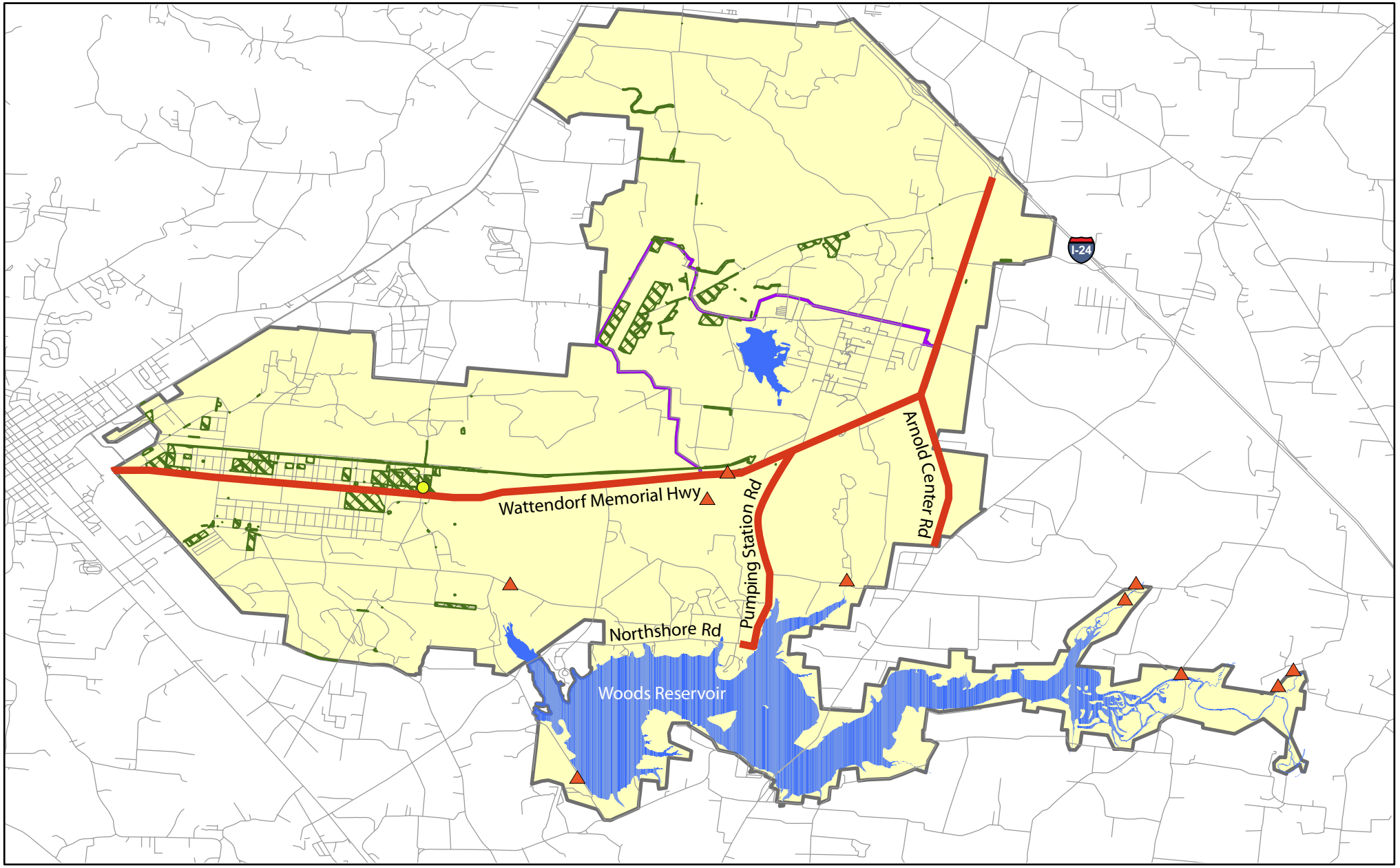
Gray bats forage primarily on aquatic insects along forested riparian corridors and use other forested corridors as travel routes. The canopy provides protective cover from potential predators (Rommé and Reaves, 1999; Lamb, 2003). Mist net surveys at Arnold AFB have confirmed this life history characteristic, and gray bats have been captured while foraging along Elk River Bottoms, Bradley Creek, Brumalow Creek, and Rowland Creek. Juvenile bats typically forage in wooded areas around the maternity cave (Rommé and Reaves, 1999; Lamb, 2003). Therefore, protection of these areas also is important to recovery and maintenance of the species.

Documented observations of the gray bat on Arnold AFB are provided on Figure 3-2.

3.4.4.2 Indiana Bat (*Myotis sodalis*)

Indiana bats hibernate in caves and typically spend summers under the loose bark of trees in upland and bottomland forests and semi-wooded areas (Whitaker and Hamilton, 1998). Typically, Indiana bats make summer roost in hardwood trees with sloughing bark or cavities (Rommé and Reaves, 1999). Indiana bats forage on insects in a variety of habitats. This species typically forages in and around the tree canopy of riparian, floodplain, and upland forests. They also may forage along fence-rows, crops, clearings, and farm ponds (Rommé and Reaves, 1999).

AnaBat II™ surveys in 2003 identified the possible presence of Indiana bats along Bradley and Brumalow Creeks, but the species has never been captured in mist nets on the Base. (Lamb, 2004). There is some difficulty in positively identifying Indiana bats from calls recorded with an AnaBat II™ detector because of similarity and marginal overlap with other bat species. The USFWS does not currently accept AnaBat II™ identifications in the absence of confirmed captures (Robert Currie, USFWS, communication, 2004 to J.W. Lamb cited in Lamb, 2004). Additional surveys would be required to confirm the presence of this species on the Base.



Legend

- Base Boundary
- AEDC Boundary
- Reservoirs
- Roads
- Tree Removal Locations
- Eggert's Sunflower Occurrences
- Gray Bat Occurrences
- Rough Rattlesnake-Root Occurrence

N

0 0.5 1 2 3 4 Miles

Figure 3-2

Sensitive Species Occurrences Near Proposed Tree Removal Sites

Conversion of Forest Land to Road Right-of-Way

Final Environmental Assessment

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3.4.4.3 Bald Eagle *(Haliaeetus leucocephalus*)

There are an estimated 50,000 bald eagles in the United States, with 80 percent found in Alaska (Murphy et al., 1989). Tennessee's bald eagle population is the highest in winter when birds migrate from the north. Most of the birds overwinter in western parts of the state, particularly at Reelfoot Lake, and at Dale Hollow Reservoir. However, bald eagles may occur on almost any waterway in the state (Tennessee Wildlife Resources Agency [TWRA], 2004). In the Southeast, bald eagles build their nests in early September. To date, no bald eagles have been documented nesting at Woods Reservoir. Bald eagles have been observed at Woods Reservoir every year since 1989. Typically two adults and in a few rare instances, a juvenile, have been observed.

3.4.4.4 Eggert's Sunflower (*Helianthus eggertii*)

Eggert's sunflower is the only federally listed threatened plant species known from Arnold AFB. Management actions for the species are integrated with other aspects of the Arnold AFB ecosystem management program.

Eggert's sunflower management on Arnold AFB is planned in coordination with the Cookeville, Tennessee office of the USFWS. A Cooperative Management Agreement was developed and signed in 2004 that guides management on Arnold AFB. Documented locations of the Eggert's sunflower on Arnold AFB are provided on Figure 3-2.

3.4.4.5 Cumberland Pigtoe (*Pleurobema gibberum*)

Cumberland pigtoe is a federally threatened aquatic invertebrate bivalve species. A single relict shell was found on Arnold AFB in a 1990 faunal survey (Mullen et al., 1995), but live specimens have never been found on the Base (Call, 2003). Additional relict shells have not been located in surveys conducted by USFWS since 1990 (J.W. Lamb, personal communication, 2004). This species is therefore not considered further in this assessment.

3.4.4.6 Rough Rattlesnake-Root (*Prenanthes aspera*)

Rough rattlesnake-root is classified as endangered by the State of Tennessee. Only 5 populations of this species are known to occur in Tennessee and 2 of those are on Arnold AFB (K. Fitch, personal communication). This perennial herbaceous plant flowers in fall and occurs in relatively open areas, including along Wattendorf Highway in the western part of the Base.

3.4.5 Sensitive Habitats

Sensitive habitats are described as those supporting threatened or endangered plant and animal species, areas determined to be exemplary natural communities by federal or state agencies, or habitat areas that are exceptionally fragile and susceptible to damage. The sensitive habitats meeting these criteria occurring on the Base are the wetlands habitat, woodland/savanna/grassland habitat, and upland dry-mesic forests habitat.

3.4.5.1 Wetlands Habitat

Wetlands are inundated areas, or areas where water is present either at or near the surface of the soil for distinguishable periods of time throughout the year. Wetland flats

and depressions are the two primary wetland types on Arnold AFB. The USFWS completed a wetlands inventory and mapping project on Arnold AFB in 1998 and documented 1,894 acres of wetlands in 220 sites. Two hundred wetlands on Arnold AFB totaling about 1,775 acres are classified as either flats or depressions. Figure 3-3 shows wetlands located near proposed tree removal activities. The nature of the wetlands and the associated conservation targets have been discussed in previous EAs (CH2M HILL, 2004a, 2004b).

3.4.5.2 Woodland/Savanna/Grassland Habitat

A woodland/savanna mosaic was a dominant habitat in the premilitary landscape on Arnold AFB. Woodland and savanna components include lightly forested, oak-dominated habitats with a grass- and forb-dominated understory. Savannas are grasslands with a minor canopy cover. Woodlands are low-density forests with a well developed herbaceous understory. Historic fire exclusion resulted in the succession of most woodland and savanna habitats on Arnold AFB into forested habitats with shrub-dominated understories.

The grasslands at Arnold AFB are dominated by grasses characteristic of tallgrass prairies in the midwestern United States, and also include many wildflower and bird species associated with that region.

3.4.5.3 Upland Dry-Mesic Forests Habitat

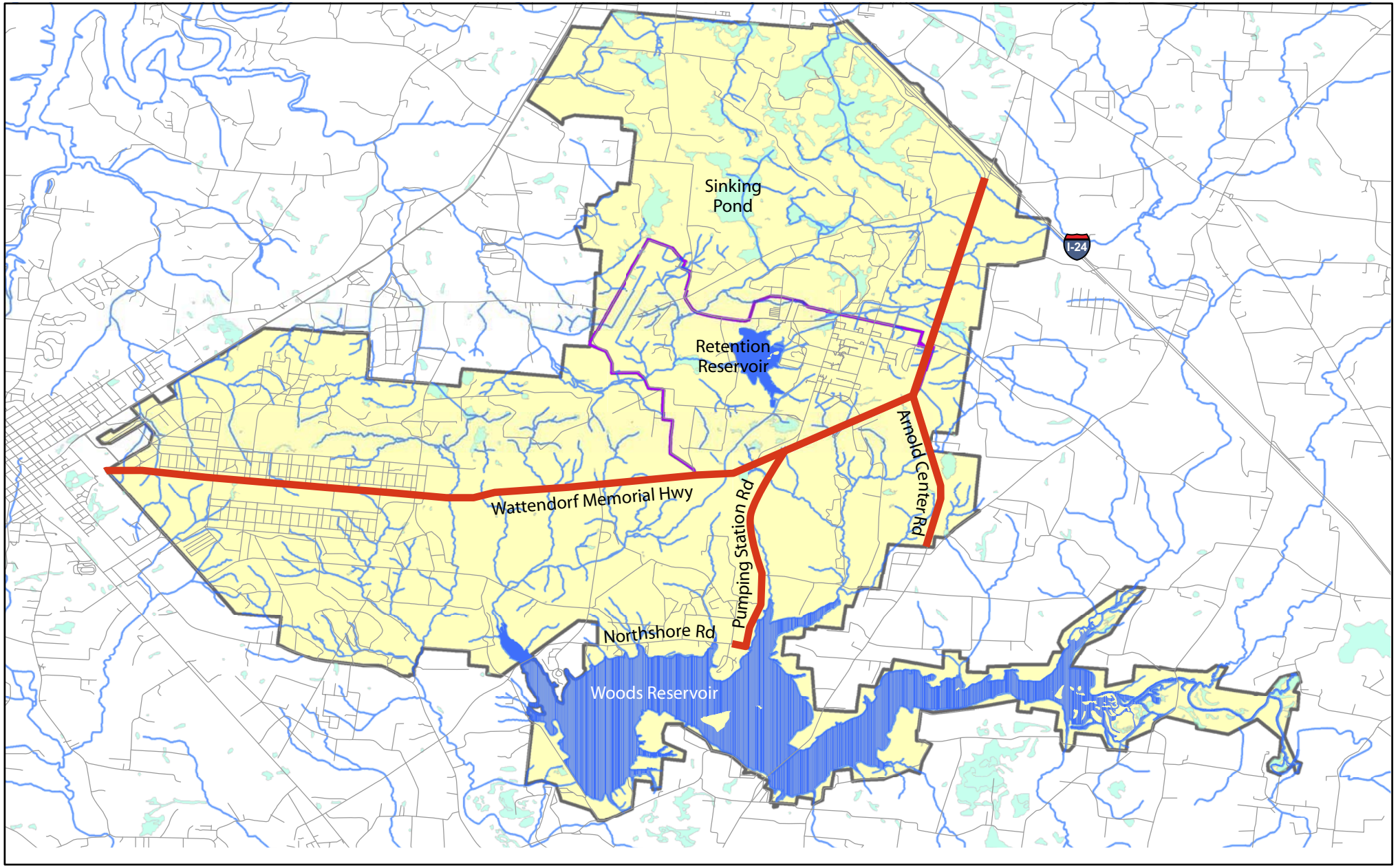
The original forest vegetation on Arnold AFB consisted of an oak-hickory forest type on the better-drained soils and a mixed bottomland hardwood type on the poorly drained soils. High-grade logging practices and burning for woodland pasture led to development of forest consisting primarily of blackjack oak, post oak, and scarlet oak on the thinner and drier upland soils with stands of southern red oak, white oak, water oak, and willow oak found on the wetter sites.

Pine is not native to this part of Tennessee but was planted on approximately 5,700 acres of the Base between 1950 and 1972. A pine reforestation program was initiated in 1983 to re-establish loblolly pine on pine sites that were removed.

Recent infestations of southern pine beetle have resulted in re-evaluation of pine management strategies on Arnold AFB. In 2003, a decision was made to convert some pine acreage to open Barrens habitat by not replanting after salvage harvest of the dead trees along Wattendorf Highway (Call, 2003).

3.5 Hazardous Materials and IRP

Arnold AFB has an active IRP designed to protect human health and ensure that natural resources are restored for future use (CH2M HILL, 2002a). Twenty-six IRP sites have been identified on Arnold AFB, 11 of which have been closed after determinations of no further action required. Proposed removal areas are located in Solid Waste Management Unit (SWMU) 24 and cross over streams that are considered active IRP sites (Figure 4-8).



Legend

- Base Boundary
- AEDC Boundary
- Reservoirs
- Roads
- Tree Removal Locations
- Wetlands

N

0 0.5 1 2 3 4 Miles

Figure 3-3

Wetlands Located on Arnold Air Force Base

Conversion of Forest Land to Road Right-of-Way
Final Environmental Assessment

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Wattendorf Memorial Highway crosses Bradley Creek, Brumalow Ditch, and Rowland Ditch, which have been identified as IRP sites. PCBs and metals have been reported in the sediments of Brumalow Ditch (CH2M HILL, 2002b). Bradley Creek drains much of the industrial area of AEDC and has shown concentrations of volatile organic compounds (VOCs) in surface water and PAHs in the sediments in past samplings (CH2M HILL, 2003). Rowland Ditch is a periodically dredged channel with known concentrations of VOCs, semivolatile organic compounds (SVOCs), pesticides, PCBs, hydrazine, and metals in the sediment (CH2M HILL, 2002c).

Arnold Center Road traverses through SWMU 24, the site of the former Camp Forrest complex. SWMU 24 is approximately 5,000 acres in size and encompasses 85 separate potential contaminant source areas. These source areas are former gas stations, motor pools, vehicle maintenance areas, warehouses, fuel storage and distribution areas, a coal pile, an incinerator, and two landfills. These sites were active between 1941 and 1946, when Camp Forrest was decommissioned and dismantled. Most of SWMU 24 is now overgrown with vegetation. Current uses include forestry, wildlife management, and recreation.

Sites with the potential for contamination within SWMU 24 were evaluated from 1999 to 2004. During the Confirmatory Sampling Program, organic chemicals were found in low concentrations at some sites. These include xylene, ethylbenzene, pesticides, acetone, and phthalates. Arsenic or other metals slightly above background levels were also detected at some sites. Sixteen of the 85 sites were then investigated in a RCRA Facility Investigation (RFI). Seven of the former fuel handling sites were found to have surface soils with contaminants exceeding USEPA human health or ecological screening levels, primarily polycyclic aromatic hydrocarbons (PAHs) and lead. The two former landfills and the former incinerator also had surface soil contamination exceeding screening levels, including SVOCs, metals, pesticides, PCBs, and dioxins. Former Landfill 1 and the former incinerator site are the two areas with the highest levels of surface soil contamination. The incinerator is located on a 1-acre site in the northeastern corner of Camp Forrest in Area A, on Road 14. The landfill is adjacent to the incinerator and encompasses approximately 17 acres. A fence around the incinerator and landfill restricts access to those properties (CH2M HILL, 2001).

3.6 Aesthetics

At present, approximately 30 percent of the 17.5 miles of roadway proposed for clearing is considered open, with the nearest trees more than 30 feet from the roadway. Trees are located within 30 feet of the roadway on the remaining 70 percent. The aesthetics along the four roads would change as a result of tree removal. A strip of forested grounds would be converted to open semi-improved grounds. The existing cleared ROW would continue to be maintained by mowing at the same frequency as in the past, and the newly created open areas would be maintained by mowing on a somewhat less frequent schedule. This change would be most noticeable along the publicly traversed Wattendorf Highway and Arnold Center Road. Currently there are several areas along Wattendorf Highway with tree lines that are located more than 75 feet from the road bed.

3.7 Cultural Resources

Section 106 of the NHPA requires that federal agencies analyze the impacts of federal activities on historic properties. Areas potentially impacted by mission activities are surveyed as part of the AF Cultural Resources Management Program.

Cultural resources that have been identified on Arnold AFB were described and discussed in previous EAs (CH2M HILL, 2004a, 2004b). Not all of the areas proposed for tree removal have been surveyed for cultural resources. Section 4.8 addresses the size and locations of any Phase 1 archeological surveys.

4.0 Environmental Consequences

4.1 Land Use

4.1.1 Proposed Action

The Proposed Action would result in conversion of 194 acres of forested land to semi-improved grounds. This conversion, less than 0.7 percent of the forested land on Arnold AFB and limited to narrow road corridors, would be minor. The minor conversion would not result in a need for changes in forest management on Arnold AFB.

4.1.2 Alternative Action

The Alternative Action would result in conversion of 91 acres of forested land to semi-improved grounds. This conversion, approximately 0.3 percent of forested land on Arnold AFB and limited to narrow road corridors, would be minor. The minor conversion would not result in a need for changes in forest management on Arnold AFB.

4.1.3 No-Action Alternative

Under the No-Action Alternative, tree removal along Wattendorf Highway, Arnold Center Road, Pumping Station Road, and Northshore Road would not occur. There would be no change in land use on Arnold AFB.

4.2 Occupational Health and Safety

4.2.1 Proposed Action

A detailed discussion of tree cutting practices and issues was presented in a previous (CH2M HILL, 2004a). A JSA has been developed at the Base for tree cutting activities and personnel participating in tree removal must read, understand, and sign this JSA before participating in any felling activities. Following the procedures outlined in the JSA would minimize the potential for accidental worker injury during the tree removal activities.

Cutting alongside roadways could temporarily impede traffic movement on or adjacent to the Base. Appropriate traffic control measures would be implemented to maintain traffic flow and thus protect driver safety.

Removal of trees within 75 feet of the roadways would reduce the potential risk for trees to fall across the roadway during inclement weather and would reduce potential traffic and safety hazards associated with road obstruction resulting from treefalls.

Maintaining cleared, semi-improved conditions within 75 feet of the roadway would improve visibility and field of view for drivers. This would reduce the risk of deer-vehicle collisions along these roadways (Jaren et al., 1991; Putnam et al., 2004; Rea, 2003;

Staines et al., 2001). However, because the area would not be seeded to grass but allowed to naturally revegetate, maintenance mowing would have to be timed properly to prevent vigorous growth of shrubs, which could attract deer and increase the potential for collisions (Rea, 2003).

Because of the measures described above, impacts to occupational health and safety would be minor during tree removal activities.

4.2.2 Alternative Action

In the Alternative Action, tree removal would occur along the same roads as in the Proposed Action. Effects on occupational health and safety during tree removal activities would be the same as those of the Proposed Action.

Removal of trees within 50 feet of the roadways would reduce the potential for trees to fall across the roadway during inclement weather and would reduce potential traffic and safety hazards associated with road obstruction and tree impact.

Maintaining cleared, semi-improved conditions within 50 feet of the roadway would improve visibility for drivers and deer and would reduce the potential for deer-vehicle collisions along these roadways (Jaren et al., 1991; Putnam et al., 2004; Rea, 2003; Staines et al., 2001). However, because the area would not be seeded to grass but allowed to naturally revegetate, maintenance mowing would have to be timed properly to prevent vigorous growth of shrubs, which could attract deer and increase the potential for collisions (Rea, 2003).

4.2.3 No-Action Alternative

Under the No-Action Alternative, tree removal along Wattendorf Highway, Arnold Center Road, Pumping Station Road, and Northshore Road would not occur. Heavy winds or ice storm damage could cause trees or large limbs to break and fall into the roadways, impeding traffic and potentially causing accidents.

Additionally, the narrowly cleared ROW provides cover for larger animals, such as deer, and makes it difficult for drivers to see and avoid these animals when they cross the road. Animal-vehicle collisions would be more likely along roads with less cleared area along the sides than under the Proposed Action or the Alternative Action (Jaren et al., 1991; Putnam et al., 2004; Rea, 2003; Staines et al., 2001).

4.3 Geomorphology

Minor disturbance to soils would occur from the tree removal activities related to the Proposed Action.

4.3.1 Proposed Action

The Proposed Action does not include construction of new logging roads. Only temporary paths and designated decking areas within the sites to be cleared would be established to prevent equipment from damaging the asphalt. The total area of soil disturbance would be 194 acres. Implementation of appropriate BMPs, consistent with

the Tennessee Erosion and Sedimentation Control Act and the Tennessee Guidelines for Forestry BMPs, would prevent excessive damage to soils during felling operations. Stump removal would occur 18 months after tree removal activities, giving the stump time to decompose. Stumps would be sheared at ground level and the soil would not be disturbed. Stumps and logging debris would be raked and disposed in an appropriate solid waste disposal area. Any disturbance to soils would be temporary and minor. Modifications to the soil structure from tree removal activities would be minimized through soil stabilization where necessary. A complete discussion of tree removal activities and the associated effects to geomorphology is available in a previous EA (CH2M HILL, 2004a).

4.3.2 Alternative Action

The Alternative Action effects to geomorphology would be similar to those of the Proposed Action. The temporarily impacted area would be less (91 acres compared to 194 acres), with proportionately less soil disturbance. Implementation of BMPs and site restoration measures, as described for the Proposed Action, would minimize impacts.

4.3.3 No-Action Alternative

There would be no tree removal and no associated soil disturbance resulting from implementation of the No-Action Alternative. Therefore, the No-Action Alternative would have no impacts on geomorphology.

4.4 Hydrology and Water Quality

4.4.1 Hydrology

Impacts to hydrology could result from land clearing, loss of vegetation, and associated accelerated runoff following precipitation events. Increased site runoff could result in an increased flash response of receiving streams, with higher and more rapid stream rise and a greater potential for flash floods. Increased runoff could also result in reduced groundwater levels through loss of recharge and lower resultant stream baseflow.

4.4.1.1 Proposed Action

Tree removal activities would be of short duration and occur in a relatively narrow corridor along existing roads. Potential impacts to hydrology would be controlled through implementation of appropriate BMPs to control stormwater runoff and prompt stabilization of removal areas where necessary. Streamside Management Zones (SMZs) would be impacted to some degree, within the allowable limits of the Tennessee Guidelines for Forestry (Tennessee Division of Forestry [TDF], 2003), by the Proposed Action. Pine trees located in SMZs would be felled away from the stream, but hardwood trees would be left. Additional site-specific BMPs, consistent with the Tennessee Erosion and Sedimentation Control Act, would be implemented as needed to prevent water quality degradation from hydrologic changes resulting from increased runoff or channelization as a result of tree removal. However, stumps would be left in place in these areas to minimize soil disturbance and retain the root mass for streambank stabilization. Soil disturbance would be limited to minor compaction and surficial

scarring from treefall and removal. Removal activities would not be conducted on either side of the road in the vicinity of Goose Pond, which is located east of Wattendorf Highway (Figure 2-8).

The impacts on hydrology would be minimal because of the duration of the tree removal activities, use of appropriate BMPs, and avoidance of stump removal actions. Impacts on hydrology would be temporary, as understory vegetation cover that would intercept and slow runoff would establish within one growing season.

4.4.1.2 Alternative Action

The Alternative Action effects to hydrology would be similar to those of the Proposed Action. The magnitude of impact would be more limited because the area to be cleared is less than half that of the Proposed Action (91 acres compared to 194 acres).

4.4.1.3 No-Action Alternative

There would be no tree removal and no associated soil disturbance resulting from implementation of the No-Action Alternative. Therefore, the No-Action Alternative would have no impacts on hydrology.

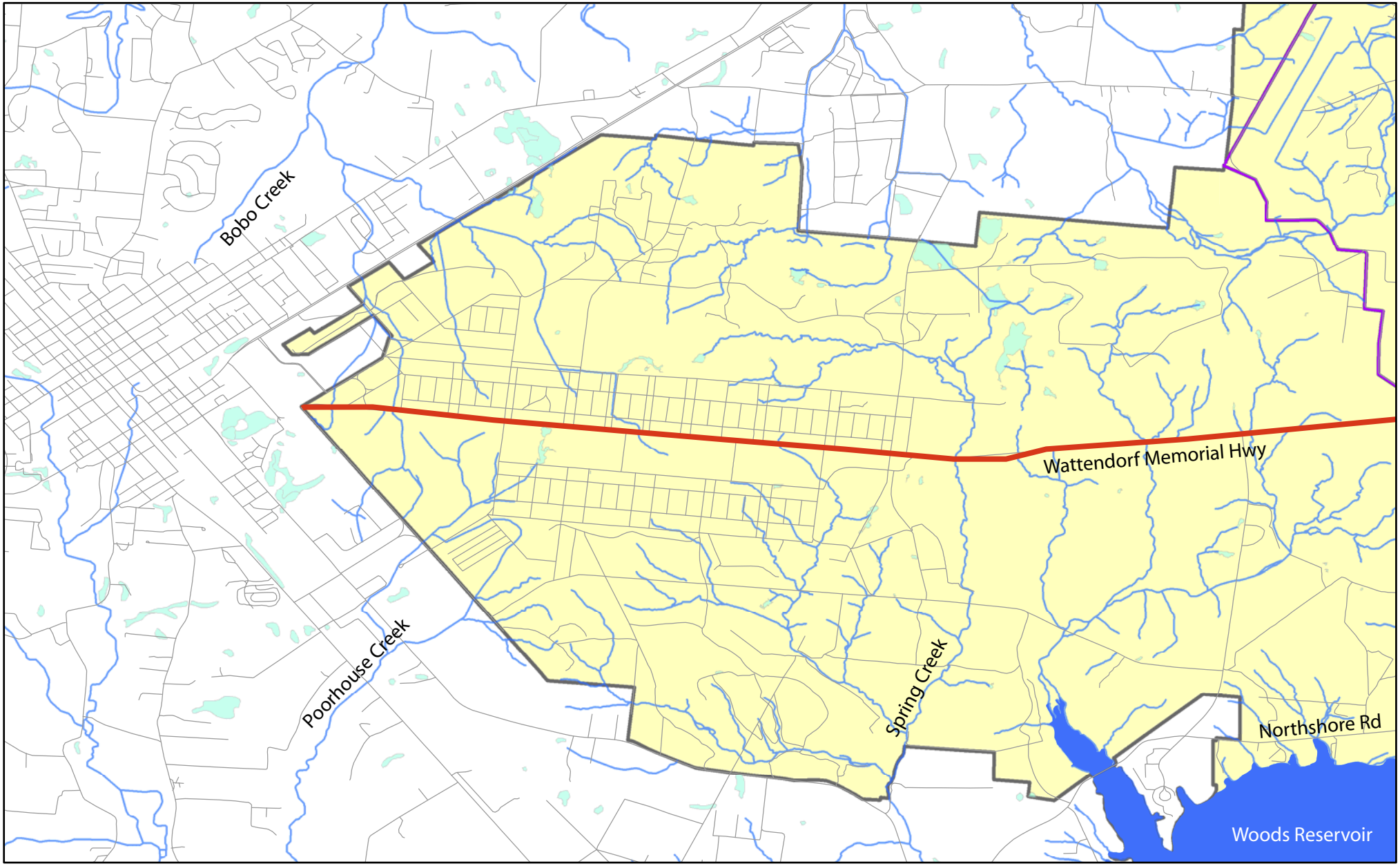
4.4.2 Water Quality

The potential for adverse effects to water quality would exist due to the proposed felling activities. The TDEC 305(b) Report concludes that forestry operations do not contribute significantly to soil erosion and water pollution in Tennessee. However, poor logging practices can result in unnecessary environmental problems. Only where logging decks and stream crossings expose soil would the possibility exist for the transport of sediment into streams (TDF, 2003). Transport can occur downslope, into immediately adjacent waters, or downstream from a headwater wetland that where trees are removed. Impacts to waters could result from:

- Sediment – soil material suspended in water resulting from erosion. Sediment from runoff causes cloudy water and covers the bottom of streams and lakes. These conditions limit the ability of aquatic organisms to breathe, feed, and reproduce.
- Organic Matter - debris from living organisms. Examples of organic matter include leaves, twigs, branches, and other plant material. Organic matter in waterways can impede navigation, restrict water flow, reduce oxygen levels, and change water color.
- Elevated Water Temperature - caused by direct sunlight resulting from removal of tree canopy adjacent to waterways. Elevated water temperature limits the ability of aquatic organisms to breathe, feed, and reproduce (TDF, 2003).

4.4.2.1 Proposed Action

Potential impacts to waters would result from sediments and organic matter and an increased canopy opening allowing more sunlight and potentially more aquatic macrophyte growth (e.g., algae). Figures 4-1 through 4-3 identify the road corridors that would be felled and the nearby streams.



Legend

- Base Boundary
- AEDC Boundary
- Reservoirs
- Roads
- Tree Removal Locations
- Streams
- Wetlands

N

0 0.25 0.5 1 1.5 2 Miles

Figure 4-1

Wetland and Stream Locations and Proposed Western Tree Removal Sites

Conversion of Forest Land to Road Right-of-Way
Final Environmental Assessment

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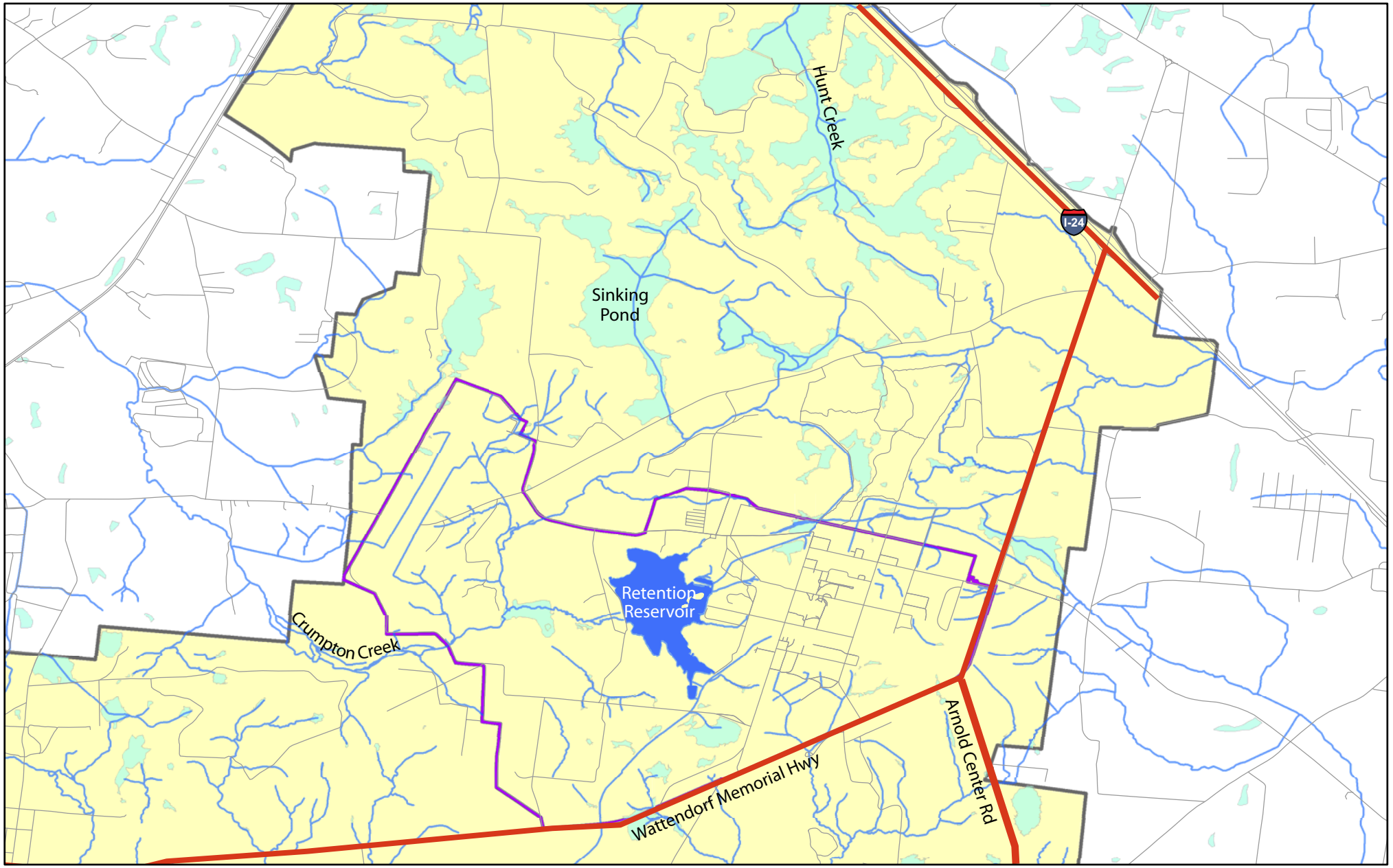

Legend

- Base Boundary
- AEDC Boundary
- Reservoirs
- Roads
- Tree Removal Locations
- Wetlands
- Streams

N

0 0.25 0.5 1 1.5 2 Miles

Figure 4-2

Wetland and Stream Locations and Proposed Eastern Tree Removal Sites

Conversion of Forest Land to Road Right-of-Way

Final Environmental Assessment

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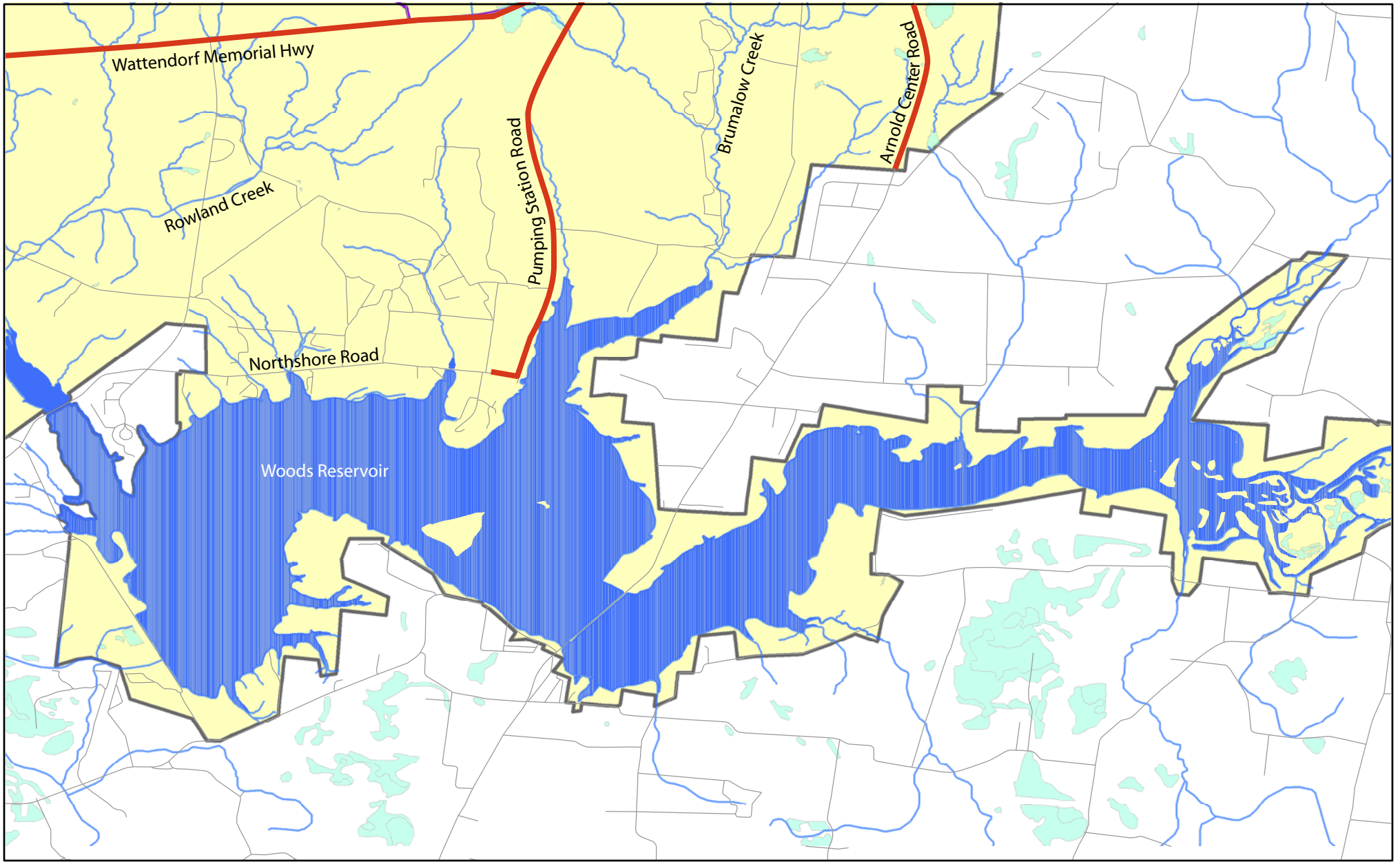

Legend

- Base Boundary
- AEDC Boundary
- Reservoirs
- Roads
- Tree Removal Locations
- Streams
- Wetlands

N

0 0.25 0.5 1 1.5 2 Miles

Figure 4-3

Wetland and Stream Locations and Proposed Southern Tree Removal Sites

Conversion of Forest Land to Road Right-of-Way
Final Environmental Assessment

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All streams near proposed felling sites are in generally level terrain and would not require additional corridor width based on site slope. Topographic quadrangles were reviewed to determine the slopes near each of the removal areas. The slopes are very gradual. No stump removal would occur in SMZs. Appropriate BMPs, as identified in the *Guide to Forestry Best Management Practices* (TDF, 2003), would be adhered to throughout all tree removal activities to minimize the potential for movement of sediments to offsite areas.

Logging debris, such as trees, and branches, can block streams, cause channel erosion, and introduce excessive organic matter into streams. Logging debris also has the potential to cause flooding if it remains in stream channels. Because no stump removal would be conducted near streams, logging debris entering streams would be minimal and impacts from this debris would be negligible and of short duration. Trees and branches would be moved away from all waterways to prevent their being washed into waterways during high water. Trees and branches would not be dragged through stream channels.

Discharge of fuels and lubricants into waters of the State of Tennessee as part of equipment maintenance and refueling is a violation of the Tennessee Water Quality Control Act (TWQCA). Vehicle operation, refueling, and maintenance during tree removal would involve fuels and petrochemicals that could impact water quality if released into the environment. However, the contractor would be required to follow proper procedures and BMPs for operation, maintenance, and refueling of vehicles to minimize and avoid impacts to water quality from accidental spills. These procedures include keeping all vehicles and equipment in proper operating condition, not conducting refueling and maintenance activities within 100 feet of an intermittent or perennial stream or a wetland, and storing all fuels and lubricants in proper containers more than 100 feet from any stream or wetland.

BMPs for maintaining soil and water quality, as described in the *Guide to Forestry Best Management Practices* (TDF, 2003) would be adhered to throughout all tree removal activities. These actions would avoid or minimize impacts to water quality. A complete discussion of tree removal activities and the associated effects on water quality is available in a previous EA (CH2M HILL, 2004a). No more than minor, temporary adverse impacts to water quality are expected to result from the Proposed Action.

4.4.2.2 Alternative Action

The Alternative Action effects to water quality would be similar to those of the Proposed Action. The magnitude of impact would be more limited because the area to be cleared is less than half that of the Proposed Action (91 acres compared to 194 acres).

4.4.2.3 No-Action Alternative

There would be no tree removal and no associated disturbance resulting from implementation of the No-Action Alternative. Therefore, the No-Action Alternative would have no impacts on water quality.

4.5 Biological Resources

Impacts would occur if proposed tree removal activities would damage or kill an individual of a species, disturb or displace a species without causing harm, or alter habitat. This section examines potential impacts and discusses project design features that would be implemented to avoid or minimize impacts.

4.5.1 Non-Sensitive Species

4.5.1.1 Proposed Action

Tree removal would result in the loss of planted pine trees in areas adjacent to the four roads. This would be a direct localized loss of these species and would displace animal species that use forest habitats. Limited incidental mortality to animals could occur. However, conflicts between animals and vehicular traffic in the area would likely be reduced, constituting a beneficial impact to those species (Jaren et al., 1991; Putnam et al., 2004; Rea, 2003; Staines et al., 2001). The total acreage of tree removal is less than 1 percent of the total forest area on Arnold AFB. Because of the relatively small area to be cleared and the proximity of suitable replacement habitat, impacts to animals are expected to be temporary and minor.

The tree removal is consistent with the integrated ecosystem management approach on Arnold AFB and was adapted from the Forest Management Plan (FMP). Therefore, the impacts to vegetation would be minor and easily assimilated into the Base ecosystem.

4.5.1.2 Alternative Action

The Alternative Action effects to non-sensitive species would be similar to those of the Proposed Action. The magnitude of impact would be more limited, however, because the area to be cleared is less than half that of the Proposed Action (91 acres compared to 194 acres).

4.5.1.3 No-Action Alternative

Under the No-Action Alternative, no tree removal would occur. Therefore, no impacts to non-sensitive species would result from implementation of the No-Action Alternative.

4.5.2 Sensitive Species

4.5.2.1 Proposed Action

Gray Bat

The Proposed Action would not cause direct physical injury to gray bats, as no bats would be present at tree removal sites during removal. Gray bats do not roost in trees, and they forage at night when felling activities have ceased.

Some SMZs would be cleared under the Proposed Action. Gray bats typically travel and forage along riparian corridors, so there would be minor impacts to their preferred travel/foraging habitat. Gray bats have been documented foraging and traveling on Arnold AFB in and across habitats (clearings and forest) that are not riparian (Lamb, 2004). Gray bats have been documented using some of the riparian corridors in the area

(Figures 4-4 through 4-6) and alteration of less than 200 acres of habitat would not constitute a significant change in habitat quality or quantity for gray bats on Arnold AFB. Clear-cut corridors that are near riparian areas may offer additional foraging areas for gray bats, but again the magnitude would be very limited and not significant. Therefore, minor indirect, temporary impacts to gray bats are expected to result from tree removal of non-riparian forested areas on the Base.

Indiana Bat

In 2003, AnaBat II™ surveys detected the possible presence of Indiana bats on Arnold AFB (Lamb, 2004). However, the species has never been captured in mist net surveys on the Base. While the status of occurrence of the Indiana bat on Arnold AFB is uncertain, it is unlikely that the Proposed Action would impact the species. Tree removal would occur in habitats rarely used by Indiana bats (USFWS, 1999). The habitat in these areas is not very suitable for maternity roosts (Rommé and Reaves, 1999; USFWS, 1999), and any transient bats roosting in trees would relocate away from the area of disturbance.

Bald Eagle

The bald eagle has been documented using the area around Woods Reservoir but not in areas proposed for tree removal. Bald eagles do not nest on Arnold AFB and are capable of leaving the immediate area of a disturbance. Therefore, no impacts to bald eagle on Arnold AFB are expected to result from the proposed tree removal.

Eggert's Sunflower

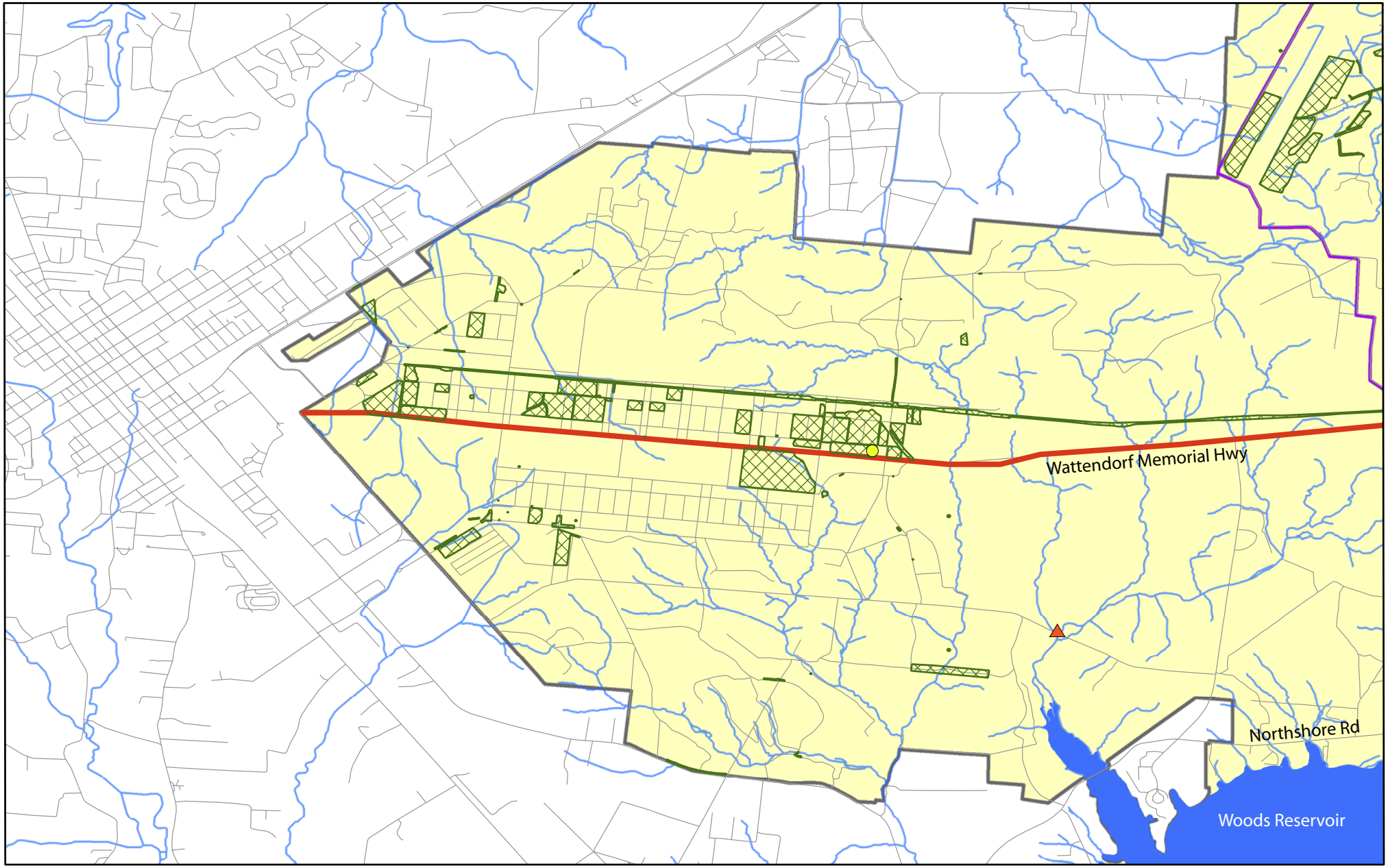
Eggert's sunflower is widely distributed on Arnold AFB. Wattendorf Highway and Arnold Center Road are adjacent to known populations of Eggert's sunflower (Figures 4-4 through 4-6). The proposed tree removal would be consistent with *AEDC Operational Information: Potential Impacts to Helianthus eggertii* as outlined in the Eggert's Sunflower Management Plan (Fitch, 2003) and the Cooperative Management Agreement developed and signed with USFWS in 2004. Therefore, no Section 7 consultation and no additional coordination with USFWS would be required.

Procedures outlined in this document, which were developed in conjunction with USFWS, ensure that activities would not likely adversely affect the species. The proposed tree removal activities could have an initial negative effect on some localized occurrences; however, this impact would be greatly outweighed by the potential positive effects of increased sunlight due to the reduction of canopy cover. The species would be expected to evidence increased plant vigor and/or expanded population size in response to the reduction in canopy cover and subsequent increase in exposure to sunlight. However, other environmental variables independent of the Proposed Action, such as extreme drought or severe pest damage, may preclude anticipated benefits.

Future management of cleared areas that contain Eggert's sunflower would consist of natural revegetation and mowing after 15 October to avoid potential impacts to the species.

Rough Rattlesnake-Root

Rough rattlesnake-root occurs at two locations on Arnold AFB and three other locations in Tennessee. One of the Arnold AFB locations is north of Wattendorf Highway in the western part of the Base where tree removal is planned (Figure 4-4). Tree removal



Legend

- Base Boundary
- AEDC Boundary
- Reservoirs
- Roads
- Tree Removal Locations
- Streams
- Eggert's Sunflower Occurrences
- Gray Bat Occurrences
- Rough Rattlesnake-Root Occurrence

N

0 0.25 0.5 1 1.5 2 Miles

Figure 4-4

Sensitive Species Occurrences and Proposed Western Tree Removal Sites

Conversion of Forest Land to Road Right-of-Way

Final Environmental Assessment

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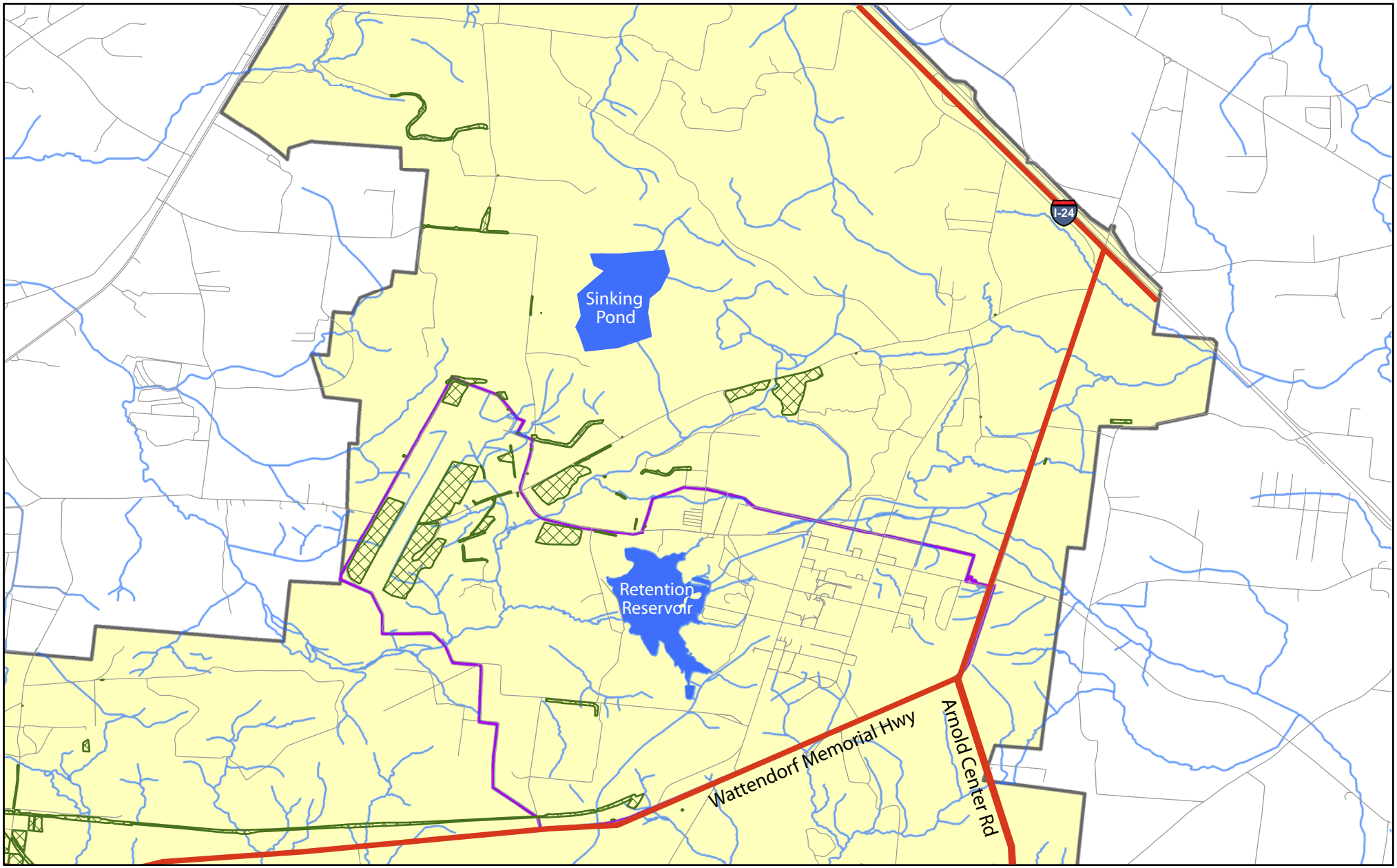

Legend

- Base Boundary
- AEDC Boundary
- Reservoirs
- Roads
- Tree Removal Locations
- Eggert's Sunflower Occurrences
- Streams

N

0 0.25 0.5 1 1.5 2 Miles

Figure 4-5

Sensitive Species Occurrences and Proposed Eastern Tree Removal Sites

Conversion of Forest Land to Road Right-of-Way
Final Environmental Assessment

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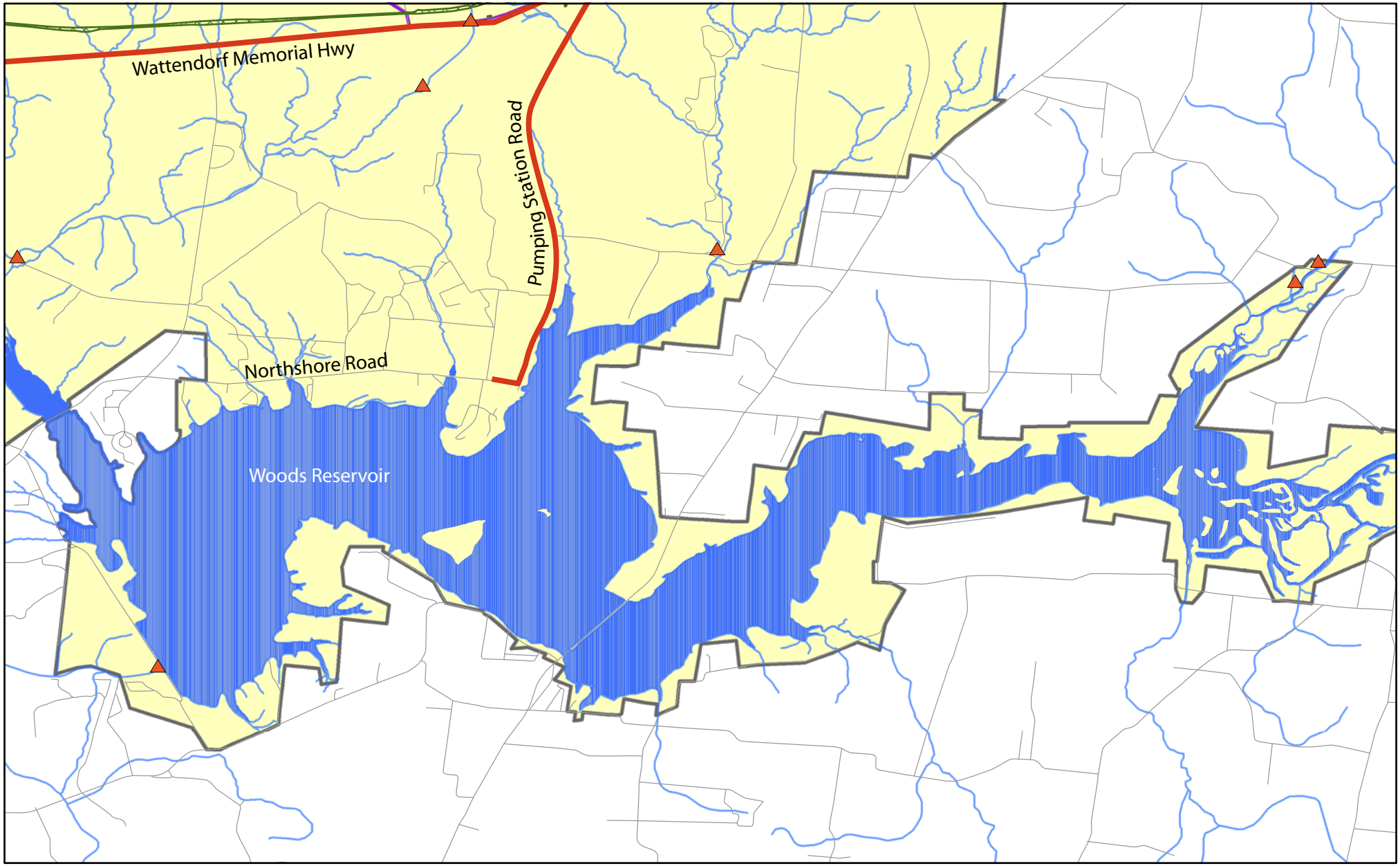

Legend

- Base Boundary
- Reservoirs
- Roads
- Tree Removal Locations
- Streams
- Gray Bat Occurrences

N

0 0.25 0.5 1 1.5 2 Miles

Figure 4-6

Sensitive Species Occurrences and Proposed Southern Tree Removal Sites

Conversion of Forest Land to Road Right-of-Way

Final Environmental Assessment

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actions should be timed to occur during the period of year this species is dormant to avoid the potential to impact the species. Future management of this site also should consider the needs of the species to avoid negative impacts. Natural revegetation should be used at this site and maintenance mowing should be conducted no more than once per year (after 30 November). By delaying mowing until after 30 November, seeds would be allowed to mature and disperse (K. Fitch, personal communication).

Tree removal may indirectly benefit the species through creation of additional open areas where the species could expand.

4.5.2.2 Alternative Action

The Alternative Action effects to sensitive species would be similar to those of the Proposed Action. The magnitude of impact would be more limited, however, because the area to be cleared is narrower than that of the Proposed Action.

4.5.2.3 No-Action Alternative

Under the No-Action Alternative, no tree removal would occur. Therefore, no impacts to sensitive species would result from implementation of the No-Action Alternative.

4.5.3 Non-Sensitive Habitats

4.5.3.1 Proposed Action

The amount of non-sensitive forest habitat that would be cleared is small relative to the amount of non-sensitive forest occurring on Arnold AFB. Therefore, the impacts to non-sensitive habitats would be minor and easily assimilated into the Base ecosystem.

4.5.3.2 Alternative Action

The Alternative Action effects to non-sensitive habitats would be similar to those of the Proposed Action. The magnitude of impact would be more limited, however, because the area to be cleared is less than half that of the Proposed Action (91 acres compared to 194 acres).

4.5.3.3 No-Action Alternative

Under the No-Action Alternative, no tree removal would occur. Therefore, no impacts to non-sensitive habitats would result from implementation of the No-Action Alternative.

4.5.4 Wetlands

Forestry operations can interrupt the natural movement of water in wetlands. For example, channelization resulting from ditches created by equipment over an extended period of time can cause conditions drier than normal. In addition, logging debris can impede natural drainage if not removed. Both of these conditions alter plant and animal species composition in wetlands. Other impacts of forestry operations in wetlands can also include accelerated soil erosion and soil compaction.

4.5.4.1 Proposed Action

The Proposed Action includes several areas that are adjacent to or contain portions of forested wetlands and streams (Figures 4-1 through 4-3). BMPs would be implemented to eliminate or reduce runoff into and prevent impacts to these sensitive habitats.

Felling activities would follow BMPs outlined in the *Guide to Forestry Best Management Practices* (TDF, 2003) to avoid or minimize impacts to wetlands. To further minimize potential impacts to wetlands, the existing adjacent roads would be used for moving equipment and logs and log decks would be located away from wetlands.

4.5.4.2 Alternative Action

The Alternative Action effects to wetland habitats would be similar to those of the Proposed Action. The magnitude of impact would be more limited, however, because the area to be cleared is less than half that of the Proposed Action (91 acres compared to 194 acres).

4.5.4.3 No-Action Alternative

Under the No-Action Alternative, no tree removal would occur. Therefore, no impacts to wetlands would result from implementation of the No-Action Alternative.

4.5.5 Upland Dry-Mesic Forests

4.5.5.1 Proposed Action

The removal activities proposed would occur primarily on upland dry-mesic forests. Felling activities would create the reduced canopy cover and grass-dominated opening characteristic of the Barrens mosaic.

4.5.5.2 Alternative Action

The Alternative Action effects to dry-mesic forest habitats would be similar to those of the Proposed Action. The magnitude of impact would be more limited, however, because the area to be cleared is less than half that of the Proposed Action (91 acres compared to 194 acres).

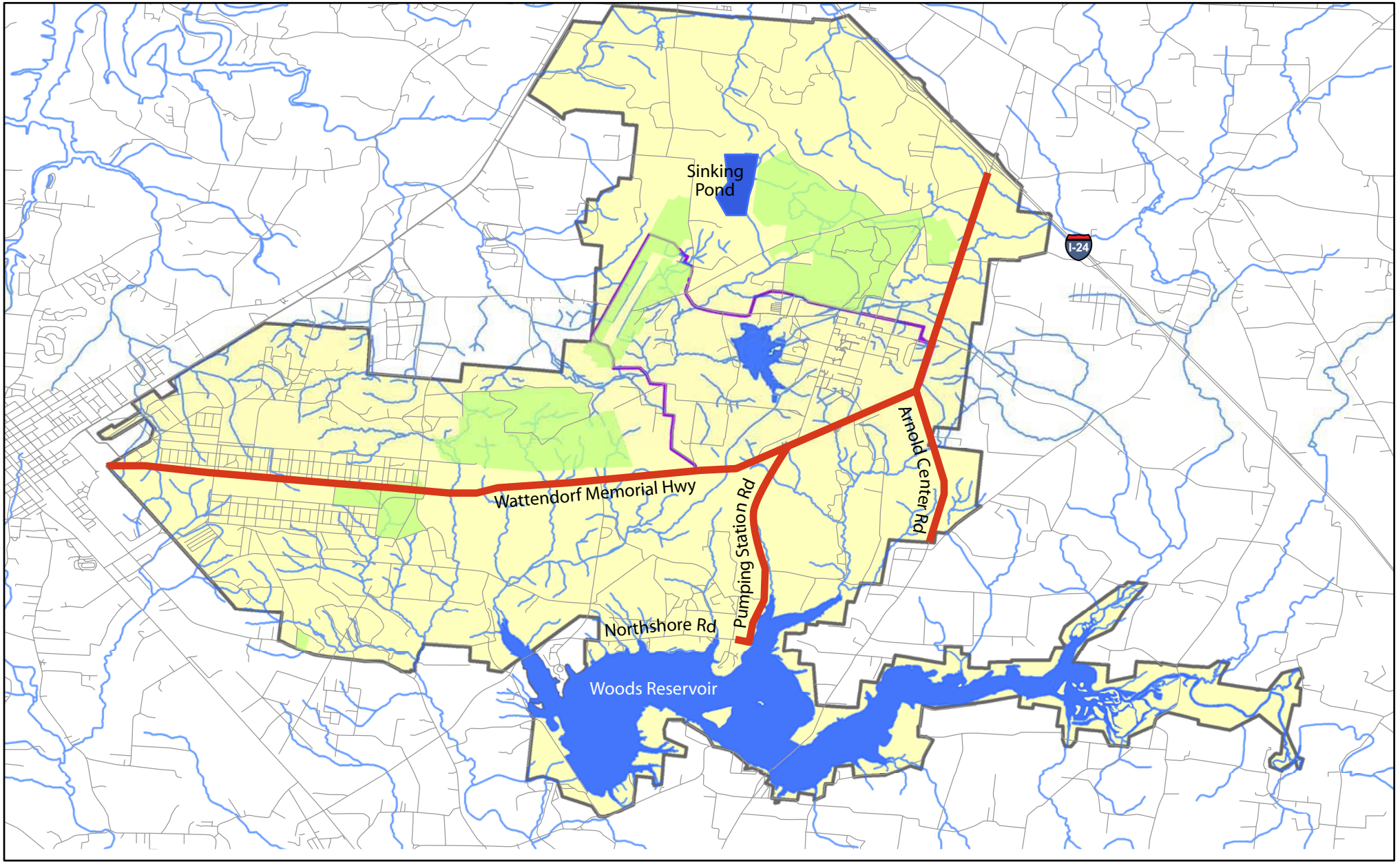
4.5.5.3 No-Action Alternative

Under the No-Action Alternative, no tree removal would occur. Therefore, no Barrens restoration, or the associated ecological benefits, would occur.

4.5.6 Woodland/Savanna/Grassland

4.5.6.1 Proposed Action

No tree removals are scheduled for woodland/savanna/grassland areas and Barrens restoration areas (Figure 4-7). Therefore, no negative impacts to woodlands/savanna/grasslands would result from implementation of the Proposed Action. The ecological benefits would be derived from increasing habitat diversity and areal coverage of open habitat.



Legend

- Base Boundary
- AEDC Boundary
- Reservoirs
- Roads
- Tree Removal Locations
- Barrens Restoration

N

0 0.5 1 2 3 4 Miles

Figure 4-7

Barrens Restoration and Proposed Tree Removal Sites

Conversion of Forest Land to Road Right-of-Way
Final Environmental Assessment

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4.5.6.2 Alternative Action

The Alternative Action effects to woodland/savanna/grassland habitats would be similar to those of the Proposed Action. The magnitude of impact would be more limited, however, because the corridor to be cleared is less than that of the Proposed Action.

4.5.6.3 No-Action Alternative

Under the No-Action Alternative, no tree removal would occur. Therefore, no impacts to woodlands/savanna/grasslands would result from implementation of the No-Action Alternative. The benefits that would result from Barrens mosaic restoration would not occur.

4.6 Hazardous Materials and IRP

4.6.1 Proposed Action

The Proposed Action entails some activities near active IRP sites (Figure 4-8). Tree removal in these areas would not significantly disturb soil since removal would be conducted along a narrow corridor near the roads. Tree removal activities include felling the trees and grinding out the stumps after they have had time to decompose. Stumps would not be removed from any areas near the creeks that flow under Wattendorf Highway, eliminating the potential contamination associated with Bradley Creek, Brumalow Ditch, and Rowland Ditch. Soil disturbance from tree removal activities would be limited to compaction and surficial scarring and would not extend below the ground surface into the groundwater. Interim corrective measures are in place on these sites and tree removal would not affect groundwater or impact measures in place on those sites. Removal activities in SWMU 24 would be conducted adjacent to Arnold Center Road and not near the landfill and incinerator sites within the area.

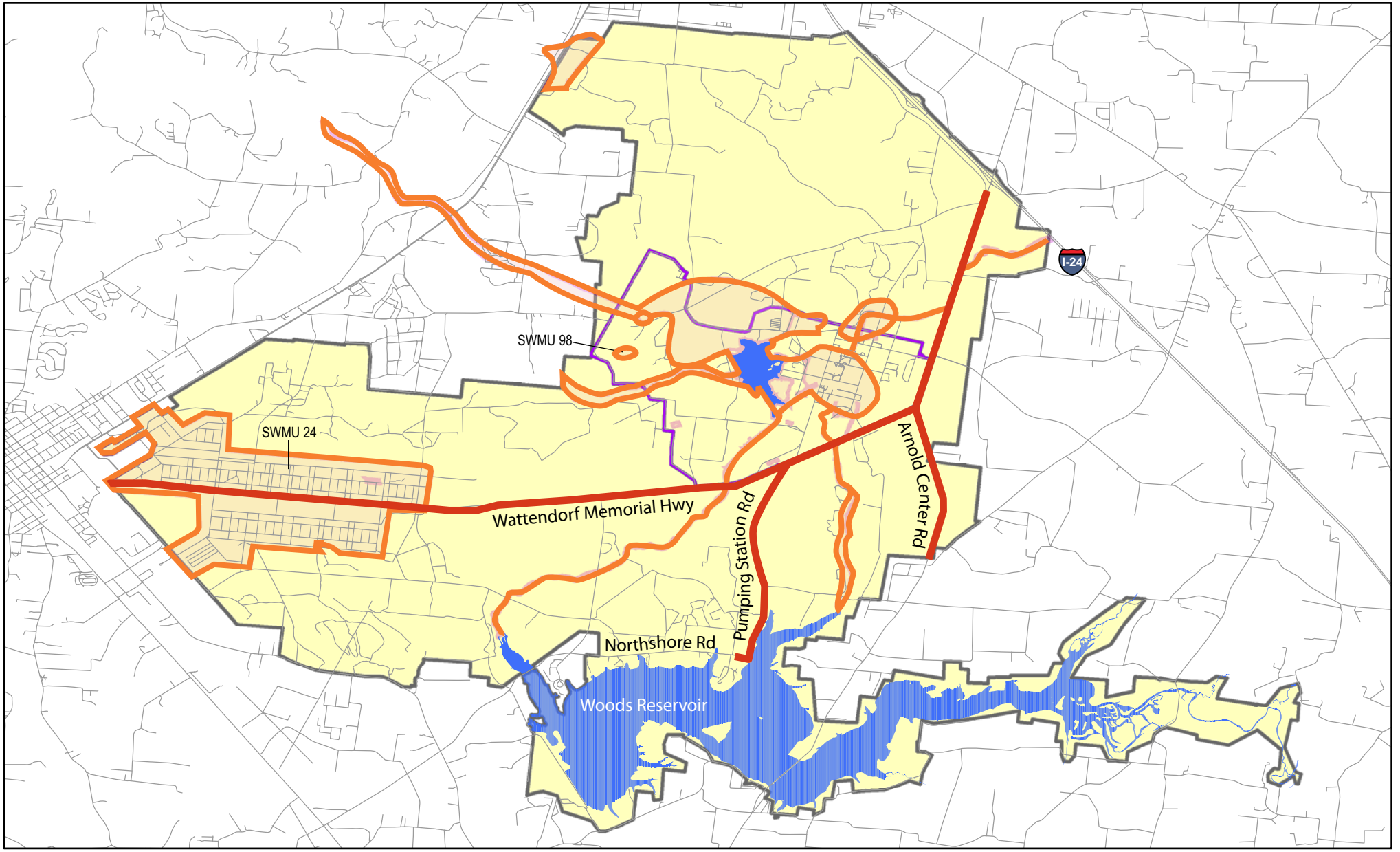
Therefore, the proposed activities would not affect the IRP sites. In addition, the proposed tree removal would not result in changes in use/handling or storage of hazardous chemicals on Arnold AFB. Therefore, potential impacts to the IRP sites from the Proposed Action would be minimal.

4.6.2 Alternative Action

The Alternative Action effects to hazardous materials and IRP sites would be similar to those of the Proposed Action.

4.6.3 No-Action Alternative

There would be no tree removal and no associated disturbance resulting from implementation of the No-Action Alternative. Therefore, the No-Action Alternative would have no impacts on hazardous materials and IRP sites.



Legend

- Base Boundary
- AEDC Boundary
- Reservoirs
- Roads
- Tree Removal Locations
- IRP Sites

N

0 0.5 1 2 3 4 Miles

Figure 4-8

Location of Tree Removal Activities near IRP Sites

Conversion of Forest Land to Road Right-of-Way

Final Environmental Assessment

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4.7 Aesthetics

4.7.1 Proposed Action

Aesthetics is a matter of personal perception and some people prefer more open roadways, some people prefer roadways with trees closer to the road, and some people have no preference on this issue. The perception of change in aesthetics would be greatest immediately following tree removal, and most people would acclimate to and accept the wider cleared area along the roads with time (Hudacsko, 1999).

Typically, areas that have been recognized as especially sensitive to visual and aesthetic changes include:

- Areas with historic or culturally important resources
- Areas of recognized scenic beauty
- Parks and recreational areas
- Entries/gateways to cities, towns, or neighborhoods
- Bodies of water
- Public facility settings, such as universities and courthouses (Texas Department of Transportation, 2004)

The Proposed Action would have a minor impact on aesthetics, primarily along Wattendorf Highway and Arnold Center Road, since these areas are used by the general public. The roadway would change from a perceived closed condition to an open condition on approximately 70 percent of the 17.5 miles.

At present, the width of the cleared corridor on these roads varies from less than 25 feet to more than 75 feet. By removing additional trees to make a more consistent corridor, the area would be safer without significantly reducing its aesthetic appeal. After stump removal and implementation of maintenance mowing, the area would become - established as a savanna/grassland corridor. Any impacts to aesthetics would be expected to be minor and of short duration.

4.7.2 Alternative Action

The Alternative Action effects to aesthetics would be similar to those of the Proposed Action. The magnitude of impact would be more limited, however, because the area to be cleared is narrower than that of the Proposed Action, resulting in less cleared area.

4.7.3 No-Action Alternative

There would be no tree removal and no associated change in aesthetics resulting from implementation of the No-Action Alternative. Therefore, the No-Action Alternative would have no impacts on aesthetics at the Base.

4.8 Cultural Resources

Impacts analysis focuses on the potential for the Proposed Action to affect the quality and utility of significant historical and cultural resources.

4.8.1 Proposed Action

Consultation with the SHPO in 2003 identified all cultural resource sites in pine Management Units (MUs) on Arnold AFB, and this effort was documented in Archeological Assessment Report No. 300 (R. Alvey, personal communication, 2004). No impacts to cultural resources would result from tree removal in areas that are currently pine stands, as no cultural resources were identified in these areas. Areas proposed for tree removal that are currently hardwood stands have not been surveyed and could contain unknown cultural resources. The Proposed Action would cover approximately 17.5 miles of roadway. Of these, approximately 9 miles have previously been surveyed for cultural resources and cleared for further activity along both sides of the road. Another approximately 2.5 miles of roadway have been cleared for cultural resources along one side of the road. A Phase I Cultural Resources Survey would be conducted prior to tree removal in areas not previously cleared for cultural resources. Should any sites warranting inclusion on the NRHP be identified, appropriate controls would be implemented to avoid impacts to these resources.

If unknown archeological artifacts are discovered during any tree removal activities, all activities would halt in the immediate area and the Base would be notified of the finding. At this point, pertinent consultations and follow-on actions would be conducted.

4.8.2 Alternative Action

The Alternative Action effects to cultural resources would be similar to those of the Proposed Action. The magnitude of impact would be more limited, however, because the corridor to be cleared is less than that of the Proposed Action.

4.8.3 No-Action Alternative

Under the No-Action Alternative, no tree removal would occur. Therefore, no impacts to cultural resources would result from implementation of the No-Action Alternative.

5.0 Plan, Permit, and Management Requirements

5.1 Section 404 of the Clean Water Act

Section 404 of the CWA requires that a permit be obtained from the U.S. Army Corps of Engineers before dredged or fill materials can be discharged into waters of the United States. However, in Tennessee, forestry activities that discharge into wetlands are exempt from Section 404 permitting requirements if they meet the following conditions:

- It is not part of an activity whose purpose is to convert a wetland into an upland where the flow or circulation of public waters may be impaired or the reach of the waters reduced.
- It is part of an established or ongoing silvicultural operation and not a new use to which the wetland was not previously subject.
- It uses normal silvicultural activities that are in compliance with state and federal BMPs.
- It has not lain idle for so long that hydrological modifications will be necessary to resume operations.
- It does not contain any toxic pollutants listed under Section 307 of the CWA.

Section 404 of the CWA further specifies that all forest roads and skid trails must be constructed and maintained in accordance with the baseline BMPs for water quality protection to retain Section 404 permit exemption status for the road operation associated with timber harvest.

The Proposed Action, as described, would qualify for the exemption from CWA Section 404 permitting because it meets the above-specified conditions.

5.1.1 Tennessee Water Quality Control Act

The TWQCA prohibits any person from causing a condition of pollution in state waters or altering the physical, chemical, radiological, biological, or bacteriological properties of state waters without the authority of a permit. A forestry operation that creates a point source discharge is regulated by the Act. If the forestry operation is regulated by the Act, logging practices must comply with all aspects of the law, including the necessity to obtain any appropriate permits. The TWQCA also governs any logging practice that causes pollution to waters. Typically, any forestry operation that implements BMPs as recommended by the *Guide to Forestry Best Management Practices* (TDF, 2003) would not likely create a point source discharge and therefore would be exempt from the Act. The Proposed Action would implement appropriate BMPs from the *Guide to Forestry Best Management Practices* (TDF, 2003). That, combined with the separated tree removal sites

and only limited pine removal from SMZs on perennial streams, would allow the proposed tree removal to proceed without creating a point source discharge regulated under the TWQCA.

The TDEC Division of Water Pollution Control (WPC) is the state agency responsible for the abatement of existing ground- and surface water pollution, the reclamation of polluted waters, and the prevention of future pollution of waters in the state. WPC has been empowered to exercise general supervision and control over the quality of all state waters, to administer and enforce all laws relating to pollution of such waters and to administer and enforce all laws consistent with the purposes of the TWQCA (TCA 69-3-101).

The TWQCA affects forestry activities in the following ways:

- It exempts agriculture and silviculture (forestry) activities from general permitting requirements "unless there is a point source discharge from a discernible, confined and discrete water conveyance (TCA 69-3-120g)." Landowners are exempt from obtaining a permit for forestry activities on forest management operations.
- If the forest operation requires a CWA Section 404 Permit, a state CWA Section 401 Certification is required.
- Activities that involve working in a stream such as stream bank disturbance and alteration, gravel removal, or bank stabilization require an Aquatic Resource Alteration Permit (ARAP) from WPC.

The Proposed Action would result in tree removal near intermittent streams and wetlands subject to regulation of the ARAP program. However, the work would not result in stream bank disturbance as no stump removal would occur and buffers would be placed around all wetlands to prevent impacts to these regulated waters. Therefore, an ARAP would not be required for the proposed activity.

5.1.2 Cultural Resources

All areas that have not been previously surveyed for cultural resources would be surveyed prior to tree removal. Coordination with the Tennessee SHPO would be required if these surveys identify any site potentially eligible for listing on the NRHP. Additional coordination with the SHPO would not be required to remove trees in areas that have been surveyed for cultural resources.

6.0 List of Preparers

6.1 CH2M HILL

Russell Short/Senior Project Manager/28 years of experience/Master of Arts

Rich Reaves/Environmental Scientist/9 years of experience/Ph.D.

Jeremy Scott/Environmental Scientist/ 6 years of experience/Master of Science

Robert Price/Environmental Scientist/6 years of experience/Master of Science

Paul Rose/Project Planner/16 years of experience/Master of City Planning

Collin Horace/GIS Analyst/3 years of experience/Master of Science

David Dunagan/Technical Editor/26 years of experience/Master of Arts

7.0 List of Contacts

DoD

Richard McWhite, Civ AEDC/SDE

ATA

Michael Black, Aerospace Testing Alliance Natural Resources

Steve Farrington, Aerospace Testing Alliance Natural Resources

Kevin Fitch, Aerospace Testing Alliance Natural Resources

John W. Lamb, Aerospace Testing Alliance Natural Resources

Mark Moran, Aerospace Testing Alliance Natural Resources

Carrie Miller, Aerospace Testing Alliance Natural Resources

Jeff Piatt, Aerospace Testing Alliance Natural Resources

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Appendix A

AF Form 813

Type:	**Environmental Impact Analysis**
Number:	**000320**
From:	Philip A Sherrill
State:	Proponent Environmental Planning Review Team Environmental Final Media Manager Coordination EIAP Review Approved Cancelled On Hold
Date Created:	15-Oct-2004 02:08 PM
Date Modified:	18-Nov-2004 03:39 PM
Asset ID	
Proponent Organization	AF/SDE
Title	Tree Removal
Project/ACES/Job Number	
Purpose and Need	The tree removal is necessary due to the way pine trees matured, growing their limbs only on the roadside of the tree to acquire more sunlight. These trees are susceptible to ice storm damage and could fall onto roadways. Public safety is the main purpose of removing these trees.
Description And Alternative	Trees, especially pine trees, located within 75 feet of either side of Wattendorf Highway, Arnold Center Road, Pumping Station Road, and a short distance on Northshore Road will be removed via a Forestry Sales Contract. A follow-up contract will be let to chip up all debris left on logging decks. The cleared area measures 194 acres. This cleared area would be converted into semi-improved land over a 2-3 year period. This will require root raking and bush-hogging activities. <P>No Action Alternative- leave trees in place</P> <P>Alternative 1- reduce size of cleared area from 75 feet wide on both sides of the roadway to 50 feet. This reduces the area affected from 194 acres to 91 acres.
Air Installation Compatible Impact	No Effect
Description	
Status	Closed
Air Quality Impact	No Effect

Description	
Status	Closed
Water Resources Impact	Adverse Effect
Description	See Mark Moran for erosion control measures.
Status	Closed
Safety And Occupational Health Impact	No Effect
Description	
Status	Closed
Hazardous Materials Impact	No Effect
Description	
Status	Closed
Hazardous Waste Impact	No Effect
Description	
Status	Closed
Biological Resources Impact	No Effect
Description	There is potential impact to the environment especially wetlands and RTE species that are located on or near the highway right-of-way. The area to be disturbed needs to be surveyed for RTE species prior to implementation. Clearing (removal of stumps) has to be avoided in the wetland areas and site protection devices must be installed to prevent silt and sediment from moving off the cleared site into area drains and wetlands.
Status	Open
Cultural Resources Impact	Unknown Effect
Description	Parts of the area to be cleared has not been surveyed for historic properties, a Phase I archaeological survey will be required prior to implementation.
Status	Open

Geology And Soils Impact	No Effect
Description	
Status	Closed
Socioeconomic Impact	No Effect
Description	
Status	Closed
Installation Restoration Program Impact	No Effect
Description	
Status	Closed
Other Impact	
Remarks	
Determination	Further Environmental Analysis Required
Determination Justification	