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PROGRAMMATIC ENVIRONMENTAL ASSESSMENT

FOR

INSTALLATION DEVELOPMENT AT ARNOLD AIR FORCE BASE, TENNESSEE

PREPARED BY:

Department of the Air Force

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Letters or other written comments provided may be published in the Final Programmatic Environmental Assessment (PEA). As required by law, substantive comments will be addressed in the Final PEA and made available to the public. Any personal information provided will be kept confidential. Private addresses will be compiled to develop a mailing list for those requesting copies of the Final PEA. However, only the names of the individuals making comments and their specific comments will be disclosed. Personal home addresses and phone numbers will not be published in the Final PEA.

FORMAT PAGE

Cover Sheet

Draft Programmatic Environmental Assessment for Installation Development at Arnold Air Force Base, Tennessee

Responsible Agencies: US Air Force (USAF), Arnold Engineering Development Complex (AEDC).

Affected Location: Arnold Air Force Base (AFB), Tennessee.

Proposed Action: Installation Development for Arnold AFB

Report Designation: Draft Programmatic Environmental Assessment (PEA).

Abstract: Arnold AFB and AEDC identified priorities for Installation development projects to be able to maintain the Installation's mission and propose to implement them. The intent of Installation development at Arnold AFB is to provide Installation improvements necessary to support the mission of the Installation. This PEA includes all reasonably foreseeable Installation development projects planned and programmed for the next five years at Arnold AFB. The projects considered in this PEA were identified as priorities for Installation improvement in the 2017 Arnold AFB Installation Development Plan (IDP) and include a range of selected projects, such as demolition of aging facilities, new facility construction, facility upgrades, facility repair and renovation, utilities upgrades, and infrastructure improvement, including road maintenance projects. Of the 357 selected projects, the Proposed Action includes six demolition projects, 20 new construction projects, and nine road maintenance projects, which were determined to individually have the potential to have a significant impact on the human and natural environment and were identified for further detailed analysis. The analyses within this PEA reflect major broad/general environmental issues and trends that might result from making broad programmatic decisions relating to the IDP and effectively frames the scope of future analysis when details of the site- and/or project-specific actions are known allowing for subsequent follow-on tiered NEPA analysis. All projects listed in Table B-1 of this PEA will have subsequent follow-on, narrower, and site- or proposal-specific analysis to be tiered from this PEA.

This PEA analyzes the potential for environmental impacts associated with the Proposed Action and No Action Alternative and assists in determining whether a Finding of No Significant Impact can be prepared or if an Environmental Impact Statement is required. Arnold AFB has identified the Proposed Action described above, which includes 357 IDP projects to be implemented in the next five fiscal years as the Proposed Action. While the Proposed Action has the potential to impact floodplains and wetlands, the Proposed Action includes all practical measures to minimize harm to floodplains, wetlands, and other sensitive environments. Resource areas considered in the impact analysis for this PEA are noise, land use, air quality, geological resources, water resources, biological resources, cultural resources, hazardous materials and wastes, transportation and traffic, utility infrastructure, and safety.

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FINDING OF NO SIGNIFICANT IMPACT
INSTALLATION DEVELOPMENT AT
ARNOLD AIR FORCE BASE, TENNESSEE

Pursuant to the Council on Environmental Quality regulations for implementing the procedural provisions of the National Environmental Policy Act (40 Code of Federal Regulations [CFR] Sections [§§]1500-1508), Department of Defense Directive 6050.I, and the Air Force Environmental Impact Analysis Process regulations 32 CFR Part 989, the US Air Force (USAF), as the lead agency, has prepared a Programmatic Environmental Assessment (PEA) to identify both potential general and reasonably foreseeable effects associated with the proposed implementation of the Arnold Air Force Base (AFB) Installation Development Plan (IDP), including demolition of aging facilities, new facility construction, facility upgrades, facility repair and renovation, utilities upgrades, and infrastructure improvement, including road maintenance projects. The analyses within the PEA reflect major broad/general environmental issues and trends that might result from making broad programmatic decisions relating to the IDP and effectively frames the scope of future analysis when details of the site- and/or project-specific actions are known, allowing for subsequent tiered National Environmental Policy Act (NEPA) analysis. All projects listed in Table B-1 of the *Programmatic Environmental Assessment for Installation Development at Arnold Air Force Base, Tennessee,* will have subsequent follow-on, narrower, and site- or proposal-specific analysis to be tiered from this PEA. This PEA is attached and incorporated by reference.

PURPOSE AND NEED FOR THE PROPOSED ACTION (PEA §§ 1.3 and 1.4, pages 1-2; § 2.3, pages 2-2 to 2-16; Appendix B, pages B-1 to B-73): The mission of Arnold AFB is to develop, test, and evaluate weapon, propulsion, aerodynamic, and space systems at realistic conditions for the nation through modeling, simulation, and ground test facilities. Mission needs largely dictate land and facility support requirements, and the IDP was developed around the capabilities of existing infrastructure and facilities to meet existing and projected mission needs.

The purpose of the action is to provide infrastructure to adequately serve the Installation's supported populations and mission, accommodate future growth, and meet the goals and objectives of the IDP vision, which states: *Arnold AFB will provide modern facilities and workforce that utilize and develop cutting-edge technologies in support of our customers, the community, and the nation. Arnold AFB will remain a quality workplace with efficient, resilient, and sustainable facilities and infrastructure.* The need for the action is to improve and update facilities and infrastructure that are no longer adequate to meet technologically advanced and specialized aerospace testing and flight simulation requirements. If current deficiencies are not addressed, mission effectiveness would deteriorate as mission and regulatory demands outpace Installation capabilities.

Each of the projects included in the Proposed Action has a specific purpose and need, which is presented in § 2.3, pages 2-2 to 2-16, and Table B-1 in Appendix B of the PEA. The Proposed Action includes a total of 357 IDP projects; however, the USAF determined that individually 322 of the projects would not have a significant impact on the human and natural environment, and collectively these projects are discussed in this PEA. Six demolition projects, 20 new construction projects, and nine road maintenance projects that could have a significant impact on the human and natural environment were identified for further detailed analysis in this PEA.

DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

PROPOSED ACTION AND PROPOSED ACTION ALTERNATIVES (PEA § 2.1, page 2-1; § 2.2, pages 2-1 to 2-2; §§ 2.3, 2.3.1, 2.3.2, 2.3.3, pages 2-2 to 2-12): The Proposed Action is to implement a range of 357 selected projects, such as demolition of aging facilities, new facility construction, facility upgrades, facility repair and renovation, utilities upgrades, and infrastructure improvement, including road maintenance that would be among those proposed to be completed or implemented during the next five years (from fiscal year [FY] 2021 to FY 2026). Of the 357 projects included in the Proposed Action, six are demolition projects and 351 are infrastructure projects. Of the infrastructure projects, 30 are new construction, 186 are facility renovations, 12 are road maintenance, and 123 are utility upgrades. The Proposed Action includes six demolition projects, 20 new construction projects, and nine road maintenance projects, which could have a significant impact on the human and natural environment and were identified for further detailed analysis in this PEA. The USAF has determined that individually the remaining 322 projects would not have a significant impact on the human and natural environment.

NO ACTION ALTERNATIVE (PEA § 2.3.4, pages 2-12 to 2-13): The No Action Alternative would represent "no change" in facilities and infrastructure. The proposed projects identified for the Proposed Action would not be implemented, and existing space deficiencies, inadequacies, and redundancies would persist. The No Action Alternative assumes that the Proposed Action would not occur and is carried forward for analysis as a baseline against which the impacts of the Proposed Action and potential action alternatives can be evaluated.

ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION (PEA § 2.4, page 2-13): Arnold AFB considered implementation of only a subset of IDP projects; however, the Installation development process is designed to support Arnold AFB and Arnold Engineering Development Complex (AEDC) mission requirements by completing selected construction and improvements projects that address deficiencies throughout the Installation. The recommended projects included in the 2017 Arnold AFB IDP, and carried forward for analysis in this PEA, were subject to an in-depth analysis during the IDP process (see PEA § 2.2). Further, the following selection standards were used to determine if alternatives for demolition, construction, and road maintenance projects met the project's purpose and need and were viable for further consideration (PEA § 2.4, Table 2-1):

1. Ensure that Arnold AFB meets base and tenant unit mission requirements for secure and timely delivery of specialized test equipment and materiel.
2. Do not displace or adversely impact other missions at Arnold AFB (e.g., Tennessee Army National Guard training activities and other test activities).
3. Site new facilities on existing Arnold AFB land to maximize operational security.
4. Provide direct, on-base access to test facilities for delivered materiel.
5. Leverage existing infrastructure.

ENVIRONMENTAL CONSEQUENCES

Based on the findings within the PEA, the Proposed Action or the No Action Alternative would have no effect on aesthetics and visual resources, socioeconomics, environmental justice, and Airfield Compatible Use Zones (AICUZ) (PEA § 1.6, page 1-5). Arnold AFB is characterized by an industrial aesthetic and is not considered a highly sensitive visual environment. Additionally,

the design of the new proposed facilities and upgrades to existing infrastructure would be consistent with existing base architecture and construction materials. It is anticipated that construction labor would be performed by the local work force, and the Proposed Action would not impact housing or population in the region, nor would there be any impact to community resources such as emergency services, schools, or jobs in the region. The Proposed Action is located on USAF property, considerably removed from unique populations with respect to poverty (approximately 25 miles away), ethnicity (approximately 25 miles away), and children (approximately 9 miles away). There is no flying mission at Arnold AFB and, therefore, no substantial interactions between airspace, airfield usage, or airfield operations with the Proposed Action. No airfield modification would occur, and no additional air operations from the Arnold AFB airfield are proposed. Therefore, the AICUZ program is not applicable. In addition, no significant direct or indirect impacts caused by implementation of the Proposed Action when combined with other past, present, and reasonably foreseeable actions occurring near Arnold AFB were identified (PEA, § 4.0, pages 4-1 to 4-19). Overall, environmental analyses did not identify any significant impact to any of the remaining analyzed resources as discussed below. However, subsequent follow-on, narrower, and site- or proposal-specific analysis will be performed on all projects listed in Table B-1 of the *Programmatic Environmental Assessment for Installation Development at Arnold Air Force Base, Tennessee,* and tiered from this PEA.

Noise (PEA § 3.2, pages 3-1 to 3-2; § 4.1, pages 4-1 to 4-3): The noise associated with Arnold AFB is dominated by the operation of backup generators; heating, ventilation, and air conditioning (HVAC) systems; cooling towers; and chiller units associated with current ground test facilities. Background noise levels without aircraft operations or training activities were estimated for the areas surrounding Arnold AFB to be between 35 and 45 dBA (PEA, § 3.2, page 3-2). Short- and long-term negligible adverse effects would be expected. Short-term effects would be due to the use of heavy equipment during demolition and construction activities. Long-term effects would be due to the potential use of backup generators, HVAC systems, cooling towers, and chiller units at the proposed facilities. These effects would be negligible. With multiple items of equipment operating concurrently, noise levels can be relatively high during daytime periods at locations within several hundred feet of active sites. All noise-sensitive areas within 800 feet of construction and demolition activities would experience some amounts of noise. However, construction and demolition activities would be confined to on-base areas and conducted primarily during daytime hours. Due to the temporary nature of the projects and the distance to nearby off-base areas, these effects would be negligible. Although construction- and demolition-related noise effects would be negligible, the following best management practices (BMPs) would be performed to reduce the already limited noise effects:

- Construction and demolition would primarily occur during daytime hours (7:00 a.m. to 7:00 p.m.);
- Equipment mufflers would be properly maintained and in good working order; and
- On-site personnel, and particularly equipment operators, would don adequate personal hearing protection to limit exposure and ensure compliance with federal health and safety regulations.

There would be no changes in the number or types of aircraft, use of weaponry, or associated ground-based training at the Installation. Therefore, no changes in the existing noise environment associated with these sources would be expected. Backup generators, HVAC systems, cooling towers, and chiller units at the proposed facilities would generate noise. There would be limited changes in traffic patterns and associated noise to support the proposed facilities at the Installation. These changes to the overall noise environment would not be readily perceptible when compared to existing conditions, particularly in areas off the Installation.

Land Use (PEA § 3.3, pages 3-2; § 4.2, page 4-3): Implementation of the Proposed Action would not result in substantial changes to land use at or in the vicinity of Arnold AFB. Arnold AFB analyzed the capacity for future development or mission expansion during the IDP process by examining several variables, including land use. For instance, construction and demolition associated with industrial and testing facilities would be located in areas already designated for industrial land uses, and upgrades to administrative facilities under the Proposed Action would occur at facilities already sited outside of the 85 A-weighted decibel (dBA) noise contours and have been sited and designed to include appropriate antiterrorism/force protection (AT/FP) setbacks. Therefore, minor impacts on land use from implementation of the Proposed Action are expected.

Air Quality (PEA § 3.4, pages 3-2 to 3-5; § 4.3, pages 4-3 to 4-6): Both Coffee and Franklin counties, and therefore all areas associated with the Proposed Action, have been designated as being in full attainment for the National Ambient Air Quality Standards (NAAQS); therefore, the general conformity rule would not apply. The Proposed Action would have short- and long-term minor adverse effects on air quality. Short-term effects would be due to the use of heavy equipment and generation of fugitive dust during construction and demolition activities. Long-term effects would be due to additional heating of facilities and the potential addition of stationary sources of air emissions, such as backup generators. The Proposed Action would not (1) exceed the Prevention of Significant Deterioration (PSD) major source thresholds or (2) contribute to a violation of any local, state, or federal air quality regulation. Estimated annual emissions from the Proposed Action would be less than the PSD major source thresholds for all criteria pollutants; therefore, the level of effects would be minor (PEA § 4.3, page 4-4, Table 4-1). Arnold AFB is a major source of air emissions and holds a Title V operating permit which expires in June 2022 (Permit number 570221) (PEA § 3.4.2, page 3-4). All new on-base stationary sources of air emissions would be added to the Installation's air permit, as necessary. Based on this analysis, no impacts to air quality from the Proposed Action are expected, but narrower, and site- or proposal-specific analysis of noise impacts will be performed on all projects listed in Table B-1 of the PEA.

Geological Resources (PEA § 3.5, pages 3-5 to 3-7; § 4.4, pages 4-6 to 4-8): Potential impacts on geological resources associated with the Proposed Action would be limited to ground-disturbing activities occurring during demolition, road maintenance, site preparation, and new construction. Minor impacts would result from the proposed new construction and demolition projects; however, the majority of these activities would take place on previously disturbed land. Therefore, impacts on geological resources at Arnold AFB as a result of the Proposed Action would be minor. Seismic hazards in Middle Tennessee are relatively low (PEA § 3.5, page 3-6). There are no known active faults underlying Arnold AFB, and consequently no known potential for fault rupture. Therefore, implementation of the Proposed Action would result in negligible impacts associated with seismicity or geologic hazards.

Topography across Arnold AFB is gently sloping, and there are no excessive slopes at the proposed project sites. Further, the proposed projects have been sited away from slopes toward water features, and the proposed project locations are generally level. The Proposed Action would not pose a substantial erosion hazard as the new construction components are largely sited in previously disturbed, graded locations. However, where erosion hazards may exist, the use of BMPs, including erosion and turbidity control structures, would substantially reduce the potential for erosion and siltation. Therefore, impacts on topography resulting from implementation of the Proposed Action would be negligible. Implementation of the Proposed Action would include excavation and site preparation activities associated with construction. Soils at Arnold AFB include the Dickson silt loam (Dk) series, the Guthrie silt loam soil (Gd) series, the Lawrence silt

loam (La) soils, the Lobelville silt loam (Lh) soils, the Mountview silt loam soils (Mt) series, the Purdy silt loam (Pg) series, and the Waynesboro loam soil (Wa and Wb) series (PEA § 3.5, page 3-6). Some of these soils pose development limitations due to issues such as shrink-swell potential, flooding, and depth to saturated zone. However, buildings across the Installation have been constructed on the same soils and have used construction techniques similar to those that would be used for all proposed new construction projects. To minimize potential erosion, siltation, and soil compaction during new construction and road maintenance activities, BMPs would be incorporated as part of the Proposed Action, including erosion and siltation prevention measures (e.g., watering for dust suppression, use of netting and silt fencing), covering stockpiled soils and excavated areas during rains, and limiting the use of heavy equipment to the extent practicable. With implementation of these BMPs, construction and road-maintenance-related impacts on soils would be minimal and localized to the proposed project footprints. Therefore, implementation of the Proposed Action would result in short-term, minor, site-specific impacts on soils. Once the proposed facilities are operational, potential impacts on soils would be negligible. All project components would be engineered so that potential impacts resulting from erosion, siltation, and geological hazards (e.g., landslides) would be minimized. Therefore, implementation of the Proposed Action would result in negligible long-term impacts on geological resources.

All soils in the Dk, La, Lh, and Mt series are considered prime farmland; however, there are no unique farmlands present on Arnold AFB that are suitable for the production of specific high-value food and fiber crops (PEA § 3.5, page 3-7). Therefore, implementation of the Proposed Action would have no effect on important farmlands.

Water Resources (PEA § 3.6, pages 3-7 to 3-13; § 4.5, pages 4-8 to 4-10): Construction, demolition, and road maintenance activities associated with the Proposed Action could potentially temporarily increase the turbidity of surface waters at Arnold AFB due to increased airborne dust and siltation from soil erosion. However, as the majority of the soils underlying the Installation are moderately well drained and because of the considerable distance between most project sites and potential receiving waters, the majority of the demolition and grading activities associated with the Proposed Action would be expected to have minor impacts on surface waters at Arnold AFB. Additionally, the implementation of BMPs and erosion control measures described in the Arnold AFB's Stormwater Pollution Prevention Plan (SWPPP) would further reduce impacts associated with the Proposed Action. Since the Proposed Action would result in the disturbance or redisturbance of more than 1 acre, a National Pollutant Discharge Elimination System (NPDES) Construction General Permit would be required to address stormwater discharges from construction projects. In addition to the BMPs that would be implemented under the Proposed Action, the proposed construction, demolition, and road maintenance projects would comply with the measures outlined in the NPDES permit. Further, in accordance with § 438 of the Energy Independence and Security Act (requiring federal facility projects over 5,000 square feet to maintain or restore the predevelopment hydrology of the property), low-impact development techniques would be incorporated into proposed new construction projects. Consequently, implementation of the Proposed Action would result in only minor short-term and long-term impacts on surface waters. Implementation of the Proposed Action would result in a negligible change in impervious surface area at Arnold AFB. Therefore, long-term impacts on groundwater would be minor.

Under the Proposed Action, one of the proposed new construction projects would occur in the floodplain (ANZY030047A at the Elk River Dam). The proposed Elk River Dam project would construct a 650-linear-foot watercraft barrier at the already existing dam. Because this project would not alter the floodplain and is associated with water control structure protection, there would be no significant impacts on floodplains on Arnold AFB associated with the Proposed Action.

The majority of proposed projects included in the Proposed Action have been sited such that impacts on wetlands are limited to the maximum extent feasible. However, four projects (ANZY060075, ANZY080033, ANZY1500261, and ANZY190012) could not be sited such that their implementation would both avoid impacts on wetlands and accomplish their purpose and need. Any wetland loss could adversely affect a sensitive habitat that supports individual plants and animals, but population-level effects would be unlikely based on the size and regional context of the affected area. A § 404 Individual Permit would be obtained pursuant to the Clean Water Act for the four projects sited in wetlands, prior to commencement of any construction activities within jurisdictional waters of the United States, including potential wetlands. Mitigation would be specified in the permit requirements, and USAF would comply with all appropriate mitigation requirements included in the permit. Any project that may affect wetlands will require a project-specific wetland delineation and evaluation of possible impacts prior to discussing possible wetland mitigation. Consequently, long-term impacts on wetlands from the Proposed Action would be less than significant.

Biological Resources (PEA § 3.7, pages 3-13 to 3-17; § 4.6, pages 4-10 to 4-11): Most of the proposed projects would occur in developed, improved, or maintained areas, and impacts on vegetation and the associated wildlife resulting from projects located within developed or maintained areas would be minor. Vegetation removal associated with new construction projects would represent long-term habitat loss. Trees and other vegetation may support foraging, nesting, and other behaviors for mammals, birds (including migratory birds), reptiles, and amphibians. While any habitat loss could adversely affect individuals, the amount of impacted forest, grassland, and wetland habitat is relatively small compared with similar habitat available in the vicinity, and most of the proposed project locations are in areas near current human activity. Overall, population-level effects on any species are not expected as a result of vegetation removal. To the extent practicable, Arnold AFB would schedule any tree and vegetation removal associated with the proposed projects to occur outside of times of increased migratory bird and bat activity. Construction activities within or adjacent to forests, grasslands, and wetland areas could potentially result in injury, mortality, or disturbance of wildlife species. The potential for injury or mortality would result from direct strike by vehicles or construction equipment. Mobile species, such adult birds, would not be as susceptible to physical strikes, while others, such as smaller and/or less mobile species, would have greater potential to be impacted. It is not expected that substantial numbers of wildlife would be physically impacted by the Proposed Action.

Reduced habitat would also occur as a result of any wetlands fill. For example, wading bird foraging area and amphibian habitat could be decreased. However, the total area of wetland habitat affected would be minor. Soil disturbance and changes to stormwater flow could result in discharge of sediments and pollutants into the surrounding wetlands, reducing water quality and value as wildlife habitat on the Installation and in downstream areas. However, the USAF would continue to implement species- and habit-specific management consideration and measures to offset potential impacts (see § 5.0, *Management Considerations and Measures to Offset Potential Impacts*, of the Natural Resources Report in Appendix C of the PEA).

In addition, most of the wildlife species expected in the project areas are locally and regionally common, and mortality or injury to a small number of individuals would not result in an overall decrease in population diversity, abundance, or fitness of any species. Fish and wildlife in the proposed project areas could also be temporarily disturbed or displaced due to increased noise and human activity associated with the proposed construction, demolition, and road maintenance projects. It is expected that these effects would be short term and would affect only animals in the immediate project areas. Affected individuals would generally be able to return to the area after completion of activities. While some individuals might avoid project sites for the long term, the affected areas are small compared with other, similar available habitat nearby.

Three federally listed bats, the federally endangered gray bat (*Myotis grisescens*) and Indiana bat (*Myotis sodalist*) and the federally threatened northern long-eared bat (*Myotis septentrionalis*), are known to occur at Arnold AFB (PEA § 3.7, pages 3-15 to 3-17). Removal of vegetation associated with the proposed new construction projects could result in potential direct and indirect impacts on federally listed bat species and state listed protected species. However, the USAF would consult with the US Fish and Wildlife Service (USFWS) under the existing 2016 Biological Opinion/Incidental Take Statement (Natural Resources Report in Appendix C of the PEA), which would provide a framework for mitigation and adaptive management measures that would be negotiated for each project with the potential to affect federally listed species. In addition, in accordance with Arnold AFB's Integrated Natural Resources Management Plan, the USAF would continue to implement species- and habit-specific management consideration and measures to offset potential impacts on protected species (§ 5.0, *Management Considerations and Measures to Offset Potential Impacts*, of the Natural Resources Report in Appendix C of the PEA). Further, operational procedures outlined in the Woods Dam Reservoir Management Plan for the protection of gray bats (§ 3.1.1.1 of the Natural Resources Report in Appendix C of the PEA) would continue to be implemented. Consequently, impacts on federally listed bat species and state listed protected species from the Proposed Action would be less than significant.

Cultural Resources (PEA § 3.8, pages 3-17 to 3-24; § 4.7, pages 4-12 to 4-15): The analysis of the potential for individual projects to affect historic properties was conducted in accordance with the 2014 Programmatic Agreement (PA), which was negotiated to streamline the Section 106 consultation process and contains comprehensive provisions for the management of historic properties (Appendix C of the PEA). The stipulations of the 2014 PA establish the standards, the process for effects determinations, and the treatment of all historic properties affected by the proposed 357 projects. All effects determinations, including adverse effects on historic properties, would be mitigated through the provisions of the executed PA. The results of the effects analysis for individual proposed projects are presented in Appendix C of the PEA. Four archaeological sites located within the proposed project footprints have been determined not eligible for listing in the National Register of Historic Places (NRHP). No previously documented Traditional Cultural Properties are located near the individual proposed projects. A total of 42 projects are planned for nonhistoric buildings located in nonhistoric areas of the Installation. Projects planned for these nonhistoric resources were eliminated from further analysis in accordance with the 2014 PA Stipulation IV.E.3.

Stipulation II of the 2014 PA identifies two categories of projects exempted from further review: projects in the exempted work categories outlined in Appendix B of the PA and mission-critical projects. A total of 103 proposed IDP projects are exempt from further review. Arnold AFB has classified 70 projects as mission critical. A total of 47 projects are planned for historic properties, while seven projects are planned for nonhistoric properties in historic districts. The remaining 16 mission-critical projects are planned for nonhistoric properties. Mission-critical projects require no further review, but historic properties need to be documented prior to the start of each project. Documentation requirements are detailed in Stipulations II.C and VIII of the PA and comprise photographs and historical information, such as documents and diagrams. This documentation will "serve as sufficient record of changes to these historic properties as well as sufficient mitigation of any project-related adverse effects."

A total of 77 projects meet the requirements for a "no historic properties affected" determination applying the PA. Stipulation V.A.2 of the 2014 PA states that a finding of "no adverse effect" is appropriate when a project will not alter the characteristics of a historic property "that qualify the property for inclusion in the NRHP in a manner that would diminish its integrity of location, design,

setting, materials, workmanship, feeling, or association" (36 CFR 800.5(a)(1), (b)). Sixty-four proposed projects would result in "no adverse effects" on historic properties.

The 2014 PA defines an adverse effect on historic properties in accordance with the federal regulations governing § 106 compliance – 36 CFR 800.5(a) (Stipulation V.A.3). One proposed project meets the criteria for an adverse effect. Project ANZY139052 is planned for Building 721, a historic property in the Arnold AFB Test Facility Historic District. This project proposes either extensive roof alterations or building demolition, dependent upon further investigation and project development. Mitigation for this project will be completed in accordance with the PA either under Stipulation V.A.3, which requires a Decision Full Report to the Tennessee State Historic Preservation Officer, or under Stipulation VII, which establishes standardized treatment measures for the demolition of historic properties. Therefore, the adverse effect of this project would be mitigated in accordance with the 2014 PA.

The Proposed Action would have no effect on cultural resources at Arnold AFB when the projects are completed in accordance with the 2014 PA. The 2014 PA was negotiated to streamline the § 106 consultation process and contains comprehensive provisions for the management of historic properties. The proposed 357 IDP projects are covered by the terms and conditions of 2014 PA. Implementation of the PA demonstrates that Arnold AFB has taken historic properties into account and has satisfied NHPA § 106 responsibilities for the 357 individual projects proposed as part of the Proposed Action.

Hazardous Materials and Wastes (PEA § 3.9, pages 3-24 to 3-28; § 4.8, pages 4-15 to 4-16):
The use and storage of minor amounts of hazardous materials related to the proposed construction and road maintenance activities would increase temporarily during implementation of the Proposed Action. Any hazardous materials used or hazardous wastes generated as a result of implementation of the Proposed Action would be accumulated and removed in compliance with the procedures included in the Installation's 2020 Hazardous Materials Management Plan. Therefore, short-term construction-related impacts associated with hazardous materials and wastes would be negligible.

Operationally, implementation of the Proposed Action would not be expected to result in any substantial changes in storage of hazardous materials at Arnold AFB. A minor increase in storage of hazardous materials and production of hazardous waste may occur as a result of Proposed Action, particularly the proposed new nitrogen conversion facility (ANZY119050), the proposed Petroleum Operations/Fuels Lab Facility (ANZY020049), and the proposed ethylene glycol storage facility for C-Airside (ANZY189067). However, these proposed projects would only represent a small portion of the hazardous materials and wastes generated at Arnold AFB. The Installation would continue to operate and be regulated as a large-quantity generator. Consequently, the Proposed Action would result in minor impacts on hazardous materials and waste generation and storage at Arnold AFB.

Collectively, the proposed demolition projects would remove an estimated 76,650 square feet (1.76 acre) of facilities over the next five FYs. Most of the facilities at Arnold AFB, including the facilities proposed for demolition, are expected to have building materials that include asbestos-containing material (ACM). The removal of asbestos from buildings basewide (Project ANZY9901154) is also included in the Proposed Action and would constitute a minor beneficial impact at Arnold AFB. Prior to demolition, facilities would be examined for ACM, and all potential ACM in the buildings proposed for demolition under the Proposed Action would be handled and disposed of according to the Installation's Asbestos Management Plan as well as in compliance with all applicable federal, state, and local regulations. Additionally, appropriate BMPs would be followed during all demolition activities (e.g., trained workers, personal protective equipment,

medical surveillance, recordkeeping). Therefore, impacts associated with asbestos would be minor under implementation of the Proposed Action. Further, removal of ACM would constitute a minor beneficial impact at Arnold AFB.

The majority of the ERP sites at Arnold AFB are in a long-term operation/long-term monitoring phase (PEA § 3.9, page 3-28). These sites cover a large portion of land at Arnold AFB, and many projects under the Proposed Action would be sited within or adjacent to one or more of these sites (PEA § 3.9, Figure 3-3, page 3-26). However, all of the Environmental Restoration Program (ERP) sites are in the long-term operation/long-term monitoring phase and are no longer undergoing active restoration measures. Because these sites are relatively large and the projects proposed within the sites would not cover the sites entirely and would in most cases include minor renovation of upgrades to existing facilities and infrastructure, the Proposed Action would not likely interfere with the long-term monitoring of ERP sites at Arnold AFB.

Transportation and Traffic (PEA § 3.10, pages 3-28 to 3-29; § 4.9, pages 4-16 to 4-17): The Proposed Action would have short-term minor adverse effects and long-term moderate beneficial effects on transportation and traffic. Short-term effects would result from construction vehicles and small changes in localized traffic patterns due to the construction and demolition projects. Long-term beneficial effects would result from upgrades at Gate 2 and the roadway maintenance projects included in the IDP that would improve ingress and egress of traffic at Gate 2 and traffic flow throughout the base.

Utility Infrastructure (PEA § 3.11, pages 3-29 to 3-30; § 4.10, pages 4-18): The proposed demolition, construction, and road maintenance projects included in the Proposed Action would cause temporary impacts on utilities. Utilities would be interrupted temporarily on various portions of Arnold AFB during the proposed demolition, construction, and road maintenance activities; however, the Proposed Action would not introduce long-term increases in utility use on base. Further, many projects would upgrade existing utility infrastructure and would have long-term moderate beneficial effects on on-base utilities infrastructure.

Safety (PEA § 3.12, pages 3-30 to 3-31; § 4.11, pages 4-18 to 4-19): Implementation of the Proposed Action would have no impacts on the quantity of explosives stored on Arnold AFB, and Explosive Safety Quality Distance (ESQD) arcs would remain (PEA § 3.12, page 3-31). Further, no new facilities would be placed within these arcs. Additionally, several proposed IDP projects were chosen for implementation because they would have beneficial impacts on explosives safety. Therefore, implementation of the Proposed Action would result in minor beneficial impacts on explosives safety. Under the Proposed Action, all of the proposed IDP projects would follow AT/FP guidelines. The design and siting of the proposed facilities have been conducted in consultation with the Arnold AFB Security Forces Office to ensure that they are designed with appropriate AT/FP setbacks. Further, the upgrade of infrastructure and existing facilities would improve safety and security at Arnold AFB. Therefore, the Proposed Action would result in moderate beneficial impacts associated with AT/FP.

PUBLIC REVIEW / INTERAGENCY COORDINATION

An early public notice detailing that the Proposed Action would occur in wetlands and/or floodplains was published in *The Manchester Times*, *The Tullahoma News*, and *Herald Chronicle* on 9 and 10 December 2020. The notice requested comments be submitted by 10 January 2021; no comments were received. A Notice of Availability was published in *The Tullahoma News* and *The Manchester Times* on 2 June 2021 and in the *Herald Chronicle* on 3 June 2021, inviting the public to review the draft PEA and draft finding of no significant impact (FONSI) for a 30-day

comment period. In addition, the USAF issued a press release on 2 June 2021 announcing the availability of both draft documents. Copies were posted to the Arnold AFB public-facing website for download and were available for review at the Coffee County Manchester, Lannom, and Franklin County public libraries. The public comment period closes on 3 July 2021. In consideration of the effect that lengthy closures of local public libraries and other public meeting places as well as challenges associated with an increasingly overburdened Internet due to the coronavirus (COVID-19) pandemic had on the traditional methods of releasing documents for public review, the USAF encourages members of the public and all interested stakeholders to contact Arnold AFB directly by email or telephone to discuss and resolve issues involving access to the draft PEA and FONSI or the ability to comment.

FINDING OF NO SIGNIFICANT IMPACT

Based on my review of the facts and analysis summarized above and contained within the findings of the PEA, I find the proposed decision to implement the Proposed Action will not have a significant impact on the natural or human environment; therefore, an environmental impact statement is not required. In addition, I find there is no practicable alternative to conducting the Proposed Action within the floodplain and wetland areas as described above and within the PEA and that the Proposed Action includes all practicable measures to minimize harm to the environment. Much of the analysis within this PEA is broad in scope, reflecting environmental effects over large geographic and/or time horizons. All projects listed in Table B-1 of the *Programmatic Environmental Assessment for Installation Development at Arnold Air Force Base, Tennessee,* will have subsequent follow-on, narrower, and site- or proposal-specific analysis to be tiered from this PEA. This analysis fulfills NEPA, the President's Council on Environmental Quality 40 CFR §§1500–1508, the Air Force regulation 32 CFR §989, and Executive Orders 11988, *Floodplain Management,* and 11990, *Protection of Wetlands.*

_____ _____

Ronald J. Onderko, P.E. Date
Command Senior Civil Engineer
Logistics, Civil Engineering and Force Protection

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GLOSSARY OF ABBREVIATIONS AND ACRONYMS

ACAM	Air Conformity Applicability Model
ACM	asbestos-containing material
AEDC	Arnold Engineering Development Complex
AFB	Air Force Base
AFI	Air Force Instruction
AFM	Air Force Manual
AICUZ	Air Installation Compatible Use Zone
ANSI	American National Standard Institute
APE	Area of Potential Effects
ASTF	Aeropropulsion Systems Test Facility
AT/FP	antiterrorism/force protection
BA	Biological Assessment
Blvd.	Boulevard
BMP	best management practice
BO	Biological Opinion
BX	Base Exchange
°C	degrees Celsius
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2e	carbon dioxide equivalent
CRM	Cultural Resources Manager/Management
CWA	Clean Water Act
dB	decibel
dBA	A-weighted decibel
DDT	dichlorodiphenyltrichloroethane
DoD	Department of Defense
DoDI	Department of Defense Instruction
EA	Environmental Assessment
EHR	Eastern Highland Rim
EIAP	Environmental Impact Analysis Process
EISA	Energy Independence and Security Act
EO	Executive Order
ESQD	Explosive Safety Quality Distance
ERP	Environmental Restoration Program
ESA	Endangered Species Act
ETF	Engine Test Facility
°F	degrees Fahrenheit
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
FY	fiscal year
GHG	greenhouse gas
GN2	gaseous nitrogen
HAZMAT	hazardous materials and wastes
HVAC	heating, ventilation, and cooling
I-	Interstate
IBA	Important Bird Area
IDP	Installation Development Plan
IICEP	Interagency/Intergovernmental Coordination for Environmental Planning
INRMP	Integrated Natural Resources Management Plan
kV	kilovolt
LED	light-emitting diode
LN2	liquid nitrogen
LUCAM	Land Use Control Assurance Manual
m^3	cubic meter
MBTA	Migratory Bird Treaty Act
MMT	million metric tons
msl	mean sea level
NAAQS	National Ambient Air Quality Standards
NCA	National Climate Assessment (The Third)
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act
NO_2	nitrogen dioxide
NOA	Notice of Availability
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NTNC	nontransient, noncommunity
O_3	ozone
PA	Programmatic Agreement
Pb	lead
PCB	polychlorinated biphenyl
PC&S	propulsion, consolidation, and streamlining
PEA	Programmatic Environmental Assessment
PIF	Partners in Flight
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
PM_{10}	particulate matter less than 10 microns in diameter
ppb	parts per billion
ppm	parts per million
PSD	Prevention of Significant Deterioration
PWS	Public Water System(s)
PWT	Propulsion Wind Tunnel
RCRA	Resource Conservation and Recovery Act
ROI	Region of Influence
ROW	right-of-way
RPM	reasonable and prudent measure
SF	square foot/feet
SDWA	Safe Drinking Water Act
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SO_2	sulfur dioxide

SO_x	sulfur oxides
St.	Street
SWMU	Solid Waste Management Unit
SWPPP	Stormwater Pollution Prevention Plan
TDEC	Tennessee Department of Environmental Conservation
TNARNG	Tennessee Army National Guard
tpy	tons per year
UFC	Unified Facilities Criteria
USACE	US Army Corps of Engineers
USAF	United States Air Force
USC	United States Code
USDA	US Department of Agriculture
USEPA	US Environmental Protection Agency
USFWS	US Fish and Wildlife Service
USGS	US Geological Survey
UTSI	University of Tennessee Science Institute
VKF	Von Kármán Gas Dynamics Facility
VOC	volatile organic compound
VTS	Volunteer Training Site
WTP	Water Treatment Plant

1.0 PURPOSE, NEED, AND SCOPE

1.1 INTRODUCTION

This Programmatic Environmental Assessment (PEA) has been prepared in accordance with regulations issued by the Council on Environmental Quality (CEQ), 32 Code of Federal Regulations (CFR) Part 989, and the US Air Force's (USAF's) Environmental Impact Analysis Process (EIAP) to evaluate potential environmental impacts associated with the proposed implementation of the Arnold Air Force Base (AFB) Installation Development Plan (IDP), including demolition of aging facilities, new facility construction, facility upgrades, facility repair and renovation, utilities upgrades, and infrastructure improvement, including road maintenance projects. In accordance with CEQ Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (NEPA) (40 CFR Parts 1500-1508, Section 1502.13), this section specifies the purpose and need for the proposed implementation of the Arnold AFB IDP.

1.2 BACKGROUND

Arnold AFB is home to Arnold Engineering Development Complex (AEDC), which uses a 3,682-acre industrial aerospace test facility. AEDC and its mission are unlike that of any other USAF facility in the United States. AEDC operates aerodynamic and propulsion wind tunnels as well as rocket and turbine engine test cells, space environment chambers, and other specialized units. AEDC is a vital resource for the nation's air and defense operations.

Since the establishment of Arnold AFB, Installation development has been a continual activity. Each year, structures are demolished, facilities are constructed, infrastructure is upgraded, and resources are studied. The intent of the ongoing process of Installation development at Arnold AFB is to provide Installation improvements necessary to support the mission of the Installation. In the 2017 IDP, Arnold AFB identified priorities for Installation improvement to be implemented over the next five years. The IDP was created in accordance with Air Force Instruction (AFI) 32-7062, *Comprehensive Planning* (now replaced by AFI 32-1015, *Integrated Installation Planning*), and with principles from Unified Facilities Criteria (UFC) 2-100-01, *Installation Master Planning*. Its content, especially regarding future development planning and plan implementation, was developed in a collaborative process with key stakeholders at Arnold AFB. The IDP identified requirements for improvement of the physical infrastructure and functionality of Arnold AFB, including current and future mission and facility requirements, improvement constraints and opportunities, and land use relationships.

This PEA includes all reasonably foreseeable Installation development projects planned and programmed for the next five years at Arnold AFB. All projects fall under two categories: demolition and infrastructure projects.

- **Demolition Projects.** Arnold AFB proposes demolition projects that could occur over the next five years to achieve efficiency and support growth associated with its mission requirements. Facilities scheduled for demolition have been deemed too costly to repair or renovate, and no longer meet the needs of Arnold AFB. Demolition of these facilities would provide additional square feet (SF) of usable land and reduce the need to construct new facilities on undeveloped land.
- **Infrastructure Projects.** Arnold AFB proposes infrastructure projects over the next five years. These projects may include new construction, facility renovations, road maintenance, or utility upgrades.

1.3 LOCATION AND MISSION

Arnold AFB is located in south-central Tennessee, approximately 72 miles southeast of Nashville, and 61 miles northwest of Chattanooga (**Figure 1-1**). The Installation straddles Coffee and Franklin counties; nearby cities include Tullahoma, Manchester, Winchester, Estill Springs, Decherd, and Sewanee (**Figure 1-2**).

The mission of Arnold AFB it to develop, test, and evaluate weapon, propulsion, aerodynamic, and space systems at realistic conditions for the nation through modeling, simulation, and ground test facilities. Mission needs largely dictate land and facility support requirements, and the IDP was developed around the capabilities of existing infrastructure and facilities to meet existing and projected mission needs.

Due to the nature of the mission, an unusually large amount of land is needed at Arnold AFB. Arnold AFB encompasses 38,863 acres; AEDC's mission area constitutes 3,682 of those acres. This expansive area lends privacy and security to the AEDC mission and provides a large buffer for Installation operations. Within base boundaries, common activities include testing and evaluation operations, Tennessee Army National Guard (TNARNG) military training exercises, and periodic airfield operations. AEDC's industrial area (analogous to a main cantonment area at other, more traditional bases) is centrally located within the larger Installation of Arnold AFB.

1.4 PURPOSE AND NEED

The purpose of the action is to provide infrastructure to adequately serve the Installation's supported populations and mission, accommodate future growth, and meet the goals and objectives of the IDP vision, which states: *Arnold AFB will provide modern facilities and workforce that utilize and develop cutting-edge technologies in support of our customers, the community, and the nation. Arnold AFB will remain a quality workplace with efficient, resilient, and sustainable facilities and infrastructure.* The need for the action is to improve and update facilities and infrastructure that are no longer adequate to meet technologically advanced and specialized aerospace testing and flight simulation requirements. If current deficiencies are not addressed, mission effectiveness would deteriorate as mission and regulatory demands outpace Installation capabilities.

Each of the projects included in the Proposed Action has a specific purpose and need, which is presented in Section 2.3 and Table B-1 (**Appendix B**). The Proposed Action includes a total of 357 IDP projects; however, the USAF determined that individually 322 projects of these projects do not have the potential to have a significant impact on the human and natural environment, and collectively these 322 projects are discussed in this PEA. Six demolition projects, 20 new construction projects, and nine road maintenance projects, which were determined to individually have the potential to have a significant impact on the human and natural environment, were identified for further detailed analysis in this PEA.

1.5 SUMMARY OF ENVIRONMENTAL STUDY REQUIREMENTS

The proposed activities addressed within this document constitute a federal action and, therefore, must be assessed in accordance with NEPA, which requires federal agencies to consider the environmental consequences of proposed actions in the decision-making process (42 United States Code [USC] 4321, et seq.). The intent of NEPA is to protect, restore, or enhance the environment through well-informed decisions by the federal decision maker. The

Figure 1-1. Regional Location of Arnold Air Force Base

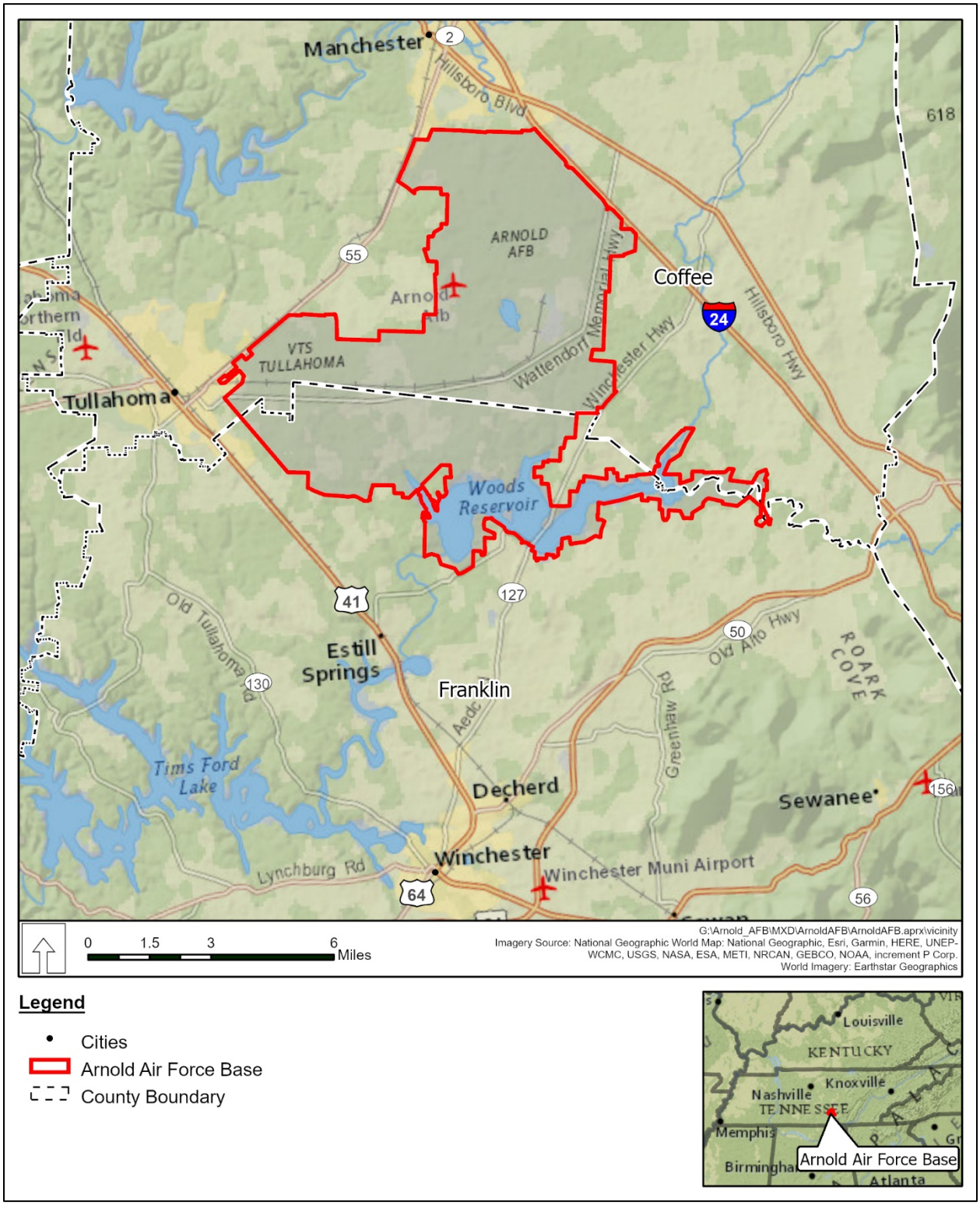

Figure 1-2. Location of Arnold Air Force Base and Surrounding Area

CEQ was established under NEPA, 42 USC 4342, et seq., to implement and oversee federal policy in this process. In 1978, the CEQ issued regulations implementing the NEPA process under Title 40, CFR 17, Parts 1500–1508. On 14 September 2020, CEQ issued an *Update to the Regulations Implementing the Procedural Provisions of the National Environmental Policy Act (*40 CFR, Parts 1500–1508 and 1515–1518). The Air Force EIAP for meeting CEQ requirements is accomplished via procedures set forth in CEQ regulations and 32 CFR Part 989. This PEA has been prepared in accordance with NEPA and 32 CFR Part 989.

1.6 SCOPE OF THE ENVIRONMENTAL ASSESSMENT

The Arnold AFB IDP includes a total of 357 proposed projects (see Section 2.3 and **Appendix B**). Each of these projects is in various stages of planning and development. A number of the projects evaluated in the PEA may not be implemented in the timeframe anticipated due to lack of funding or other unforeseen issues. Consequently, this environmental assessment is programmatic in nature and evaluates the proposed implementation of the Arnold AFB IDP holistically. Additional NEPA analysis tiering off findings of this document (e.g., Categorical Exclusions, in most cases), consistent with CFR Part 989, *Environmental Impact Analysis Process,* would be required for each of the projects evaluated in this PEA. Further, consultation with the US Fish and Wildlife Service (USFWS) as well as the Tennessee State Historic Preservation Office (SHPO) would be conducted under the existing Programmatic Biological Opinion (BO) and existing Programmatic Agreement (PA), as described in Section 1.7.

1.7 APPLICABLE REGULATORY REQUIREMENTS

Applicable federal, state, and local regulations have been considered during analysis of the impacts to individual environmental and social resources evaluated as part of the EA. The following legislation has been given particular consideration:

- Clean Air Act (CAA) (42 USC 7401)
- Clean Water Act (CWA) (33 USC 1251)
- Endangered Species Act (ESA) (16 USC 1531–1543)
- Migratory Bird Treaty Act (MBTA) (16 USC 703–712)
- National Historic Preservation Act (NHPA) (16 USC 470)
- Safe Drinking Water Act (SDWA) (42 USC 300f et seq.)
- Stormwater requirements under Section 438 of the Energy Independence and Security Act (EISA) (42 USC\ 17094)
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 USC 9601–9675)
- Resource Conservation and Recovery Act (RCRA) (42 USC 6901)
- Executive Order (EO) 11990, *Protection of Wetlands*
- EO 11998, *Floodplain Management*

Arnold AFB has consulted with the USFWS under section 7 of the ESA regarding the project. Arnold AFB completed a Programmatic Biological Assessment (BA) in March 2015 to evaluate and document the effects of ongoing, routine operations on Arnold AFB on two federally endangered species, the Indiana bat (*Myotis sodalis*) and the gray bat (*Myotis grisescens*), and a federally threatened species, the northern long-eared bat (*Myotis septentrionalis*), in accordance with the ESA. In response, in January 2016 (and amended in February 2016) the USFWS provided its BO for the effects of the activities covered in the Programmatic BA on the federally listed and proposed species.

To comply with the NHPA and its implementing regulations at 36 CFR Part 800, federally recognized tribes affiliated historically with the Arnold AFB geographic region will be invited to consult on all proposed undertakings that have a potential to affect properties of cultural, historical, or religious significance to the tribes. The tribal coordination process is distinct from NEPA coordination or the Interagency/ Intergovernmental Coordination for Environmental Planning (IICEP) processes and requires separate notification of all relevant tribes. Timelines for tribal consultation are also distinct from those of intergovernmental consultations. Arnold AFB initiated consultation in accordance with AFI-90-2002, *Interactions with Federally Recognized Tribes* (24 August 2020). Once consultation is initiated by the Commander, the Arnold AFB point of contact for consultation with the Tribal Historic Preservation Officer and the Advisory Council on Historic Preservation is the Cultural Resources Manager. Records of correspondence with the Native American tribal governments to date are included in **Appendix A**.

Arnold AFB has consulted with the Tennessee SHPO pursuant to 36 CFR Part 800.14 regarding the management of historic properties at the installation. In 2014, AEDC, Arnold AFB, the Tennessee SHPO, tribal representatives, local governmental jurisdictions, and other parties consulted on a *Programmatic Agreement (PA) between Arnold Engineering Development Complex, Arnold Air Force Base and the Tennessee State Historic Preservation Officer Regarding Management of Historic Properties at Arnold Air Force Base, Tennessee Pursuant to 36 CFR Part 800.14* regarding the management of historic properties at the installation. The PA is effective until 2024 and may be modified, terminated, or extended dependent on review by the signatories. The PA establishes alternative procedures to implement Section 106, standards and procedures for the treatment of historic properties, classes of undertakings exempt from further review, standardized treatments for project effects, and documentation, reporting, and monitoring requirements.

Arnold AFB would comply with CERCLA and RCRA and all applicable state and federal regulations concerning the transport, storage, use, and disposal of hazardous substances, including all hazardous materials and wastes (HAZMAT). No hazardous substance use is anticipated during implementation of the Proposed Action; however, the Proposed Action includes the removal of asbestos from buildings basewide (see Project ANZY9901154 in **Table B-1** in **Appendix B**).

The Proposed Action also must comply with USAF planning and design manuals and design standards. These include:

- Department of Defense (DoD) Installation master planning criteria, consistent with UFC 2-100-01, *Installation Master Planning*
- 2011 USAF Civil Engineering Strategic Plan
- AFI 32-1015, *Integrated Installation Planning* (30 July 2019, Incorporating Change 1, 13 October 2020, and Corrective Action, 4 January 2021)
- USAF requirements for functional space, consistent with Air Force Manual 32-1084, *Facility Requirements* (20 April 2012)
- DoD antiterrorism/force protection (AT/FP) criteria, consistent with UFC 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings*, and the USAF Installation Force Protection Guide (1 October 2013)
- EO 13693, *Planning for Federal Sustainability in the Next Decade,* the Energy Policy Act of 2005, and the USAF's 20/20 by 2020 initiative

- Air Force Manual 32-1084 (1 April 2018)
- DoD Instruction 1015.10, *Military Morale, Welfare, and Recreation Programs* (6 July 2009)

In addition to meeting the above requirements, Arnold AFB would obtain all necessary permits (e.g., Section 404 Individual Permit pursuant to the CWA, National Pollutant Discharge Elimination System [NPDES] Construction General Permit from the Tennessee Department of Environment and Conservation [TDEC], etc.) prior to the initiation of demolition or construction activities.

1.8 PUBLIC AND AGENCY REVIEW OF EA

Through the public involvement process, USAF notified relevant federal, state, and local agencies and the public of the Proposed Action and requested input on environmental concerns they might have regarding the Proposed Action. The public involvement process provides Arnold AFB with the opportunity to consider and address state and local views in its decision regarding implementing this federal proposal. Table 1-1 presents the persons and agencies that were contacted in the preparation of this EA.

A scoping notification was published in the *Manchester Times* and *Tullahoma News* on 9 December 2020, and in the *Herald Chronicle* on 10 December 2020. In accordance with EO 11990, Arnold AFB published the scoping notification to notify the public of potential impacts on floodplains and wetlands and to invite public comment on the proposal and any practicable alternatives that may reduce wetland or other impacts. No responses to the notification were received. The scoping notifications are provided in **Appendix A.**

Table 1-1. Persons and Agencies Consulted/Coordinated

Federal Agencies	
Ms. Mary Walker USEPA Region 4 Sam Nunn Atlanta Federal Center 61 Forsyth Street, SW Atlanta, GA 30303-8960	Mr. Chase Coakley USDA NRCS Area 3 Cookeville Area Office 900 South Walnut Avenue, Room 3 Cookeville, TN 38501
Mr. Dan Elbert Field Supervisor U S Fish and Wildlife Service Tennessee Field Office 446 Neal Street Cookeville, TN 38501	Ms. Tammy Turley USACE Nashville District Estes Kefauver Federal Building & Courthouse Annex 801 Broadway Nashville, TN 37203
State Agencies	
Mr. Matthew Taylor Tennessee Department of Environment and Conservation Office of Policy and Sustainable Practices matthew.k.taylor@tn.gov	Ms. Jennifer Greer Tennessee Department of Environment and Conservation Columbia Environmental Field Office 1421 Hampshire Pike Columbia, TN 38401
Mr. Roger McCoy Tennessee Department of Environment and Conservation Division of Natural Areas William R. Snodgrass TN Tower 312 Rosa L. Parks Avenue, 2nd Floor Nashville, TN 37243	Mr. Reggie Reeves Tennessee Department of Environment and Conservation Division of Natural Heritage TN Tower DNA 312 Rosa L. Parks Avenue, 2nd Floor Nashville, TN 37243
Mr. Mike Moore Tennessee Division of Archaeology Cole Building #3 1216 Foster Avenue Nashville, TN 37243	Mr. Patrick McIntyre Jr. Tennessee Historic Commission 2941 Lebanon Road Nashville TN 37243-0442
Mr. Wes Winton Tennessee Wildlife Resources Agency Region II Ellington Agricultural Center 5105 Edmonson Pike Nashville, TN 37211	
Tribes	
Governor Edwina Butler-Wolfe Absentee Shawnee Tribe of Oklahoma 2025 S. Gordon Cooper Drive Shawnee, OK 74801	First Chief Herbert Johnson Sr. Alabama-Coushatta Tribe of Texas 571 State Park Road 56 Livingston, TX 77351
Russell Wind Alabama-Quassarte Tribal Town P.O. Box 187 Wetumka, OK 74883	Chief Chuck Hoskin Jr. Cherokee Nation P.O. Box 948 Tahlequah, OK 74465-0948

Governor Bill Anoatubby Chickasaw Nation P.O. Box 1548 Ada, OK 74821-1548	Chairman David Sickey Coushatta Tribe of Louisiana 1940 CC Bel Rd. Elton, LA 70532
Paul Barton Eastern Shawnee Tribe of Oklahoma P.O. Box 350 Seneca, MO 64865	Principal Chief Richard Sneed Eastern Band of Cherokee Indians P.O. Box 455 Cherokee, NC 28719
Whitney Warrior United Keetoowah Band of Cherokee P.O. Box 746 Tahlequah, OK 74464	Chief Jeremiah Hobia Kialegee Tribal Town P.O. Box 332 Wetumka, OK 74883
Principal Chief David Hill Muscogee (Creek) Nation of Oklahoma P.O. Box 580 Okmulgee, OK 74447	Tribal Chair Stephanie Bryan Poarch Band of Creek Indians 5811 Jack Springs Road Atmore, AL 36502
Edwin Marshall Seminole Nation of Oklahoma P.O. Box 1498 Wewoka, OK 74884	Tribal Chairman Ron Sparkman Shawnee Tribe of Oklahoma P.O. Box 189 Miami, OK 74355
Mekko Ryan Morrow Thlopthlocco Tribal Town P.O. Box 188 Okemah, OK 74859	

USEPA – US Environmental Protection Agency; **USDA** – US Department of Agriculture; **NRCS** – Natural Resources Conservation Service; **USACE** – US Army Corps of Engineers

A Notice of Availability (NOA) of this Draft PEA and Finding of No Significant Impact (FONSI) was published in the newspapers of record (*The Manchester Times*, Manchester, Tennessee; *The Tullahoma News*, Tullahoma, Tennessee; and *Herald Chronicle*, Winchester, Tennessee) announcing the availability of the PEA for a period of 30 days. Public and agency comments received on the Draft PEA will be provided in **Appendix A** of the Final PEA.

Copies of the Draft PEA and FONSI were also made available for review online at the Arnold AFB public website: https://www.arnold.af.mil/Units/Test-Support-Division/ and at the following locations:

Coffee County Manchester Public Library
1005 Hillsboro Blvd.
Manchester, TN 37355

Lannom Public Library
312 North Collins St.
Tullahoma, TN 37388

Franklin County Library
105 South Porter St.
Winchester, TN 37398

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2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

This section provides a description of the Proposed Action and Alternatives, alternative selection standards, and those alternatives considered by not carried forward for further analysis.

2.2 PROPOSED ACTION

The Proposed Action would implement a range of 357 projects during the next five years (from fiscal year [FY] 2021 to FY 2026), including the demolition of aging facilities, new facility construction, facility upgrades, facility repair and renovation, utilities upgrades, infrastructure improvement, and road maintenance identified in the Arnold AFB IDP. The Arnold AFB IDP includes six demolition projects, 20 new construction projects, and nine road maintenance projects, which were determined to individually have the potential to have a significant impact on the human and natural environment and were identified for further detailed analysis in this PEA. The USAF has determined that individually the remaining 322 projects would not have a significant impact on the human and natural environment.

2.3 SELECTION STANDARDS FOR PROJECT ALTERNATIVES

An analysis of planning constraints, including operational, environmental, and built constraints, that limit future development projects on the Installation was performed as part of the Arnold AFB 2017 IDP process. The planning constraints were considered in development of the recommended IDP projects identified under the Proposed Action. These constraints also provide the selection standards necessary to choose the Proposed Action alternatives included in this PEA. Planning constraints are human-made or natural elements that may create significant limitations on the operation or construction of buildings, roadways, utility systems, airfields, training ranges, and other facilities. These constraints, when considered collectively with the Installation's capacity opportunities, identify areas open for development and those areas that can be redeveloped to support future growth or mission expansion.

ON-BASE PLANNING CONSTRAINTS

Major Constraints to future development include:

- Operational Constraints
- Environmental Restoration Program (ERP) Sites
- Explosive Safety Quantity-Distance Arcs

Minor Constraints to future development include:

- Anti-Terrorism/Force Protection (AT/FP) Standards
- Natural Resources
- Wetlands
- Cultural Resources
- Fuel and Chemical Storage Tanks
- Hazardous and Non-Hazardous Waste
- Flood Analysis and Management

Constraints that do not impact future development include:

- Electromagnetic Radiation Safety Zones
- Air Installation Compatible Use Zone (AICUZ) and Airfield Clearances

The identification of planning constraints at Arnold AFB integrated a multitude of considerations, such as natural and cultural resources information, environmental quality issues, airspace restrictions, operational safety requirements, the built environment, and other factors that influence facility site planning on the Installation. Identifying these constraints was critical in selecting IDP projects for mission redevelopment, expansion, or new mission acceptance.

There are multiple major and minor constraints to future development at Arnold AFB that limit the location, intensity, or form of future development. Because mission needs largely dictate land and facility support

requirements, the IDP was developed around the capabilities of existing infrastructure and facilities to meet existing and projected mission needs. Examination of Installation capacities provided planning guidance regarding the improvements needed to adequately serve the Installation's supported populations and missions, accommodate future growth, and meet the goals and objectives of the IDP vision.

Arnold AFB's capacity for future development or mission expansion was determined by examining current supply, demand, and headroom (i.e., capacity) of land uses, facility types, utility systems, available facility space or land that could support the mission, and quality of life of current and future users of the Installation. The analysis was performed during the IDP process and provides the selection standards necessary to choose the Proposed Action alternatives included in this PEA. To be considered viable, an alternative must meet the purpose of and need for the Proposed Action. The following are the selection standards that an alternative must meet to satisfy this requirement:

1. Ensure that Arnold AFB meets base and tenant unit mission requirements for secure and timely delivery of specialized test equipment and materiel.
2. Do not displace or adversely impact other missions at Arnold AFB (e.g., TNARNG training activities and other test activities).
3. Site new facilities on existing Arnold AFB land to maximize operational security.
4. Provide direct, on-base access to test facilities for delivered materiel.
5. Leverage existing infrastructure.

2.4 DESCRIPTION OF PROPOSED ACTION PROJECTS

NEPA and CEQ regulations mandate the consideration of reasonable alternatives to the Proposed Action. "Reasonable alternatives" are those that also could be utilized to meet the purpose of and need for the Proposed Action. Per the requirements of 32 CFR Part 989, the USAF EIAP regulations' selection standards are used to identify alternatives for meeting the purpose and need for the USAF action.

The scope and locations of the proposed projects are described here and grouped by project category. Reasonable and practicable alternatives for projects have been presented where multiple viable courses of action exist and where the alternatives meet the criteria described in Section 2.2**.**

Projects included in the Proposed Action are grouped by project category: demolition projects or infrastructure projects (new construction, facility renovations, road maintenance, or utility upgrades). All recommended projects included in this alternative meet the selection standards above and are retained for consideration in this PEA, unless dismissed as noted below in the project descriptions. Projects would be designed to meet current AT/FP requirements per UFC 4-010-01 and meet Leadership in Energy and Environment Design certification, where possible and practicable.

Of the 357 projects included in the Proposed Action, six are demolition projects and 351 are infrastructure projects. Of the infrastructure projects, 30 are new construction, 186 are facility renovations, 12 are road maintenance, and 123 are utility upgrades. **Figure 2-1** depicts the general locations of all 357 projects and also shows the boundaries for the six development districts of the Installation that were identified in the IDP: Test Operations, Mission Support, Airfield, TNARNG, Community, and Buffer Districts.

Test Operations District. The Test Operations District is the central feature of Arnold AFB. It is characterized by numerous test cells, extensive utility systems, and supporting administrative

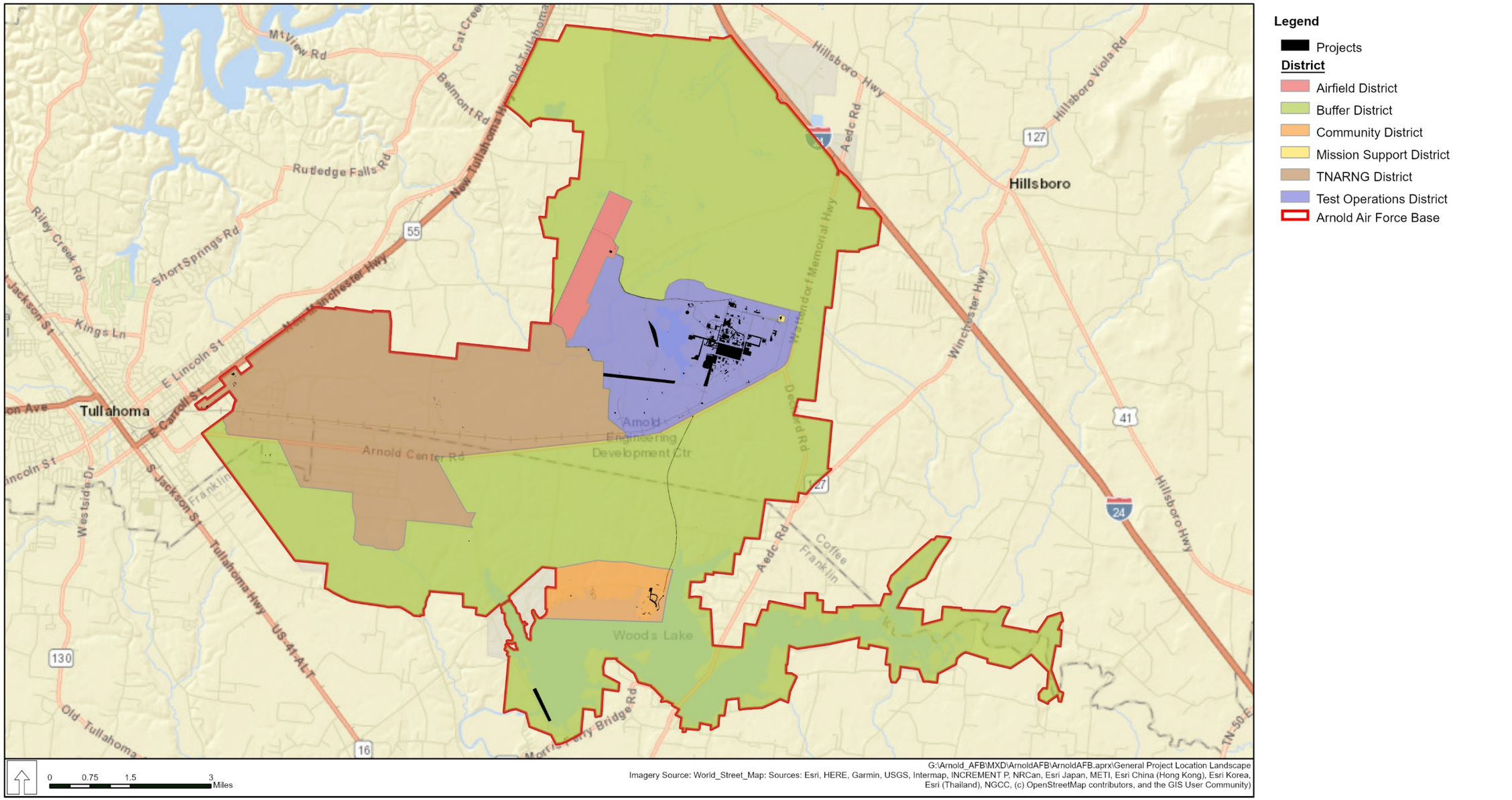

Figure 2-1. Proposed Installation Development Projects on Arnold Air Force Base

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facilities. The Test Operations District comprises the entire area within the AEDC fence line, excluding the airfield (included in the Airfield District) and the community services facilities along Von Karman Road near the Main Gate (included in the Mission Support District). Also included in this district are the munitions storage area, the Secondary Reservoir, the Retention Reservoir, the fitness center and running trail, Building 100, and the fire department. Within the Test Operations District are several areas dedicated to certain types of test operations. The Propulsion Wind Tunnel (PWT) and Aeropropulsion Systems Test Facility (ASTF) comprise the two large central blocks within the Test Operations District.

The Test Operations District is the core mission operations area; it is thought of as the flightline would be at an AFB with a flying operation. Testing operations at Arnold AFB rely on heavy utility use, primarily water, power, and pressurized air, so maintaining these systems is critical to keeping operations running. Many of the test cells within the Test Operations District were constructed in the middle of the twentieth century. Extremely high construction or replacement cost and new, modern, stricter environmental regulations would make replacement or reconstruction of these test cells impossible. Therefore, it is exceedingly likely that the Test Operations District will continue to exist largely as it is today. It will remain as the core mission area. Given its value to Arnold AFB, the greatest number of future projects, especially those related to utilities, will occur in the Test Operations District.

Mission Support District. The Mission Support District is a small district located within the Test Operations District. Stakeholders have identified the Mission Support District as the area where community services and support functions are appropriate within the main cantonment area. Currently, the Base Exchange (BX), Commissary, and Medical Clinic are located within this district, which is located on Von Karman Road between Kindel Drive and Avenue B. The parcel on the south side of Von Karman Road between Avenue B and Kindel Drive has future development potential for small commercial uses serving the workforce or other community members.

Airfield District. The Airfield District comprises the runway, taxiway, and ramp/apron at Arnold AFB, as well as the clear zones on either end of the runway. The only existing facility within this district is the airfield operations facility. The district is entirely utilitarian in nature, with facilities and land use exclusively dedicated to flight operations. Reactivation of the runway in 2018, required several facility and infrastructure projects in the Airfield District, which are ongoing and planned for completion in fall 2021. In general, the Airfield District is not anticipated to change significantly in the short- to mid-range future. The airfield will be used for delivering out-sized specialized equipment and materials for testing to Arnold AFB test facilities. There will continue to be no flying mission at Arnold AFB, so the airfield facilities will be used only on an as-needed basis. No aircraft maintenance will be performed, nor will there be any refueling or air traffic control operations.

TNARNG District. The TNARNG District is 7,578 acres characterized by the land that is leased or licensed to the TNARNG for their training purposes. This district encompasses TNARNG's Volunteer Training Site (VTS), which consists of a 10-acre cantonment area, the only improved portion of the training site, off of Industrial Boulevard at the eastern edge of the Arnold AFB boundary; land navigation training areas around the former Camp Forest areas; a variety of small arms, machine gun, and grenade ranges; a live-fire shoot house; an urban assault course; a tactical training base; and a drop zone. The land mostly comprises the range areas.

Community District. The Community District is characterized by the development along Woods Reservoir on the south side of the base, which includes privatized housing areas, the Gossick Leadership Center, Wingo Inn, Arnold Lakeside Center, Crockett Cove Campground cabins, Dogwood Ridge campground, and Fam Camp. The district also includes the mountain bike trails located north of Northshore Road and numerous other recreational features, such as the tennis courts, softball field, and playground. In addition, an outgrant to the Highland Yacht Club is located within this district. Several hunting areas, including duck hunting on Woods Reservoir and bow hunting in the wooded areas, also exist within the Community District. The district is bound by Woods Reservoir on the south and east and University of Tennessee Science Institute (UTSI) on the west. The northern boundary is about a quarter mile north of Northshore Road. It is nearly three miles south of Wattendorf Highway and Gate 2. As a result of the distance and the heavy forest that covers much of Arnold AFB, the Community District is fairly isolated from the cantonment area. No major projects are anticipated for this area over the next 10 to 20 years. In general, the Community District will remain as it is today.

Buffer District. The Buffer District is made up of the largely undeveloped portions of land that surround the other districts. It includes the golf course, hunting areas, recreational areas, utility easements and corridors, and Woods Reservoir. It is the largest planning district at Arnold AFB encompassing 25,946 acres. There is a desire to retain the buffer for noise and security purposes; no future development is planned in the Buffer District. Should additional development be needed, there is undeveloped land within the existing fence line in the Mission Support and Test Operations Districts that can serve future mission needs.

Detailed figures depicting the proposed projects are provided in **Appendix B.** The majority (329) of the proposed projects are located within the Test Operations District on Arnold AFB; 19 are located in the Community District; four are located in the Buffer District; three are located in the Mission Support District; one is located in the Airfield District; and one is located in the TNARNG District (see figures in **Appendix B**).

The following and **Table 2-1** provide an overview of the proposed demolition, new construction, and road maintenance projects included in the Arnold AFB IDP that are evaluated in this PEA. The six demolition projects, 20 new construction projects, and nine road maintenance projects carried forward as part of the Proposed Action (highlighted in green in **Table 2-1**), along with alternatives considered, selection standards, and screening summary for each project are summarized in **Table 2-1**.

2.4.1 Proposed Demolition Projects

All six demolition projects proposed at Arnold AFB in the next five FYs were identified for further detailed analysis as selected projects under the Proposed Action (**Table 2-1**). Each of the six demolition projects were determined to individually have the potential to have a significant impact on the human and natural environment. Collectively, these demolition projects would remove an estimated 76,650 SF (1.76 acres) of facilities over the next five FYs.

Renovating and leasing unneeded facilities on Arnold AFB to non-DoD entities instead of demolition was considered but would not be feasible for force protection requirements because secured, active military installations cannot accommodate non-military functions. Therefore, this alternative was eliminated from consideration because it does not meet Selection Standard 3. Mothballing unneeded and obsolete facilities was also considered, but would also be infeasible because, without maintaining operational climate control systems, facilities would rapidly deteriorate due to dry-rotting and mold/mildew formations in Tennessee's hot and humid climate. Therefore, this alternative does not meet Selection Standard 5 and was eliminated from

consideration due to incurring costs of maintaining facilities no longer needed to support the mission. At the programmatic level, there are no alternatives to demolition for these projects. Specific alternative methods for facility demolition would be determined at the design phase, but regardless of the alternative demolition method chosen, work would be limited to the immediate vicinity of the facility proposed for demolition. There are no other practicable alternatives that meet the purpose and need of the proposed action.

2.4.2 Proposed Infrastructure Projects

2.4.2.1 New Construction

Of the 30 construction projects proposed on Arnold AFB over the next five FYs, 20 were identified for further analysis as selected projects under the Proposed Action (**Table 2-1**). Collectively, these 20 new construction projects would result in an estimated 3,291,300 SF (75.6 acres) of ground disturbance over the next five FYs. The other new construction projects summarized in **Appendix B** (see **Table B-1**) were determined not to individually have the potential to have a significant impact on the human and natural environment and are cumulatively addressed in this PEA.

Overall, all the proposed new construction projects remedy identified deficiencies in the infrastructure on Arnold AFB and maintain infrastructure that is adequate to support the Installation's mission and applicable USAF, state, and federal requirements. They make as much use as possible of existing land and facilities, avoid creating or maintaining redundant space or infrastructure, avoid or minimize operational inefficiencies, and represent the most cost-effective and sustainable alternatives. All the proposed new construction projects would be consistent with all Arnold AFB internal planning documents and zoning requirements, applicable Installation architectural compatibility guides, and relevant legal and regulatory requirements.

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Table 2-1. Proposed Projects, Alternatives Considered, Selection Standards, and Screening Summary for Each Installation Development Plan Project

Project Considered	Appendix B Map Reference	Proposed Project Description	Alternatives Considered	Selection Standards*					Screening Summary
				1	2	3	4	5	
Demolition Projects									
Demolition Project 1: ANZY142002 Demolish Water Pump Control House Facility 2114, 2115, and 2116	Figure B-14	This project would demolish the water pump control house (Facilities 2114, 2115, and 2116) and would restore the grounds. Facilities 2114, 2115, and 2116 were constructed in 1988 and 1996 and have exceeded their useful life cycles. The original purpose of these facilities was to support fire training drills, which are now accomplished through a more affordable option where a contractor brings a fire training trailer on the site to Arnold AFB when needed. The demolition of these facilities would return their land parcels to a mix of gravel and grass.	Demolition of proposed facilities does not allow for alternatives besides differing methods or timing of demolition, which are not alternatives that can be evaluated under NEPA in the planning process.	Yes	Yes	N/A	N/A	N/A	Meets all applicable selection standards.
Demolition Project 2: ANZY152004 Demolish Acid Storage Shed, Building 1460	Figure B-7	This project would demolish the acid storage shed, Building 1460, and would restore the grounds. Building 1460 was constructed in July 1959 and is no longer of use to the Installation. The facility is unmaintained and an eyesore. The demolition of this building would return its land parcel to a mix of gravel and grass.	Demolition of proposed facilities does not allow for alternatives besides differing methods or timing of demolition, which are not alternatives that can be evaluated under NEPA in the planning process.	Yes	Yes	N/A	N/A	N/A	Meets all applicable selection standards.
Demolition Project 3: ANZY070055 Demolish J-3 Test Cell, Building 890, and Related Structures	Figure B-10	This project would demolish the J-3 Test Cell Building 890 and related structures. The J-3 Test Cell's current state is nonoperable due to the decision to discontinue the use of the test cell. The test cell, constructed in 1960, will be demolished, and its land parcel will be returned to a gravel/grass mixture following demolition. Previous projects have been implemented to control the long-term deterioration of the test cell and to make it safer with respect to environment issues. The test cell had many hazards including chemicals (e.g., rocket propellants). The cleared area would allow an area for employee and customer parking, an outside storage building, and laydown area.	Demolition of proposed facilities does not allow for alternatives besides differing methods or timing of demolition, which are not alternatives that can be evaluated under NEPA in the planning process.	Yes	Yes	N/A	N/A	N/A	Meets all applicable selection standards.
Demolition Project 4: ANZY010067P Demolish PWT Test Fuel Building, Facility 750	Figure B-9	This project would demolish the PWT Test Fuel Building, Facility 750, and restore the grounds. The facility is an inactive fuel metering facility with piping and valves and special asbestos insulation that must be abated. Building 750 was constructed in July 1958 and has exceeded its useful life cycle. Once demolished, the building footprint would be returned to match the surrounding industrial area and would include a mix of gravel and grass.	Demolition of proposed facilities does not allow for alternatives besides differing methods or timing of demolition, which are not alternatives that can be evaluated under NEPA in the planning process.	Yes	Yes	N/A	N/A	N/A	Meets all applicable selection standards.
Demolition Project 5: ANZY122003 Demolish High Bay 1 Heaters, Von Kármán Gas Dynamics Facility, Building 676	Figure B-10	This project would demolish an old 1,344 SF gas-fired High Bay 1 heater on the west side of the Von Kármán Gas Dynamics Facility (VKF), Building 676. The High Bay 1 heaters on the west side of Building 676 have been in place since the facility was constructed in 1954. These heaters have been abandoned in place since the 1990s. Once the heaters are demolished, their footprint would be returned to match the other areas surrounding Building 676 and would include a mix or grass, gravel, and potentially concrete for a walkway.	Demolition of proposed facilities does not allow for alternatives besides differing methods or timing of demolition, which are not alternatives that can be evaluated under NEPA in the planning process.	Yes	Yes	N/A	N/A	N/A	Meets all applicable selection standards.
Demolition Project 6: ANZY132009 Demolish J-6 Support Building, Facility 2120	Figure B-13	This project would demolish the approximately 3,250 SF J-6 Support Building 2120 to consolidate facilities. This demolition project is needed because the J-6 Support Building 2120 is in a blast zone and cannot be occupied by personnel, yet the USAF must still maintain it. Currently, USAF still maintains the building for storage of spare parts; however, it is no longer required to perform the base mission. The building was constructed in 1987 and has exceeded its useful life cycle. The demolition of this building would return its land parcel to a mix of gravel and grass.	Demolition of proposed facilities does not allow for alternatives besides differing methods or timing of demolition, which are not alternatives that can be evaluated under NEPA in the planning process.	Yes	Yes	N/A	N/A	N/A	Meets all applicable selection standards.
New Construction									
New Construction Project 1: ANZY119050 Nitrogen Conversion Facility	Figure B-10	This project would provide a new 18,854 SF nitrogen conversion facility near the current distribution system but outside the J4 explosives zone. This project would construct a new facility that includes all equipment to store and convert liquid nitrogen to 5,000 pounds per square inch gaseous nitrogen and that could be tied into the utility gaseous nitrogen (GN2)	**Alternative 1:** New Construction Project 1, Alternative 1 would be constructed in a location removed from the main road (Von Karman Road) on Arnold AFB outside the J4	Yes	Yes	Yes	Yes	Yes	Meets all the selection standards.

Project Considered	Appendix B Map Reference	Proposed Project Description	Alternatives Considered	Selection Standards*					Screening Summary
				1	2	3	4	5	
		system. Construct a new GN2 to liquid nitrogen (LN2) conversion facility outside of the J4 blast zone, which is designed to be reliable and maintainable.	explosive zone, which would further increase security protection measures						
			Alternative 2: New Construction Project 1, Alternative 2, would upgrade and repair the current facility.	Yes	No	No	Yes	Yes	It would be located within the J4 explosives zone, so this alternative fails to meet Selection Standards 2 and 3.
New Construction Project 2: ANZY020049 Petroleum Operations/Fuels Lab Facility	Figure B-9	Due to the nature of the Arnold AFB mission, the base has performed an average of 4,125 test procedures per year for the past three years using the current laboratory facility. The purpose of the project is to construct a laboratory of an appropriate size commensurate to the number of test procedures conducted annually and located near the fuel farm, thus remedying the current process whereby samples must be transported across the base to perform the required fuels testing. Arnold AFB's mission is to provide preflight testing in support of DoD pre-/post-fuselage, turbine, and weapons testing program. The existing fuels laboratory provides fuels test procedures for all engine test facilities. Quality testing of fuels is currently performed in a room of approximately 321 SF in area that is set aside in the base's chemistry laboratory, Building 445. This new construction project is needed because the current laboratory area suffers from inadequate ventilation and limited storage, and the allotted space is inadequately sized and is too congested to contain all the required equipment.	**Alternative 1:** New Construction Project 2, Alternative 1 would construct a 2,000 SF petroleum operations/laboratory facility at the existing facility.	Yes	Yes	Yes	Yes	Yes	Meets all the selection standards.
			Alternative 2: New Construction Project 2, Alternative 2 would construct an entirely new Fuels Lab facility.	Yes	Yes	Yes	Yes	No	Construction of a new facility does not leverage existing infrastructure, so this alternative fails to meet Selection Standard 5.
New Construction Project 3: ANZY169004 Construct New VKF Storage Building	Figure B-10	This project would construct a new 103,035 SF building suitable for tunnel equipment storage and usable and efficient workspace. The current building has very limited usable space to house all the parts, equipment, and many various items required to function on a day-to-day basis. Presently, the second floor cannot meet all requirements due to floor loading restrictions. This new construction project is needed to house tunnel equipment and to create a safe working environment. The existing low ceiling creates a human safety hazard. This building is also needed to meet the Installation's future requirements.	**Alternative 1:** New Construction Project 3, Alternative 1, would construct a new exterior tunnel equipment storage building at a location near the testing facility but in an out-of-the way location for any planned future mission efforts.	Yes	Yes	Yes	Yes	Yes	Meets all the selection standards.
			Alternative 2: New Construction Project 3, Alternative 2 would modify the current facility, by adding to it or upgrading the floor capacity.	No	No	No	Yes	Yes	Modification to the existing facility does not meet base and tenant unit mission requirements; would impact other missions at Arnold AFB, as the current building has very limited usable space; and modifying the existing facility would not maximize operational security. Therefore, this alternative fails to meet Selection Standards 1, 2, and 3.
New Construction Project 4: ANZY010027A Upgrade Skimming Lagoon #1	Figure B-15	This project would update Skimming Lagoon #1 on the Retention Reservoir to ensure that a large fuel spill does not result in the shutdown of all cooling water use by test facilities and plants until spills can be controlled and cleaned up. The following project components would be installed: a permanent fuel/water separator with a flow capacity of 100 gallons per minute; an electric air compressor with the capacity to supply air to a drum skimmer, weir skimmer, and three air-powered pumps, all in concurrent use; a work platform at water level to allow safe access to cleanup equipment for all range of pond levels; a storage building at the lagoon site for the storage of spill equipment and safety equipment; an approximately 400 SF storage area for a small boat; a gravel staging area for handling and temporary storage of at least six 1,500-gallon polytanks on trailers; a safety shower and eyewash station; a traveling screen to capture floating materials (i.e., sticks, trash, weeds, etc.) before they enter the skimming area; and a permanent barrier tape holders with reels to contain the tape around the lagoon area. This new construction project is needed to maintain environmental compliance with NPDES permit parameters by providing cleanup workers with a method to clean/contain large fuel spills in all weather conditions. This project also provides a substantial safety improvement for the personnel working at the lagoon	No alternatives or alternative locations were proposed, as the Proposed Action is limited to the area where there are currently identified deficiencies, and the location is a fixed variable since it needs to remain near the skimming lagoon for this project to support the skimming lagoon operation.	Yes	Yes	Yes	Yes	Yes	Meets all the selection standards.

Project Considered	Appendix B Map Reference	Proposed Project Description	Alternatives Considered	Selection Standards*					Screening Summary
				1	2	3	4	5	
		and provides a safe, reliable method for them to respond to and clean up large fuel/oil spills.							
New Construction Project 5: ANZY199037 Cooling Water Expansion, Rowland Creek 20009	Figures B-8 and B-9	This project would construct 1,800 linear feet of 72-inch-diameter coated steel water line and a 1,500 SF addition with both a motor and a pump at the Rowland Creek Pumping Station. Test mission requirements have increased in recent years driving the need to perform concurrent testing. Current cooling water infrastructure must be upgraded to accommodate changes. This project would allow the system to convey 620,000 gallons/minute of cooling water, and the new water line would have the flexibility to deliver to multiple test facilities, while remaining test capabilities are served from other portions of the distribution system.	No other viable alternatives were proposed. Test mission requirements have increased and have driven the need to perform concurrent testing, which now requires upgrades to the current cooling water system to ensure that Arnold AFB meets base and tenant unit mission requirements for secure and timely delivery of specialized test equipment and materiel. Expanding and upgrading the current cooling water system does not displace or adversely impact other missions on base, and it would be sited on existing Arnold AFB land and would leverage existing infrastructure.	Yes	Yes	Yes	Yes	Yes	Meets all the selection standards.
New Construction Project 6: ANZY009139 Replace Building 792, PWT Pipe Shop	Figure B-9	This project would replace the existing metal building and construct a new 1,190 SF metal building. This project is needed because the existing building was erected in 1966 and is in deplorable condition.	**Alternative 1:** New Construction Project 6, Alternative 1 would construct a new 1,190 SF metal building at the PWT Pipe Shop.	Yes	Yes	Yes	Yes	Yes	Meets all the selection standards.
			Alternative 2: New Construction Project 6, Alternative 2 would modify the current facility.	No	No	Yes	Yes	Yes	Modification to the existing facility does not meet base and tenant unit mission requirements; would impact other missions at Arnold AFB, as the current building is currently unusable, and modifying the existing facility would not maximize operational security. Therefore, this alternative fails to meet Selection Standards 2 and 3.
New Construction Project 7: ANZY1500261 Replace Perimeter Security Fence	Figure B-12	This project would construct approximately 61,700 linear feet of perimeter fencing in two phases. This project would bring the perimeter gates/access points into accordance with UFC 4-022-02 standards and would maintain the security of the Installation.	No viable alternative locations for New Construction Project 7 were proposed. The location of the current fenced boundary is already established, and this project would upgrade the current fenceline to meet codes and would add gates where access capabilities are desired based on current need. Gate locations are at already existing roadways or where outside contractor access is needed.	Yes	Yes	Yes	Yes	Yes	Meets all the selection standards.
New Construction Project 8: ANZY149046 Construct Fuel Transfer Line to SL1 Test Cell	Figure B-8	This project would install 41,249 linear feet of fuel transfer line from the fuel transfer trench at the corner of Fourth Street and North Hap Arnold Drive to SL1. The purpose of this line is to fill the SL1 fuel tank. Currently, the SL1 fuel tank is filled by the fuel farm refueler. Upcoming work at SL1 will require several fuel deliveries per day. This new line is needed to accommodate these multiple deliveries.	No other feasible alternatives were proposed for New Construction Project 8. Based on siting and cost constraints, the USAF chose the project's proposed location because it is the shortest distance between the current transfer trench and SL1.	Yes	Yes	Yes	Yes	Yes	Meets all the selection standards.
New Construction Project 9: ANZY180017 Add/Alter Installation Access Control Point Gate 2 Upgrade	Figure B-5	This project would construct an approximately 18,615 SF access control point. Gate 2 is currently used to process both privately owned vehicles and commercial traffic. The primary purpose of this project would be to separate the two vehicle entry points to increase processing efficiency and update access control points to meet all AFI/UFC requirements.	**Alternative 1:** New Construction Project 9, Alternative 1 would update Gate 2 by constructing an 18,615 SF access control point.	Yes	Yes	Yes	Yes	Yes	Meets all the selection standards.
			Alternative 2: New Construction Project 9, Alternative 2 would utilize the current gate location (Gate 2) and	No	No	Yes	Yes	Yes	Utilization of the existing Gate 2 location and the old Gate 3 location does not meet base and tenant unit mission requirements, would impact other

Project Considered	Appendix B Map Reference	Proposed Project Description	Alternatives Considered	Selection Standards*					Screening Summary
				1	2	3	4	5	
			an old gate location (Gate 3) to separate the two vehicle entry points.						missions at Arnold AFB, and would not maximize operational security. Therefore, this alternative fails to meet Selection Standards 1 and 2.
New Construction Project 10: ANZY030047A Install Watercraft Barriers, Elk River Dam	Figure B-23	This project is in a floodplain and would construct a 650-linear-foot barrier project to meet all current AFI/UFC requirements.	No alternative locations for New Construction Project 10 were proposed, as the location is limited to the area where there are currently identified deficiencies, and the location is a fixed variable since it along an existing structure. USAF did initially consider different forms of watercraft barriers; however, construction of the barrier was the only option that would meet AFI/UFC requirements.	Yes	Yes	Yes	Yes	Yes	Meets all the selection standards.
New Construction Project 11 ANZY080033 Construct Security Fence, Munitions Storage Area	Figure B-14	This project would construct security fence within the munitions storage area in compliance with Air Force Pamphlet 91-201, which requires the fence to prevent unauthorized access to the storage area. This project is needed to isolate the munitions storage area from the rest of the Installation and would result in approximately 1,467,684 LF of new fencing.	No alternative locations for New Construction Project 11 were viable. A fence that completely isolates the munitions storage area is the only solution. The current layout makes for efficient and timely construction, as it runs along the ditch line of an existing roadway. Other alignments were initially considered but would have increased cost.	Yes	Yes	Yes	Yes	Yes	Meets all the selection standards.
New Construction Project 12: ANZY060046 Install Streetlights, AE Annex Parking Lot, Facility 10006	Figure B-2	This project would make it easier for drivers to see in the dark by installing street lighting at base entrance gates and the parking lot. This project is needed to implement suggestions from SP06-D021 and SP06-E003. The parking lot is dark at night, and improved lighting at gates is needed to help drivers see security bollards and speed bumps.	No alternative locations for New Construction Project 12 were proposed because the lighting is needed at the existing parking lot next to an existing facility. The use of alternative forms of lighting were initially considered but based on other similar lighting projects on base in recent years, LED lights have proven to be the most efficient and cost-effective light of choice for street and parking lot lighting.	Yes	Yes	Yes	Yes	Yes	Meets all the selection standards.
New Construction Project 13: ANZY040045 Construct Sandblast Facility, Facility 1604	Figure B-18	This project would demolish the old structure and construct a new 5,207 SF aggregate blasting facility. This project would provide a facility of an adequate size that can be used regardless of weather conditions. This project would assist the testing community in completing construction of their facilities and meeting testing schedules. This project is needed because the current building is inadequate for the size of the components that are being sent to the paint shop by the test facilities for blasting and painting, which forces the painting process to be halted during inclement weather.	**Alternative 1:** New Construction Project 13, Alternative 1 would construct a new 5,207 SF aggregate blasting facility at a location near the current facility and would then demolish the old structure.	Yes	Yes	Yes	Yes	Yes	Meets all the selection standards.
			Alternative 2: New Construction Project 13, Alternative 2 would move the sandblasting activities to an off-base facility.	No	No	No	No	No	Moving the sandblast facility off base would result in testing delays that would be detrimental to Arnold AFB test customers due to lag time to go off base to have parts or test articles sandblasted before returning to the Installation for actual testing. These delays could negatively impact national security by impeding testing and test results. Moreover, the transport of high-security, top secret parts to an off-base location is not feasible. This alternative

Project Considered	Appendix B Map Reference	Proposed Project Description	Alternatives Considered	Selection Standards*					Screening Summary
				1	2	3	4	5	
									fails to meet any of the selection standards.
			Alternative 3: New Construction Project 13, Alternative 3 would first demolish the current facility and then construct a new facility within the same footprint.	Yes	Yes	No	No	Yes	Demolition of the existing facility and construction of a new one in its place does not meet base and tenant unit mission requirements and would impact other missions at Arnold AFB, because the activities performed at the facility are part of the day-to-day mission requirements of AEDC. Therefore, this alternative fails to meet Selection Standards 3 and 4.
New Construction Project 14: ANZY180010 Construct Addition to Fitness Center, Facility 1358	Figure B-4	As a military installation, physical fitness and quality of life are crucial aspects of maintaining morale and supporting a productive work force. The purpose of this new 1,971 SF construction project, which includes an associated 0.5 acre of tree removal, is to provide an area of adequate size with modern amenities for physical fitness activities. This project is needed to accommodate new workout equipment that will require a new space to be constructed so that the fitness center is able to maintain the use of the equipment already in place. In addition, a new facility is needed to support the height requirement of the new equipment.	**Alternative 1:** New Construction Project 14 Alternative 1 would construct a new 1,971 SF addition to the existing Fitness Center.	Yes	Yes	Yes	Yes	Yes	Meets all the selection standards.
			Alternative 2: New Construction Project 14 Alternative 2 would construct a new standalone facility at an alternate location, not at the location of the exiting Fitness Center.	Yes	Yes	Yes	Yes	No	Construction of a new facility does not leverage existing infrastructure, so it does not meet Selection Standard 5.
New Construction Project 15: ANZY149006 Construct Industrial Water Supply, Steam Plant A 1411	Figures B-6 and B-9	This project would construct an 14,324 SF industrial water supply for Steam Plant A. The purpose of the industrial water supply system is to provide water needed to operate Steam Plant A, including water storage as required. This project is needed to reduce potable water usage.	**Alternative 1:** New Construction Project 14 Alternative 1 would construct an 14,324 SF industrial water supply for Steam Plant A that connects to the existing treatment plant.	Yes	Yes	Yes	Yes	Yes	Meets all the selection standards.
			Alternative 1: New Construction Project 14 Alternative 2 would construct an 14,324 SF industrial water supply for Steam Plant A that directly connects to the secondary reservoir instead of the front half of the existing treatment plant.	Yes	Yes	No	Yes	Yes	Direct connection of the steam plant would not maximize operation security; therefore, this alternative does not meet Selection Standard 3.
New Construction Project 16: ANZY960128 Add to Propulsion Tech Lab	Figure B-9	This project would construct a 4,000 SF addition at Building 936, which would include a 1,200 SF machine shop area. This project would provide a proper machine shop area spatially separated from other personnel. This new construction project is needed to provide sufficient storage and workspace for the laboratory buildup area. Due to the loss of Building 931, this proposed project is needed to accommodate some of the items stored in that building. In addition, it is needed to accommodate the combustion laboratory currently located in Building 876, Engine Test Facility (ETF) Shop.	No alternatives or alternative locations are possible for New Construction Project 16. Based on the current siting restrictions and facility needs, there was only one feasible way to extend the facility without crossing into a parking lot. Further, operation of two spatially separated lab units was not deemed a viable alternative, as the functions within the old and new spaces need to be within the same facility.	Yes	Yes	Yes	Yes	Yes	Meets all the selection standards.
New Construction Project 17: ANZY189060 Add Addition to PWT Blade Shop, Facility 645	Figure B-10	This project would construct a new 2,956 SF addition to the existing PWT Blade Shop Building. Its purpose is to increase the capacity of the current shop. This project is needed to house blade carts with spare blades, store spare spacers, and control access to compressor hardware.	**Alternative 1:** New Construction Project 17 Alternative 1 would construct a new 2,9566 SF addition to the existing PWT Blade Shop Building.	Yes	Yes	Yes	Yes	Yes	Meets all the selection standards.
			Alternative 2: New Construction Project 17 Alternative 2 would locate a new blade shop off base.	No	Yes	No	No	No	Off-site storage would result in delays detrimental to Arnold AFB test customers due to lag time to go off base and retrieve spare parts needed during testing. These delays could negatively impact national security by impeding

Project Considered	Appendix B Map Reference	Proposed Project Description	Alternatives Considered	Selection Standards*					Screening Summary
				1	2	3	4	5	
									testing and test results. Moreover, the transport of high-security, top secret parts to an off-base location is not feasible. Therefore, this alternative fails to meet Selection Standards 1, 3, 4, and 5.
			Alternative 3: New Construction Project 17 Alternative 3 would construct a new PWT Blade Shop Building at an alternate location, not the location of the exiting building.	Yes	Yes	Yes	Yes	No	Construction of a new facility does not leverage existing infrastructure and fails to meet Selection Standard 5.
New Construction Project 18: ANZY180022 Construct Commissary/BX Entrance Drive Modification, Facility 60002	B-2	This project would remove existing entrance drives and construct a new 17,416-linear-foot access drive west of the ground-retractable automobile barrier. Its purpose is to comply with AT/FP standards.	There are no alternatives or alternative locations for New Construction Project 18; however, in order to be code compliant, USAF would have to extend the driveway beyond the permanently installed barrier that extends past the main gate. Modification of the existing entrance drive at the selected location included in the Proposed Action is the shortest and most cost-effective means to meet current AT/FP requirements.	Yes	Yes	Yes	Yes	Yes	Meets all the selection standards.
New Construction Project 19: ANZY189067 Construct Ethylene Glycol Storage Capability for C-Airside	Figure B-9	This project would remove a decommissioned and never-used trichloroethylene stripper located on top of the east side of the C-Airside; cut, grade, and install gravel; install an approximate 1,425 SF concrete slab; remove, clean, paint, and install two new A-plant glycol storage tanks on top of a new concrete slab; install pump and piping to/from storage tanks; and connect piping to existing glycol storage system. Additional glycol storage is needed due to the installation/operation of the new desiccant dryer units in C-Airside.	**Alternative 1:** New Construction Project 19 Alternative 1 would remove the existing trichloroethylene stripper and add new infrastructure to increase the storage capacity for C-Airside.	Yes	Yes	Yes	Yes	Yes	Meets all the selection standards.
			Alternative 2: New Construction Project 19 Alternative 2 would locate glycol tanks inside an existing facility (Facility 939).	No	No	No	Yes	Yes	Locating the glycol tanks inside an existing facility (Facility 939) does not meet base and tenant unit mission requirements, would impact other missions at Arnold AFB, and would not maximize operational security. Therefore, this alternative fails to meet Selection Standards 1 through 3.
New Construction Project 20: ANZY073001 Add/Alter Test Cell Delivery Bay	Figure B-10	This project would demolish J-2A Test Cell, J-2A Cryogenic Building 893, ETFA Valve Repair Shop Building 897, and associated plant equipment and construct a 44,012 SF extension to the north side of the ETF Test Building 880's high bay. This project would increase the structural capacity of the existing Building 880 bridge crane and extend the crane support to the new high bay area. This project is needed as part of the Propulsion, Consolidation, and Streamlining (PC&S) Program to support the growth in the test-article ground-testing requirements. Failure to implement this project would prevent the necessary infrastructure improvements for timely, cost-effective, and safe handling of test articles valued as high as $50 million.	**Alternative 1:** New Construction Project 20 Alternative 1 would demolish J-2A Test Cell, J-2A Cryogenic Building 893, ETFA Valve Repair Shop Building 897, and associated plant equipment and would construct a new 44,012 SF path extension that a large truck and trailer could utilize to navigate to the north side of the high bays at the existing ETF Test Building.	Yes	Yes	Yes	Yes	Yes	Meets all the selection standards.
			Alternative 2: New Construction Project 20 Alternative 2 would demolish J-2A Test Cell, J-2A Cryogenic Building 893, ETFA Valve Repair Shop Building 897, and associated plant equipment, but would not construct a new path to the facility that a large truck and trailer	No	No	No	Yes	Yes	Demolition of existing infrastructure without the construction of a new truck and trailer path does not meet base and tenant unit mission requirements, would impact other missions at Arnold AFB, and would not maximize operational security. Therefore, this alternative fails

Project Considered	Appendix B Map Reference	Proposed Project Description	Alternatives Considered	Selection Standards*					Screening Summary
				1	2	3	4	5	
			could navigate because the current operation of using forklifts to unload testing articles would continue.						to meet Selection Standards 1 through 3.
Road Maintenance									
Road Maintenance Project 1: ANZY169010 Repair Concrete Road North Side of the Model Shop Facility 451	Figure B-12	This project would reduce loading equipment stability issues and tripping hazards by repairing the concrete road on the north side of the model shop, Facility 451. This project is needed because the concrete is crumbling due to daily heavy loading, and this is creating tripping hazards as well as stability issues for solid-tired material loading/moving equipment.	For Road Maintenance Project 1, the designated section of existing road would be either improved or not. There were no alternative locations or actions considered that would meet the defined project purpose of remedying the current deficiencies and increasing vehicle safety and road stability. Existing road areas proposed for repair are currently used to transport personnel and equipment.	Yes	Yes	Yes	Yes	Yes	Meets all the selection standards.
Road Maintenance Project 2: ANZY110022 Repave Test Fuel Farm Drive Pavement	Figures B-9 and B-10	This project would increase vehicle safety along the Overlay Test Fuel Farm Drive by repaving it from the beginning of the asphalt section north of Building 873 to 3rd Street and adding street lighting to the drive. This project is needed because the drive is badly deteriorated with cracks and potholes. Where the drive joins 3rd Street, the area is cracked and has settled, causing serious water ponding issues. Lighting in this area is also very poor.	For Road Maintenance Project 2, the designated sections of the existing Overlay Test Fuel Farm Drive would be either repaired or not. There were no alternative locations or actions considered that would meet the defined project purpose of remedying the current deficiencies and increasing vehicle safety and road stability. Existing road areas proposed for paving and repair are currently used to transport personnel and equipment.	Yes	Yes	Yes	Yes	Yes	Meets all the selection standards.
Road Maintenance Project 3: ANZY950085 Modify Ramp – G-Range	Figure B-10	This project would improve the ramp on the south end of Building 678 by widening it by 10 feet and lessening its slope to accommodate large-transport-vehicle traffic. This projected is needed to allow large vehicles with heavy loads (such as launcher components) access to the launch room of G-Range Building Number 678. At present, the ramp is both too narrow and too steep to permit most large vehicles assess.	For Road Maintenance Project 3, the ramp on the south end of Building 678 would be either improved or not. There were no alternative locations or actions considered that would meet the defined project purpose of remedying the current deficiencies and increasing vehicle safety and road stability. Existing road areas proposed for improvement are locations currently used to transport personnel and equipment.	Yes	Yes	Yes	Yes	Yes	Meets all the selection standards.
Road Maintenance Project 4: ANZY100034 Construct Bulk Fuel Farm Tank Access Roads, Facility 60009	Figure B-15	This project would increase vehicle safety and the stability of the bulk fuel farm tank access roads by paving and widening the roadway at the turns and adding the necessary riprap in washed-out areas. This project is needed because the current roadway is gravel and, due to the recent heavy traffic and rain, the roadway has begun to wash out, creating gullies in the tire path. The riprap along the bank has begun to wash away causing the edge of the road to slide.	For Road Maintenance Project 4, the designated sections of existing access roads would be either improved or not. There were no alternative locations or actions considered that would meet the defined project purpose of remedying the current deficiencies and increasing vehicle safety and road stability. Existing road areas proposed for paving and widening are currently used to transport personnel and equipment.	Yes	Yes	Yes	Yes	Yes	Meets all the selection standards.
Road Maintenance Project 5: ANZY080025 Repair Concrete Trenches, J1/J2 Area	Figure B-10	This project would repair/modify the concrete overpasses at Trench A and Trench B in the J1/J2 area to accommodate heavy equipment transport. This project is needed because Trench A shows signs of an overloading (crippled web). The Trench B concrete slab has areas of spalled-out	For Road Maintenance Project 5, the designated sections of the concrete overpasses at Trench A and Trench B would be either improved or not.	Yes	Yes	Yes	Yes	Yes	Meets all the selection standards.

Project Considered	Appendix B Map Reference	Proposed Project Description	Alternatives Considered	Selection Standards*					Screening Summary
				1	2	3	4	5	
		concrete, which may also be an indication of overloading. With the heavy equipment used in this area it is necessary to either patch the existing concrete structure or try to modify or repair it as possible.	There were no alternative locations or actions considered that would meet the defined project purpose of remedying the current deficiencies and increasing vehicle safety and road stability. Existing road areas proposed for repair are currently used to transport personnel and equipment.						
Road Maintenance Project 6: ANZY060075 Add/Alter Perimeter Fence Road, Facility 60010	Figures B-2, B-5, B-6, B-12, B-13, B-17, and B-18	This project would increase vehicle safety and the stability of the road along the perimeter fence at Facility 60010 by adding new gravel to the unimproved sections of the interior perimeter of the industrial area and constructing gravel turn arounds at unimproved sections susceptible to flooding.	For Road Maintenance Project 6, the designated sections of the road along the perimeter fence would be either improved or not. There were no alternative locations or actions considered that would meet the defined project purpose of remedying the current deficiencies and increasing vehicle safety and road stability. Existing road areas proposed for improvement are currently used to transport personnel and equipment.	Yes	Yes	Yes	Yes	Yes	Meets all the selection standards.
Road Maintenance Project 7: ANZY110068 Repair Perimeter Fence Road near Landfill	B-14	This project would increase vehicle safety and the stability of Perimeter Fence Road near the landfill by replacing the four existing culverts southeast of the landfill and widening the road in this area to approximately 24 feet. This project is needed because the existing metal culverts have rusted completely through on the underside and need to be replaced with culverts that meet UFC requirements. Also, the road is narrow in this area and needs to be widened due to heavy truck traffic from the landfill.	For Road Maintenance Project 7, the designated sections of the Perimeter Fence Road would be either improved or not. There were no alternative locations or actions considered that would meet the defined project purpose of remedying the current deficiencies and increasing vehicle safety and road stability. Existing road areas proposed for culvert replacement and widening are currently used to transport personnel and equipment.	Yes	Yes	Yes	Yes	Yes	Meets all the selection standards.
Road Maintenance Project 8: ANZY190012 Repair Pavement, South Hap. Arnold Road Facility. 60009	Figures B-18, B-19, and B-20	This project would increase vehicle safety and the stability of South Hap Road by repaving and striping the road. This project is needed because the road is nearing the end of its service life.	For Road Maintenance Project 8, the designated sections of South Hap Road would be either improved or not. There were no alternative locations or actions considered that would meet the defined project purpose of remedying the current deficiencies and increasing vehicle safety and road stability. Existing road areas proposed for paving and striping are currently used to transport personnel and equipment.	Yes	Yes	Yes	Yes	Yes	Meets all the selection standards.
Road Maintenance Project 9: ANZY060028 Add/Alter Road at Retention Reservoir, Facility 60010	Figures B-19 and B-20	This project would increase vehicle safety and the stability of the road at Gate 1 and Gate 2 near the retention pond by widening it to 10 feet or wider, providing a guardrail along the road, and replacing the culvert, if a larger culvert is required. This project is needed because the existing road is too narrow for vehicles to safely travel.	For Road Maintenance Project 9, the designated sections of the road at Gate 1 and Gate 2 would be either improved or not. There were no alternative locations or actions considered that would meet the defined project purpose of remedying the current deficiencies and increasing vehicle safety and road stability. Existing road areas proposed for widening, culvert replacement, and an additional guardrail are currently	Yes	Yes	Yes	Yes	Yes	Meets all the selection standards.

Project Considered	Appendix B Map Reference	Proposed Project Description	Alternatives Considered	Selection Standards*					Screening Summary
				1	2	3	4	5	
			used to transport personnel and equipment.						

* Selection Standards: 1. Ensure that Arnold AFB meets base and tenant unit mission requirements for secure and timely delivery of specialized test equipment and materiel. 2. Do not displace or adversely impact other missions at Arnold AFB (e.g., TNARNG training activities and other test activities). 3. Site new facilities on existing Arnold AFB land to maximize operational security. 4. Provide direct, on-base access to test facilities for delivered materiel. 5. Leverage existing infrastructure.
Green – Meets all selection standards.
Red – Does not meet selection standard(s).
N/A – Selection Standards 3, 4, and 5 are not applicable to proposed demolition projects; **AFB** – Air Force Base; **NEPA** – National Environmental Policy Act; **N/A** – Not applicable; **PWT** – Propulsion Wind Tunnel; **SF** – square foot/feet; **VKF** – Von Kármán Gas Dynamics Facility; **USAF** – United States Air Force; **GN2** – gaseous nitrogen; **LN2** – liquid nitrogen; **DoD** – Department of Defense; **NPDES** – National Pollutant Discharge Elimination System; **UFC** – Unified Facilities Criteria; **AFI** – Air Force Instruction; **LED** – light-emitting diode; **AT/FP** – antiterrorism/force protection; **ETF** – Engine Test Facility; **PC&S** – propulsion, consolidation, and streamlining

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2.4.2.1 Road Maintenance

Of the 12 road maintenance projects proposed on Arnold AFB in the next five FYs, nine were identified for further detailed analysis as selected projects under the Proposed Action (**Table 2-1**). Each of the nine road maintenance projects were determined to individually have the potential to have a significant impact on the human and natural environment. Collectively, these road projects would maintain or improve upon an estimated 798,550 SF (18.3 acres) of roadways over the next five FYs. All the road maintenance projects remedy identified deficiencies in the infrastructure on Arnold AFB and maintain infrastructure that is adequate to support the Installation's mission and applicable USAF, state, and federal requirements. They make as much use as possible of existing roads, avoid creating or maintaining additional infrastructure, avoid or minimize operational inefficiencies, and represent the most cost-effective and sustainable alternatives. All the proposed road maintenance projects would be consistent with all Arnold AFB internal planning documents and zoning requirements, applicable Installation architectural compatibility guides, and relevant legal and regulatory requirements.

2.4.3 All Other Proposed Infrastructure Improvements

Of all the infrastructure projects proposed on Arnold AFB over the next five FYs, 186 are facility renovations and 123 are utility upgrades. These renovation and utility upgrade projects have no ground-disturbing components and are summarized in **Appendix B** (see **Table B-1**). The USAF has determined that individually these projects do not have the potential to have a significant impact on the human and natural environment, and collectively these projects are cumulatively addressed in this PEA. Much of the analysis within this PEA is broad in scope reflecting environmental effects over large geographic and/or time horizons. All projects listed in Table B-1 will have subsequent follow-on, narrower, and site- or proposal-specific analysis to be tiered from this PEA, consistent with CFR Part 989, *Environmental Impact Analysis Process*.

2.5 NO ACTION ALTERNATIVE

CEQ regulations require consideration of the No Action Alternative for all proposed actions. Consistent with 32 CFR Part 989, the No Action Alternative is carried forward for further analysis to provide a baseline against which the impacts of the action alternatives can be assessed. The No Action Alternative would represent "no change" from current practices. The proposed projects identified for the Proposed Action would not be implemented, and existing space deficiencies, inadequacies, and redundancies would persist. The No Action Alternative assumes that the Proposed Action would not occur and is carried forward for analysis as a baseline against which the impacts of the Proposed Action and potential action alternatives can be evaluated.

2.5.1.1 No Action Alternative for Demolition Projects

Under the No Action Alternative, the selected demolition projects would not be implemented, and obsolete, deteriorating, and underutilized facilities would continue to be maintained while mission functions would occur in facilities not appropriate to the mission requirements. Funding required to maintain these facilities would be diverted away from other essential funding needs.

2.5.1.2 No Action Alternative for Infrastructure Projects

The No Action Alternative would not implement the selected infrastructure components of the Proposed Action. Failure to construct new buildings, pave roads, upgrade aging buildings, and modernize existing utilities would result in continued use of deteriorated buildings and

unimproved roads and parking areas. Additionally, health, safety, and force protection concerns would not be addressed, and the USAF would continue to assume the increased risk of operating under noncompliant conditions.

2.6 ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

Arnold AFB considered implementation of only a subset of IDP projects; however, the Installation development process is designed to support Arnold AFB and AEDC mission requirements by completing selected construction and improvements projects that address deficiencies throughout the Installation. The recommended projects included in the 2017 Arnold AFB IDP, and carried forward for analysis in this PEA, were subject to an in-depth analysis during the IDP process (see Section 2.2 and **Table 2-1**). In addition, the recommended projects all meet the selection standards necessary to be included as part of the Proposed Action and to be implemented within the next five years. A suite of projects, including the construction of new facilities and new infrastructure, repair of existing facilities, and demolition of deficient and redundant facilities, are needed to keep pace as aerospace testing and flight simulation grow ever more technologically advanced and specialized. As such, no other alternatives considered by Arnold AFB were carried forward for detailed analysis.

2.7 SUMMARY OF POTENTIAL ENVIRONMENTAL CONSEQUENCES

The potential impacts associated with the Proposed Action and the No Action Alternative are summarized in **Table 2-2**. The summary is based on information discussed in detail in Chapter 4, *Environmental Consequences* of the PEA and includes a concise definition of the issues addressed and the potential environmental impacts associated with each alternative.

Table 2-2. Summary of Environmental Consequences

Resource Area	Proposed Action	No Action Alternative
Noise	Short- and long-term negligible adverse effects would be expected. Short-term effects would be due to the use of heavy equipment during demolition and construction activities. Long-term effects would be due to the potential use of backup generators, HVAC systems, cooling towers, and chiller units at the proposed facilities. These effects would be negligible. These changes to the overall noise environment would not be readily perceptible when compared to existing conditions, particularly in areas off the Installation.	No additional impacts beyond existing baseline conditions; continued minor noise impacts from Arnold AFB operations, including the use of use of backup generators, HVAC systems, cooling towers, and chiller units.
Land Use	Implementation of the Proposed Action would not result in substantial changes to land use at or in the vicinity of Arnold AFB. Arnold AFB analyzed the capacity for future development or mission expansion during the IDP process by examining several variables, including land use. Therefore, impacts on land use from implementation of the Proposed Action would be minor.	No additional impacts beyond existing baseline conditions. There would be no changes in land use under the No Action Alternative.
Air Quality	The Proposed Action would have short- and long-term minor adverse effects on air quality. Short-term effects would be due to the use of heavy equipment and generation of fugitive dust during construction and demolition activities. Long-term effects would be due to additional heating of facilities, and the potential addition of stationary sources of air emissions, such as backup generators.	No additional impacts beyond existing baseline conditions; continued release of minor amounts of fugitive dust from unpaved roads and Arnold AFB operations would occur under the No Action Alternative.

Resource Area	Proposed Action	No Action Alternative
Geological Resources	Potential impacts on geological resources associated with the Proposed Action would be limited to ground-disturbing activities occurring during demolition, road maintenance, site preparation, and new construction. Minor impacts would result from the proposed new construction and demolition projects; however, the majority of these activities would take place on previously disturbed land. Implementation of the Proposed Action would have no effect on important farmlands. Therefore, impacts on geological resources at Arnold AFB as a result of the Proposed Action would be minor.	No additional impacts beyond existing baseline conditions. No additional ground disturbance would occur under the No Action Alternative.
Water Resources	Construction, demolition, and road maintenance activities associated with the Proposed Action could potentially temporarily increase the turbidity of surface waters at Arnold AFB due to increased airborne dust and siltation from soil erosion. Implementation of BMPs and erosion control measures described in the Arnold AFB's Stormwater Pollution Prevention Plan (SWPPP) would reduce impacts associated with the Proposed Action. Since the Proposed Action would result in the disturbance or redisturbance of more than 1 acre, a National Pollutant Discharge Elimination System (NPDES) Construction General Permit would be required to address stormwater discharges from construction projects. In addition to the BMPs that would be implemented under the Proposed Action, the proposed projects would comply with the measures outlined in the NPDES permit. One of the proposed new construction projects would occur in the floodplain (ANZY030047A at the Elk River Dam); however, because this project would not alter the floodplain and is associated with water control structure protection, there would be no significant impacts on floodplains on Arnold AFB associated with the Proposed Action. Four projects (ANZY060075, ANZY080033, ANZY1500261, and ANZY190012) would occur in areas containing wetlands. A Section 404 Individual Permit would be obtained pursuant to the Clean Water Act for the four projects sited in wetlands, prior to commencement of any construction activities within jurisdictional waters of the United States, including potential wetlands. Mitigation would be specified in the permit requirements, and USAF would comply with all appropriate mitigation requirements included in the permit. Any project that may affect wetlands will require a project specific wetland delineation and evaluation of possible impacts prior to discussing possible wetland mitigation. Consequently, long-term impacts on wetlands from the Proposed Action would be less than significant.	No additional impacts beyond existing baseline conditions; continued loss of minor amounts of sediments and runoff from unpaved roads and continued erosion at the Elk River Dam would occur under the No Action Alternative.
Biological Resources	Most of the proposed projects would occur in developed, improved, or maintained areas, and impacts on vegetation and the associated wildlife resulting from projects located within developed or maintained areas would be minor. Vegetation removal associated with new construction projects would	No additional impacts beyond existing baseline conditions. No biological resources would be impacted by construction, renovation, or demolition

Resource Area	Proposed Action	No Action Alternative
	represent long-term habitat loss. To the extent practicable, Arnold AFB would schedule any tree and vegetation removal associated with the proposed projects to occur outside of times of increased migratory bird and bat activity. Reduced habitat would also occur as a result of any wetlands fill. For example, wading bird foraging area and amphibian habitat could be decreased. However, the total area of wetland habitat affected would be minor, and the USAF would continue to implement species- and habit-specific management consideration and measures to offset potential impacts Three federally listed bats, the federally endangered gray bat (*Myotis grisescens*) and Indiana bat (*Myotis sodalist*) and the federally threatened northern long-eared bat are known to occur at Arnold AFB. Removal of vegetation associated with the proposed new construction projects could result in potential direct and indirect impacts on federally listed bat species and state listed protected species. However, the USAF would consult with the USFWS under the existing 2016 Biological Opinion/Incidental Take Statement, which would provide a framework for mitigation and adaptive management measures that would be negotiated. In addition, in accordance with Arnold AFB's Integrated Natural Resources Management Plan, the USAF would continue to implement species and habit-specific management consideration and measures to offset potential impacts on protected species Consequently, impacts on federally listed bat species and state-listed protected species from the Proposed Action would be less than significant.	activities under the No Action Alternative.
Cultural Resources	The Proposed Action would have no effect on cultural resources at Arnold AFB when the projects are completed in accordance with the 2014 Programmatic Agreement, which was negotiated to streamline the Section 106 consultation process and contains comprehensive provisions for the management of historic properties.	No additional impacts beyond existing baseline conditions. There would be no effect on cultural resources under the No Action Alternative as no facilities would be constructed, renovated, or demolished.
Hazardous Materials and Wastes	The Proposed Action would result in minor impacts on hazardous materials and waste generation and storage at Arnold AFB, while the removal of asbestos under the Proposed Action would constitute a minor beneficial impact at Arnold AFB.	No additional impacts beyond existing baseline conditions; however, the removal of asbestos from buildings basewide would not occur under the No Action Alternative.
Transportation	The Proposed Action would have short-term minor adverse effects and long-term moderate beneficial effects on transportation and traffic. Short-term adverse effects would result from an increased number of construction vehicles, and small changes in localized traffic patterns due to the construction and demolition projects. Long-term beneficial effects would result from upgrades at Gate 2 and the roadway maintenance projects included in the IDP.	No additional impacts beyond existing baseline conditions. However, traffic congestion at Gate 2 would continue under the No Action Alternative.

Resource Area	Proposed Action	No Action Alternative
Utility Infrastructure	The proposed demolition, construction, and road maintenance projects included in the Proposed Action would cause temporary impacts on utilities. Utilities would be interrupted temporarily on various portions of Arnold AFB during the proposed demolition, construction, and road maintenance activities; however, the Proposed Action would not introduce long-term increases in utility use on base. Further, many projects would upgrade existing utility infrastructure having long-term moderate beneficial effects to on-base utilities infrastructure.	No additional impacts beyond existing baseline conditions; however, current utility infrastructure deficiencies would not be addressed, and the USAF would continue to operate using its antiquated and out-of-date utility infrastructure under the No Action Alternative.
Safety	Implementation of the Proposed Action would result in minor beneficial impacts on explosives safety. The upgrade of infrastructure and existing facilities would improve safety and security at Arnold AFB. Therefore, the Proposed Action would result in moderate beneficial impacts associated with anti-terrorism/force protection.	No additional impacts beyond existing baseline conditions; however, current health, safety, and force protection concerns would not be addressed, and the USAF would continue to assume the increased risk of operating under noncompliant conditions under the No Action Alternative.

AFB –Air Force Base; **IDP** – Installation Development Plan; **AICUZ** – Air Installation Compatible Use Zone; **USAF** – US Air Force; **USFWS** – US Fish and Wildlife Service; **USACE** – US Army Corps of Engineers; **CWA** – Clean Water Act

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3.0 AFFECTED ENVIRONMENT

The Region of Influence (ROI) for the Proposed Action is Arnold AFB unless otherwise specified below for a particular resource area.

3.1 SCOPE OF ANALYSIS

This section describes relevant existing environmental conditions at Arnold AFB. Per guidelines established by NEPA, CEQ regulations, and Title 32, CFR Part 989 (32 7 CFR 989), the USAF EIAP, the description of the affected environment in this PEA focuses on only those aspects of the environment potentially subject to impacts resulting from the Proposed Action. This PEA evaluates potential environmental impacts on the following resources that would likely be affected by implementation of the Proposed Action or its alternatives: land use, noise, air quality, geological resources, water resources, biological/natural resources, cultural resources, hazardous materials and wastes, transportation and traffic, utility infrastructure, and safety. Those resource areas that are anticipated to experience either no or negligible environmental impacts under implementation of the Proposed Action or its alternatives are not examined in detail in this PEA and include aesthetics and visual resources, socioeconomics, environmental justice, and Airfield Compatible Use Zones (AICUZ). The brief summary of the reasons for not undertaking detailed analyses for these resource areas is provided below.

Aesthetics and Visual Resources. Arnold AFB is characterized by an industrial aesthetic and is not considered a highly sensitive visual environment. Additionally, the design of the new proposed facilities and upgrades to existing infrastructure would be consistent with existing base architecture and construction materials.

Socioeconomics. It is anticipated that construction labor would be performed by the local work force and the Proposed Action would not impact housing or population in the region, nor would there be any impact to community resources such as emergency services, schools, or jobs in the region.

Environmental Justice and Protection of Children. The Proposed Action is located on Air Force property, considerably removed from unique populations with respect to poverty (unique population approximately 25 miles away), ethnicity (unique population approximately 25 miles away), and children (unique population approximately 9 miles away) (US Environmental Protection Agency [USEPA] 2021).

Airfield Compatible Use Zones. The Proposed Action would not have any effect on airfield usage or aircraft operations; therefore, the AICUZ program is not applicable.

3.2 NOISE

“Noise” is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise intrusive. Human response to noise varies depending on the type and characteristics of the noise, distance between the noise source and the receptor, receptor sensitivity, and time of day. Noise often is generated by activities essential to a community’s quality of life, such as construction or vehicular traffic.

Sound varies by both intensity and frequency. Sound pressure level, described in decibels (dB), is used to quantify sound intensity. The dB is a logarithmic unit that expresses the ratio of a

sound pressure level to a standard reference level. The hertz is the unit used to quantify sound frequency. The human ear responds differently to different frequencies. “A-weighting,” measured in A-weighted decibels (dBA), approximates a frequency response expressing the perception of sound by humans. **Table 3-1** lists sounds encountered in daily life and their dBA levels.

Table 3-1. Common Sounds and Their Levels

Outdoor Sound	Sound Level (dBA)	Indoor Sound
Motorcycle	100	Subway train
Tractor	90	Garbage disposal
Noisy restaurant	85	Blender
Downtown (large city)	80	Ringing telephone
Freeway traffic	70	TV audio
Normal conversation	60	Sewing machine
Rainfall	50	Refrigerator
Quiet residential area	40	Library

Source: Harris 1998
dBA – A-weighted decibel

Background noise levels without aircraft operations or training activities were estimated for the areas surrounding Arnold AFB using the techniques specified in the *American National Standard Quantities and Procedures for Description and Measurement of Environmental Sound Part 3: Short-Term Measurements with an Observer Present*. **Table 3-2** outlines the land use categories, off-base noise sensitive areas and their distance to the proposed projects, and the estimated background noise levels in areas surrounding the base (American National Standards Institute [ANSI] 2013). These estimates provide an indication of a range of sound levels in a given area, and land use categories with estimated sound levels above 50 dBA have an uncertainty of approximately 10 dBA (ANSI 2013).

Table 3-2. Estimated Background Noise Levels

Land Use Category	Nearest Off-Base Noise Sensitive Area		Average Sound Level (dBA)	
	Direction	Distance	Daytime	Nighttime
Quiet suburban residential	North	17,000 feet	45	39
Rural Residential	East	4,000 feet	40	34

Source: ANSI 2013
dBA – A-weighted decibel

3.3 LAND USE

Land use planning ensures orderly growth and compatibility between nearby property parcels or land areas. Land use planning in the USAF is guided by AFI 32-1015, *Integrated Installation Planning*. This document sets forth the responsibilities and requirements for comprehensive planning and describes procedures for developing, implementing, and integrating an IDP with Activity Management Plans.

Arnold AFB occupies 39,081 acres, including the 3,632-acre Woods Reservoir, which provides cooling water for facilities in AEDC. AEDC occupies 6,000 acres, generally centrally located, and includes the airfield. Approximately 4,683 acres of the Installation are occupied by wildlife food plots, buildings/structures, mowed/bushhog areas, and other open areas, such as landfills,

roads, etc. (Call 2003). There are 105 miles of roads on Arnold AFB, approximately 50 percent of which are paved (CH2M HILL 2002). Approximately 436 acres of Arnold AFB's property consists of paved areas, structures, or water. The remaining lands are considered unimproved and include forest and agricultural lands (AEDC 2004). These lands include cultivated pine forests totaling approximately 5,000 acres and hardwood forests totaling 21,333 acres (Arnold AFB 2020a). Grasslands and early successional habitats in utility rights-of-way (ROWs) occupy roughly 1,479 acres on the Installation (Arnold AFB 2020a).

Much of the land within the AEDC compound has already been developed. Within AEDC, approximately 575 acres are classified for industrial land use, approximately 25 acres are classified for administration, and 100 acres are classified for recreation as the fitness trail area. Around the airfield, approximately 350 acres are classified for military training uses. Most of the remainder of the AEDC area is classified for conservation uses, but some of this land is for transportation and utility uses. Remaining areas that are considered developable within the AEDC compound are those not currently occupied by buildings or pavement.

The Proposed Action includes projects that would demolish existing infrastructure and that would result in new development on some buildable parcels at Arnold AFB. Buildable parcels are those areas that could be developed and are not presently occupied by structures or facilities. Most buildable parcels are within AEDC and have been designated for industrial use.

3.4 AIR QUALITY

Air pollution is the presence in the outdoor atmosphere of one or more contaminants (e.g., dust, fumes, gas, mist, odor, smoke, or vapor) in quantities and duration such as to be injurious to human, plant, or animal life, or to interfere unreasonably with the comfortable enjoyment of life and property. Air quality as a resource incorporates several components that describe the levels of overall air pollution within a region, sources of air emissions, and regulations governing air emissions. The following sections include a discussion of the existing conditions, a regulatory overview, and a summary of greenhouse gases (GHGs) and global warming.

3.4.1 National Ambient Air Quality Standards and Attainment Status

The USEPA Region 4 and the TDEC regulate air quality in Tennessee. The CAA (42 USC § 7401-7671q), as amended, assigns the USEPA responsibility to establish the primary and secondary National Ambient Air Quality Standards (NAAQS) (40 CFR 50) that specify acceptable concentration levels of six criteria pollutants: particulate matter (measured as both particulate matter less than 10 microns in diameter [PM_{10}] and particulate matter less than 2.5 microns in diameter [$PM_{2.5}$]), sulfur dioxide (SO_2), carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), and lead. Short-term NAAQS (1-, 8-, and 24-hour periods) have been established for pollutants contributing to acute health effects, while long-term NAAQS (annual averages) have been established for pollutants contributing to chronic health effects. **Table 3-3** outlines the NAAQS for each criteria pollutant. Notably, the State of Tennessee has adopted statewide air quality standards that are slightly more restrictive than the NAAQS.

Federal regulations designate regions in violation of the NAAQS as *nonattainment* areas. Federal regulations designate regions with levels less than the NAAQS as *attainment* areas. Both Coffee and Franklin counties, and therefore all areas associated with the Proposed Action, have been designated as being in full attainment for the NAAQS. As the region is in full attainment for all criteria pollutants, the general conformity rules do not apply (USEPA 2020b and 40 CFR 93.153).

Table 3-3. National Ambient Air Quality Standards

Pollutant		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)		Primary	8-hour	9 ppm	Not to be exceeded more than once per year
			1-hour	35 ppm	
Lead		Primary and Secondary	Rolling 3-month average	0.15 micrograms/m^3	Not to be exceeded
Nitrogen Dioxide (NO_2)		Primary	1-hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		Primary and Secondary	Annual	53 ppb	Annual mean
Ozone (O_3)		Primary and Secondary	8-hour	0.070 ppm	Annual fourth highest daily maximum 8-hour concentration, averaged over 3 years
Particulate Matter	($PM_{2.5}$)	Primary	Annual	12 micrograms/m^3	Annual mean, averaged over 3 years
		Secondary	Annual	15 micrograms/m^3	Annual mean, averaged over 3 years
		Primary and Secondary	24-hour	35 micrograms/m^3	98th percentile, averaged over 3 years
	(PM_{10})	Primary and Secondary	24-hour	150 micrograms/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO_2)		Primary	1-hour	75 ppb	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		Secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

Source: USEPA 2020a
ppm – parts per million; **m^3** – cubic meters; **ppb** – parts per billion

3.4.2 Existing Emissions and Permitting Overview

Individual states oversee programs for permitting the construction and operation of new stationary sources of air emissions, such as boilers or backup generators. Based on the size of the emissions units and type of pollutants emitted, individual states set permit rules and standards for emissions sources. Arnold AFB is a major source of air emissions and holds a Title V operating permit which expires in June 2022 (Permit number 570221) (TDEC 2019). Primary stationary sources of air emissions at the base include boilers and generators. The permit requires periodic inventories of all significant stationary sources of air emissions. **Table 3-4** lists the basewide emissions from all significant stationary sources.

Table 3-4. Annual Emissions for Significant Stationary Sources at Arnold Air Force Base

Pollutant	Emissions (tpy)
Carbon monoxide (CO)	118.8
Nitrogen oxides (NO_x)	82.8
Volatile organic compounds (VOCs)	18.7
Fine particulate matter ($PM_{2.5}$)	6.3
Fine particulate matter (PM_{10})	6.5
Sulfur dioxide (SO_2)	3.1

Source: USEPA 2020c
tpy – tons per year

New stationary sources of air emissions, such as boilers or backup generators, would require permits to construct. There are two types of construction permits available for new emissions sources in attainment areas, including (1) prevention of significant deterioration (PSD) permits for major sources in attainment areas and (2) minor new source construction permits.

The PSD program protects air quality by imposing limits on emissions from major sources in attainment areas. The PSD process applies to all proposed new major sources of air pollutants in attainment areas and typically takes 18 to 24 months to complete. In general, the PSD major source thresholds are 25 tons per year (tpy) for lead, and 250 tpy for all other criteria pollutants; however, it is lower for some special categories, such as 100 tpy for industrial heating boilers. Major new sources of air emissions subject to PSD typically require a review of control technologies for criteria pollutants, predictive dispersion modeling of air emissions, and a separate public involvement process.

A minor new source construction permit would be required to construct any new sources of air emissions not subject to PSD; this typically takes four to five months to complete. Sources subject to minor new source construction permitting could be required to review control technologies for criteria pollutants, and upon request from the state, conduct predictive dispersion modeling of air emissions.

3.4.3 Greenhouse Gases and Climate Change

Coffee County's average high temperature is 87.1 degrees Fahrenheit (°F) in the hottest month of July, and an average low temperature of 27.6°F in the coldest month of January. Coffee County has average annual precipitation of 60 inches per year. The wettest month of the year is March with an average rainfall of 6.7 inches (Idcide 2020).

GHGs (e.g., CO_2, methane, nitrous oxide) are components of the atmosphere that trap heat near the surface of the earth and contribute to the greenhouse effect and climate change. Most GHGs occur naturally in the atmosphere but increases in their concentration result from human activities such as the burning of fossil fuels. Global temperatures are expected to continue to rise as human activities continue to add GHGs to the atmosphere. Whether or not rainfall will increase or decrease remains difficult to project for specific regions (Intergovernmental Panel on Climate Change 2014).

Tennessee is in the southeast climate region of the United States, where climate change is expected to contribute to declining water supplies, reduced agricultural yields, health impacts in cities due to heat, and flooding and erosion in coastal areas. In addition, increased heat, drought, and insect outbreaks are expected to increase wildfires throughout the region (National Climate Assessment [NCA] 2019). Annual average temperatures are projected to rise by 3°F by 2041 and by 8°F by 2099, with the greatest increases in the summer and fall. Summertime heat waves are projected to become longer and hotter, whereas the number of wintertime cold air outbreaks will decrease (USEPA 2020d).

EO 13834, *Efficient Federal Operations,* outlines policies intended to ensure that federal agencies meet such statutory requirements in a manner that increases efficiency, optimizes performance, eliminates unnecessary use of resources, and protects the environment. EO 13834 specifically requires agencies within the DoD to measure, report, and reduce their GHG emissions from both their direct and indirect activities.

3.5 GEOLOGICAL RESOURCES

Geological resources consist of surface and subsurface materials and their properties. Principal geologic factors affecting the ability to support structural development include seismic properties (i.e., the potential for subsurface shifting, faulting, or crustal disturbance), soil stability, and topography. The term *soil*, in general, refers to unconsolidated materials overlying bedrock or other parent material. Soil structure, elasticity, strength, shrink-swell potential, and erodibility all determine the ability for the ground to support human-made structures. Soils typically are described in terms of their complex type, slope, physical characteristics, and relative compatibility or constraining properties with regard to particular construction activities and types of land use. *Topography* is the change in elevation over the surface of a land area. An area's topography is influenced by many factors, including human activity, underlying geologic material, seismic activity, climatic conditions, and erosion. A discussion of topography typically encompasses a description of surface elevations, slope, and distinct physiographic features (e.g., mountains) and their influence on human activities.

3.5.1 Geology

Arnold AFB is located within the Eastern Highland Rim (EHR) physiographic region of Tennessee (Miller 1974). The constituent bedrock is composed primarily of Mississippian, St. Louis, and Warsaw limestone with Fort Payne chert underlain by Chattanooga shale (Smith 2008). The EHR is generally flat because the limestone strata underlying the area are almost flat, dipping slightly toward the east. Extensive and prolonged weathering of this limestone has produced a thick mantle of chert and residual clay soil, often a reddish to reddish-orange color. Additionally, separating the Highland Rim from the Cumberland Plateau are steep-walled karst valleys, which are often wide in proportion to their length, largely created by the solution of the underlying limestone geology (Moore 1994).

3.5.2 Seismicity

Western Tennessee is seismically active along the New Madrid Seismic Zone, which is a prolific source of intraplate earthquakes (i.e., earthquakes within a tectonic plate). The active faults in the New Madrid Seismic Zone, the most active seismic area in the United States east of the Rocky Mountains, are poorly understood because they are not expressed at the ground surface where they can be easily studied. The faults are hidden beneath 100- to 200-foot-thick layers of soft river deposited soils (Missouri Department of Natural Resources 2013). However, seismic hazards are considerably less severe in Middle Tennessee. The mapped hazard refers to an

estimate of the probability of exceeding a certain amount of ground shaking, or ground motion, in 50 years (US Geological Survey [USGS] 2014).

3.5.3 Topography

Arnold AFB is located on a gently sloping plain just north of the Cumberland Mountain Plateau. Elevations in the region range from 800 to 1,300 feet above mean sea level (msl), with isolated areas of moderate slope (e.g., 15 percent) (USAF 2010). The topography in the northern portion of Arnold AFB is relatively flat with poor surface drainage, while the topography in the southern region of the Installation is moderately rolling and sloping toward the Woods Reservoir.

3.5.4 Soils

Soils in the Arnold AFB area vary in composition and permeability characteristics and primarily belong to the Dickson-Mountview-Guthrie Association (Natural Resources Conservation Service [NRCS] 2013; Arnold AFB 2009). These soils primarily include the Dickson silt loam (Dk) series, the Guthrie silt loam soil (Gd) series, the Lawrence silt loam (La) soils, the Lobelville silt loam (Lh) soils, the Mountview silt loam soils (Mt) series, the Purdy silt loam (Pg) series, and the Waynesboro loam soil (Wa and Wb) series.

The Dk and Mt silt loam series occur on the well-drained slopes and ridges of Arnold AFB. Both of these soils are moderately permeable in their surface horizons; however, they differ primarily in that the Dk soil has a discontinuous fragipan (i.e., relatively impermeable layer) at the base of the silty upper mantle that restricts subsoil drainage (NRCS 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 of groundwater during the dry summer months (NRCS 1958, 1959; Arnold AFB 2009). Additionally, the Gd silt loam soil series includes soils that are poorly drained and are associated with flats, depressions, and floodplain areas. The La silt loam soils are somewhat poorly drained and are associated with floodplains and foot slopes. The Lh silt loam soils are moderately well drained and are associated with floodplains and foot slopes. The Pg silt loam soils are poorly drained and are associated with flats, depressions, and floodplain areas. The Wa and Wb loam soil series are well drained and are associated with upland areas (NRCS 1958, 1959; Arnold AFB 2009).

3.5.5 Important Farmlands

Important farmlands consist of prime farmland, unique farmland, and farmland of statewide or local importance. Prime farmland is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables. It has the special combination of soil quality, growing season, moisture supply, temperature, humidity, air drainage, elevation, and aspect needed for the soil to economically produce sustainable high yields of these crops when properly managed. In some areas, land that does not meet the criteria for prime or unique farmland is considered to be farmland of statewide importance for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and

delineating farmland of statewide importance are determined by the appropriate state agencies. In other areas that are not identified as having national or statewide importance, land is considered to be farmland of local importance for the production of food, feed, fiber, forage, and oilseed crops. This farmland is identified by the appropriate local agencies.

All soils in the Dk, La, Lh, and Mt series are considered prime farmland. Soils in the Gd, Pg, Wa, and Wb series are not prime farmland soils. There are no unique farmlands present on Arnold AFB that are suitable for the production of specific high-value food and fiber crops (Arnold AFB 2020a).

3.6 WATER RESOURCES

Water resources analyzed in this PEA include surface water and groundwater. Surface water resources include lakes, rivers, and streams that collect and distribute water from precipitation and natural or human-created water collection systems. Groundwater comprises subsurface water resources that are interlaid in layers of rock and soil and recharged by surface water seepage. Other issues relevant to water resources include watershed areas affected by existing and potential hazards related to floodplains.

Arnold AFB lies within the Duck River and Elk River watersheds (Arnold AFB 2020a). The drainage divide between these two watersheds runs southwest to northeast through the AEDC industrial area. 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 lies 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 Basin (Arnold AFB 2020a). **Figure 3-1** presents proposed IDP projects and water features at Arnold AFB.

3.6.1 Surface Water

There are 82 springs and approximately 171 miles of stream channel that have been identified at Arnold AFB, many of which are dry for most of the year (Arnold AFB 2020a). Some ponds on Arnold AFB have been artificially deepened and have likely lost some of their habitat values for many sensitive species, including sensitive amphibian species in particular. These wetlands dried annually in the past but now provide aquatic habitat year round and support predatory bullfrogs (*Lithobates catesbeiana*) and fish (Arnold AFB 2020a).

Impoundments at Arnold AFB include the Woods Reservoir, the Secondary Reservoir, and the Retention Reservoir. Woods Reservoir is a 3,632-acre impoundment that contains approximately 26 billion gallons of water (Arnold AFB 2020a). It was created by damming the Elk River in 1952 to supply Arnold AFB with large quantities of cooling water for the test facilities as well as potable water for human consumption, air conditioning, and fire protection. Woods Reservoir has nearly 75 miles of shoreline and provides recreational activities for base personnel and the surrounding communities. Woods Reservoir collects surface runoff from Bradley, Dry, Brumalow, Rowland, and Hardaway Branch creeks. Surface runoff from the industrial facility is returned to Woods Reservoir via gravity flow through Bradley, Brumalow, and Rowland creeks. Additionally, process wastewaters and cooling water are returned to Woods Reservoir via gravity flow through Rowland Creek (Arnold AFB 2020a).

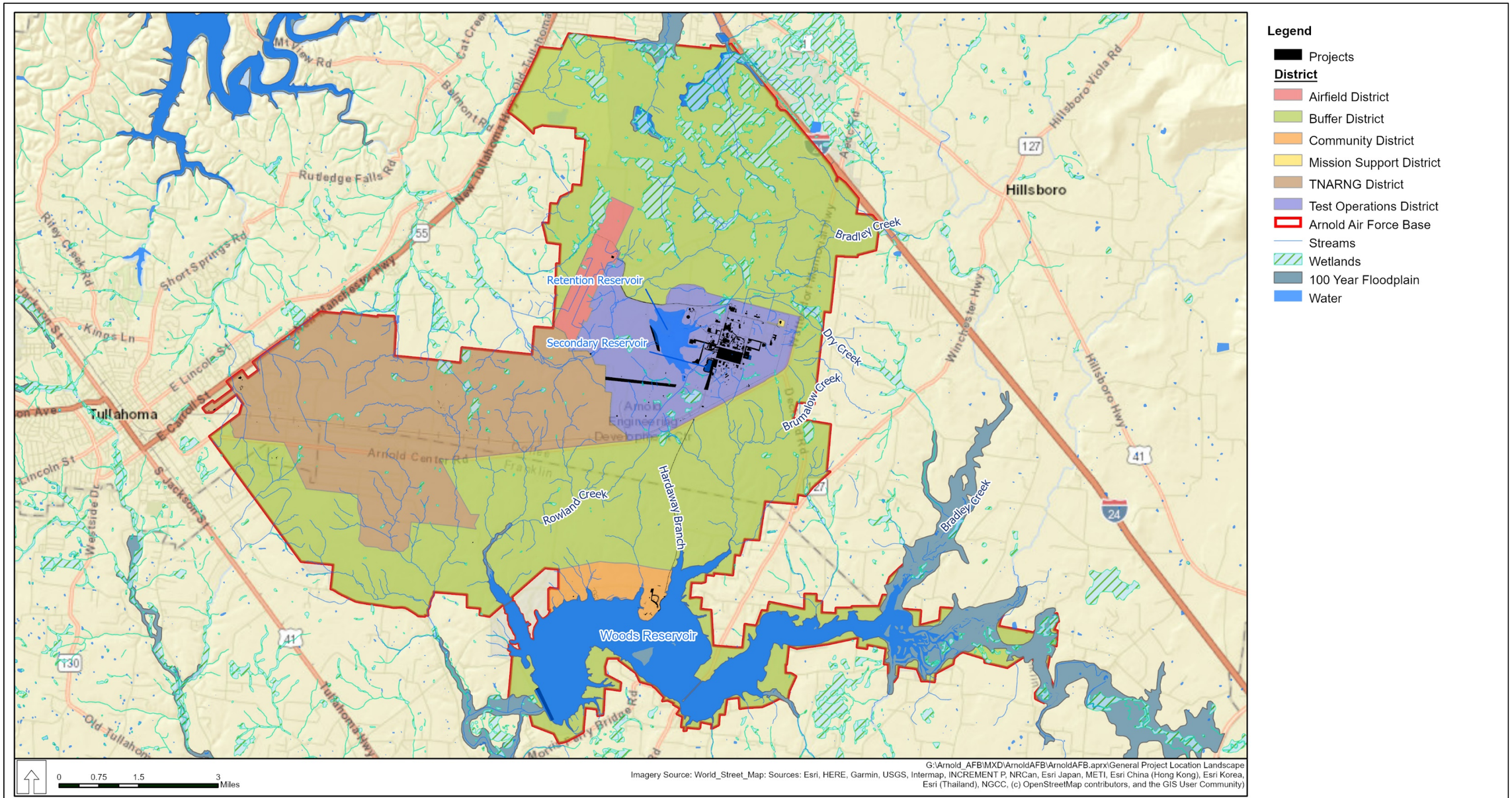

Figure 3-1. Proposed Installation Development Plan Projects and Water Features at Arnold Air Force Base

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Arnold AFB currently has 20 point sources of wastewater/storm water and two sanitary treatment centers. The base discharges into local waters under NPDES Permit #TN0003751. The AEDC Wastewater Treatment Plant discharges treated effluent into Rowland Creek, while the Arnold Village Wastewater Treatment Plant is a recirculation sand filter with a drip field and does not discharge. Further, Arnold AFB has several wastewater treatment systems in the AEDC industrial area that treat wastewater from processes before discharge. Additionally, during heavy rain events or when pump-back is not functioning, discharge from the Retention Reservoir flows into Rowland Ditch, regulated under the base's NPDES permit, as well as discharge to Bradley Creek, which may receive cooling water and runoff from the Main Test Area (Arnold AFB 2012).

The Woods Reservoir is listed by the USEPA as an impaired waterbody under Section 303(d) of the CWA (USEPA 2010). The State of Tennessee's 303(d) list identifies Woods Reservoir in the Upper Elk River Watershed as not fully supporting designated use classifications due to elevated levels of polychlorinated biphenyls (PCBs) in fish tissue samples. Past releases from AEDC have been identified as a probable source of historical PCB contamination in Woods Reservoir, as PCBs were used at AEDC from approximately 1952 to 1990. However, AEDC has demonstrated that PCBs are not present in current facility discharges (TDEC 2007). Consequently, previously contaminated sediments have been identified as the source of pollutant causes associated with the impairment.

There are generally two options to prevent PCBs contained in the sediment from being released to the reservoir: 1) avoid disturbing the sediment or 2) remediate contaminated sites. If the sediment remains undisturbed, the PCBs should degrade over time; however, if the sediment is disturbed, remediation efforts would be necessary to control the load of PCBs in the reservoir so that the water quality criteria are not exceeded (TDEC 2007). Arnold AFB biennially samples and analyzes fish tissue for PCBs and dichlorodiphenyltrichloroethane (DDT), as required under its NPDES permit (Arnold AFB 2020a).

3.6.2 Groundwater

Regional groundwater resources include the Highland Rim aquifer, which consists of a karst geology. 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 (TDEC 2006; Arnold AFB 2009). Groundwater in the Mississippian aquifers can reach depths as great as 500 feet, but most circulation occurs at depths of less than 300 feet below ground surface (USGS 1995). The three primary groundwater units located beneath Arnold AFB include the St. Louis, Manchester, and Fort Payne aquifers. The Manchester aquifer is the region's primary groundwater well source and is located between the perched shallow unit of the St. Louis aquifer and the deeper Fort Payne aquifer. The Chattanooga shale formation found under the Fort Payne aquifer confines lower groundwater units. Groundwater can be found at depths of 10 to 40 feet below the ground surface (AEDC 2013a).

Karst areas are characterized by sinkholes, springs, disappearing streams and caves, and 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 (Arnold AFB 2009). Over 800 groundwater wells monitor the groundwater within the three groundwater units underlying Arnold AFB. There are three different types of wells: compliance monitoring wells associated with landfills, investigative wells for the assessment of groundwater contamination related to Environmental Restoration Program

(ERP) sites (these make up about 75 percent of the wells) and wells that measure groundwater on a regional basis (AEDC 2013b).

Arnold AFB has several wastewater treatment systems in the AEDC industrial area that treat wastewater from processes before discharge. Some of these also treat a combination of process wastewater and groundwater. In addition to the sanitary treatment systems, the Arnold AFB ERP utilizes five groundwater treatment systems to treat groundwater contaminated by historical industrial processes or disposal practices. Air stripping is the primary remediation technology used to remove volatile organic compounds from the groundwater. Treated water is discharged via internal or external NPDES discharge locations (Arnold AFB 2020a).

3.6.3 Floodplains

EO 11988, *Floodplain Management,* requires federal agencies to protect the values and benefits of floodplains and to reduce risks of flood losses by not conducting or allowing activities within floodplains, unless there is no other practicable alternative. The developed portions of the Installation, particularly the AEDC and the Arnold Village area, do not experience significant flooding problems. There are, however, several places on the base that lie within the 100-year floodplain as established by the Federal Emergency Management Agency. These Special Flood Hazard Areas include Woods Reservoir on the south side of the Installation, Huckleberry and Hunt creeks on the north side of the Installation near Manchester, and a small area where Bobo Creek exits the base near the city of Tullahoma (AEDC 2013a).

One of the proposed new construction projects would be located within a floodplain: New Construction Project 10: ANZY030047A Install Watercraft Barriers, Elk River Dam, which would construct a 650-linear-foot watercraft barrier at the existing dam.

3.6.4 Wetlands

There are approximately 1,894 total acres of wetlands at Arnold AFB, which vary in size individually from 0.05 acre to 267.36 acres. The majority of wetlands occur in the northern portion of the base. Prominent wetlands on the base include Sinking Pond, Westall Swamp, Willow Oak Swamp, Tupelo Swamp, and Goose Pond. **Figure 3-1** presents proposed IDP projects and wetlands at Arnold AFB. Additional wetlands details can be found in Section 2.6.3 of the Natural Resources Report (**Appendix C**).

Four projects included in the Proposed Action would occur in areas previously mapped as wetlands at Arnold AFB: Road Maintenance Project 6: ANZY060075 Add/Alter Perimeter Fence Road, Facility 60010, New Construction Project 7: ANZY1500261 Replace Perimeter Security Fence, Road Maintenance Project 8: ANZY190012 Repair Pavement, South Hap. Arnold Road Facility 60009, and New Construction Project 11 ANZY080033 Construct Security Fence, Munitions Storage Area.

3.7 BIOLOGICAL RESOURCES

Biological resources include native or naturalized plants and wildlife and the habitats in which they occur. Sensitive biological resources are defined as those plant and wildlife species listed as threatened or endangered, or proposed as such, by the USFWS. These resources also include plant and wildlife species listed as threatened or endangered, or as state-designated species of special concern, by the Tennessee Wildlife Resources Agency. The ESA protects listed species against killing, harming, harassment, or any action that may damage their habitat. State-listed wildlife species are protected in accordance with the Tennessee Nongame and Endangered or Threatened Wildlife Species Conservation Act of 1974, Tennessee Statutes

70.8.101-112. Similarly, state-listed plant species are protected under the Rare Plant Protection and Conservation Act of 1985, T.C.A. §70-8-301 et seq.

Sensitive habitats include those areas designated by the USFWS as critical habitat protected by the ESA and sensitive ecological areas as designated by state or federal rulings. Sensitive habitats also include wetlands, plant communities that are unusual or of limited distribution, and important seasonal use areas for wildlife (e.g., migration routes, breeding areas, crucial summer/winter habitats).

Migratory birds, as listed in 50 CFR 10.13, are ecologically and economically important to the United States, and recreational activities such as bird watching, studying, and feeding are practiced by many Americans. The MBTA, as amended, was enacted to protect migratory birds from capture, pursuit, hunting, or removal from natural habitat. More than 800 species are currently protected under the MBTA. In 2001, EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, was issued to ensure that federal agencies consider environmental effects on migratory bird species and, where feasible, implement policies and programs which support the conservation and protection of migratory birds.

Jurisdictional wetlands are those subject to regulatory authority under Section 404 of the CWA and EO 11990, *Protection of Wetlands*. Wetlands are defined by the US Army Corps of Engineers (USACE) and the USEPA as, “those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (33 CFR 328.3[b]). The USACE has authority to regulate jurisdictional wetlands as *Waters of the United States* under Section 404 of the CWA; however, EO 11990, *Protection of Wetlands* and the related DoD Instruction (DoDI) 4715.3*, Natural Resources Conservation Program,* provides guidance concerning how to mitigate or minimize any net loss of both jurisdictional and nonjurisdictional wetlands.

As part of the NEPA process for this Installation Development PEA, a Natural Resources Report (**Appendix C**) has been prepared.

3.7.1 Vegetation

The EHR is thought to have been historically categorized by a mosaic of open grassland, savanna, shrubland, and forest in various successional stages, maintained by frequent fire and grazing of large herbivores, such as bison (*Bison* spp.) and elk (*Cervus* spp.) (DeSelm 1994; Pyne 2000). The natural communities were modified as American settlement progressed, with much of the land in Coffee and Franklin counties converted to cultivation and pasture by the early 1940s (Arnold AFB 2020a).

The natural landscape of Arnold AFB is divided into four categories: Pine Plantation (5,494 acres), Hardwoods (23,053 acres), Woods Reservoir (3,632 acres), and the remaining areas designated as open areas (e.g., grassland, food plots, and buildings [6,902 acres]) (Arnold AFB 2020a). Present vegetation at Arnold AFB is predominately composed of upland and swamp oak forest species. These forested areas are divided among the 23,053 acres of native hardwoods and 5,494 acres of nonnative pines. Forested areas are most frequently characterized by closed canopies dominated by various oaks (*Quercus* spp.). Dry sites are dominated by post oak (*Quercus stellata*), blackjack oak (*Quercus marilandica*), scarlet oak (*Quercus coccinea*), southern red oak (*Quercus falcate*), and black oak (*Quercus velutina*). Wet sites are dominated by white oak (*Quercus alba*), willow oak (*Quercus phellos*), water oak (*Quercus nigra*), and overcup oak (*Quercus lyrata*). Understories include a wide variety of

species, including dogwoods (*Cornus* spp.), maples (*Acer* spp.), sassafras (*Sassafras* spp.), sourwood (*Oxydendrum arboretum*), and blueberries (*Vaccinium* spp.).

Numerous wetland areas also occur across the base, with prevailing vegetation ranging from grassland to closed-canopy forest (see Section 3.6.4). Several hundred acres of open, prairielike barrens occur primarily in the airfield and along power line and railroad ROWs. To date, more than 900 vascular plant species have been recorded at Arnold AFB (Arnold AFB 2020a).

Vegetation within the AEDC industrial area is composed primarily of landscaped plants and grasses with some areas of mixed hardwoods. A well-developed understory is generally absent due to browsing from deer (Arnold AFB 2009). Additional details regarding historic and current vegetative cover at Arnold AFB can be found in Section 2.7.2 of the Natural Resources Report (**Appendix C**).

3.7.2 Fish and Wildlife

Arnold AFB has a diversity of habitats ranging from closed canopy forests to open grasslands. The variety of habitats provides for a highly diverse assemblage of fish and wildlife. To date, 412 species of vertebrates (Arnold AFB 2020a) have been identified from the base including:

- 234 species of birds (includes summer residents, migrants, and wintering species)
- 35 species of reptiles
- 26 species of amphibians
- 44 species of mammals
- 83 species of fish

Two species of animals at Arnold AFB are considered big-game species, white-tailed deer (*Odocoileus virginianus*) and eastern wild turkey (*Meleagris gallopavo*) (Arnold AFB 2020a). The most popular small-game animals are squirrels, quail, rabbit, and various waterfowl species (Arnold AFB 2020a).

Partners in Flight (PIF), an organization dedicated to bird conservation of which DoD is a signatory partner (DoD 2002), defines the Interior Low Plateau, which includes the EHR, as a planning unit for bird conservation. In addition, Arnold AFB has been designated as an Important Bird Area (IBA) and participates in the IBA program (Arnold AFB 2020a).

There are certain habitats on Arnold AFB that require particular attention as they are necessary in order to maintain the diversity of wildlife that currently exists. In particular, wetlands are used by amphibians for breeding, while terrestrial areas are used for the other parts of their life cycles. Streams and springs are necessary for the survival of salamanders, bats, and rare fish species. The closed canopy hardwood forest serves as the habitat for forest interior bird species and forest bats. The woodland/savanna/shrubland system is essential for rare plants and plant communities along with the faunal communities they support, including several PIF high-priority bird species and a highly diverse reptile community. The grassland system, which is the rarest habitat type found at Arnold AFB, supports a number of grassland birds, small mammals, and reptiles (Arnold AFB 2020a).

3.7.3 Sensitive Species

3.7.3.1 Wildlife

The Arnold AFB Integrated Natural Resources Management Plan (INRMP) and the USFWS Information for Planning and Consultation System (USFWS 2021) were reviewed to determine if any federally listed, proposed, candidate species, or their habitats, potentially occur in the vicinity of the Proposed Action. The gray bat, Indiana bat, and northern long-eared bat are federally listed and have the potential to occur on Arnold AFB (**Table 3-5**). Based on habitat identified in the Arnold AFB INRMP, these are the only federally listed species with the potential to occur at Arnold AFB.

Table 3-5. Federally Listed Species with the Potential to Occur on Arnold AFB

Common Name	Scientific Name	Status	Preferred Habitat
Federal			
Gray Bat	*Myotis grisescens*	E	Gray bats live in caves year-round and appear to be restricted by dependence on major areas of water, as a direct correlation exists between the distribution of summer colonies and bodies of water. Winter: caves that are deep and vertical, provide large volume below the lowest entrance, and function as cold-air traps with multiple entrances and good air flow, with preferred temperatures range from 6 to 9 °C (43 to 48 °F) Summer: caves with temperatures that range from 14 to 25 °C (57 to 77 °F), configurations that trap heat including those with small chambers, high places in domed ceilings, and domes or small pockets within these locations, and depth of etching and porosity of the rock surface
Indiana Bat	*Myotis sodalist*	E	Winter: caves or mines with configurations that provide a suitable temperature and humidity microclimate Summer: roost trees in riparian, bottomland, and upland forests. Roost trees generally have exfoliating bark which allows the bat to roost between the bark and bole of the tree and have a southeast or south-southwest solar exposure and an open canopy
Northern Long-eared Bat	*Myotis septentrionalis*	T	Winter: hibernacula that include caves and abandoned mines, often in very high-humidity areas; typically found roosting in small crevices or cracks in cave or mine walls or ceilings Summer: roost singly or in colonies underneath bark or in cavities or crevices of both live trees and snags; have also been observed roosting in colonies in humanmade structures, such as buildings, barns, a park pavilion, sheds, cabins, under eaves of buildings, behind window shutters, and in bat houses

E – Endangered; **T** – Threatened; **°C** – degrees Celsius; **°F** – degrees Fahrenheit

Gray bats were first documented in the mid-1970s using the Elk River Dam at the Woods Reservoir on Arnold AFB. Annual surveys of the dam itself began in 1998 and mist net and acoustic surveys throughout the base began in 2000. A gray bat maternity colony occurs on Arnold AFB at the Elk River Dam during the summer months. The maternity colony at Elk River Dam is the only known roost site at Arnold AFB. However, gray bats have been captured

throughout Arnold AFB every year since 2000. A telemetry project in 2018 tracked gray bats to determine foraging areas, travel corridors, and day roost sites and found that males traveled great distances foraging on and off base and roosting in caves up to 46 kilometers away. Arnold AFB has conducted surveys almost every year since 2000 and performed acoustic surveys during many of those years for the Indiana bat. Although abundant potential habitat is present on Arnold AFB for Indiana bats, no maternity roosts have been identified to date. The northern long-eared bat has been documented as occurring on Arnold AFB since annual baseline bat surveys began in 2000. Potential suitable habitat for the northern long-eared bat occurs in forested areas throughout the base, encompassing approximately 12,397 acres (Arnold AFB 2020a). Maternity colonies are also known to occur at Arnold AFB. Based on previous survey efforts, northern long-eared bats utilize the base during the summer months.

In 2016, Arnold AFB prepared a Programmatic BA for Routine Training, Land Management, and Elk River Dam Operations for the base (see **Appendix C** for additional details). This Programmatic BA addressed potential impacts on federally listed bat species as a result of ongoing routine testing, training, land management, recreation, and Elk River Dam operation activities. It also included a number of conservation measures, including implementation of the INRMP, additional monitoring of federally listed bats, maintaining forested noise buffers, limiting off-road vehicle use, and minimizing tree removal/clearing as well as other measures associated with the operation of the Elk River Dam at the Woods Reservoir.

As a result of the Programmatic BA, the USFWS concluded in its 2016 BO (#04ET10000-2015-F-0420) that routine training, land management, and Elk River Dam Operations at the Woods Reservoir on Arnold AFB are not likely to jeopardize the continued existence of the gray bat, Indiana bat, or northern long-eared bat. This conclusion was reached by examining the current status of the species, the environmental baseline for the action area, and various possible effects on the species (including direct, indirect, interrelated and interdependent effects of the proposed federal action, and cumulative effects of other non-federal future actions that may occur in the action area, including state, tribal, local or private activities, and are reasonably certain to occur in the project area).

In the 2016 BO, it was determined that routine training, land management, and Elk River Dam Operations at the Woods Reservoir on Arnold AFB may result in incidental take of the gray bat, Indiana bat, and northern long-eared bat. Further, it was determined that incidental take would be exceeded when the take exceeds an unknown number of gray bats in 577 acres of summer foraging habitat, and an unknown number of Indiana bats and northern long-eared bats in 15,935 acres of suitable summer habitat, which is what has been exempted from the prohibitions of Section 9 of the BO. Reasonable and prudent measures (RPMs) to minimize the take, and terms and conditions, that must be observed when implementing those RPMs, are also included in the BO. Arnold AFB submits an annual report to the USFWS regarding actions taken related to the BO. The most recent annual report was submitted in January 2020.

Bald eagles (*Haliaeetus leucocephalus*) nest and winter at Arnold AFB and are protected by the Bald and Golden Eagle Protection Act. In addition, 21 animals and 63 plants are state listed as threatened, endangered or special concern species (see *List of Federal and State Threatened, Endangered, and Special Concern Species and Rare Communities* in **Appendix C**). **Figure 3-2** presents proposed IDP projects and the general known locations of federally and state-listed threatened and endangered species at Arnold AFB.

3.7.3.2 Plants

No federally listed plant species are known to occur at Arnold AFB. However, 57 state-listed endangered, threatened, or species of special concern are known to occur on the Installation (see *List of Federal and State Threatened, Endangered, and Special Concern Species and Rare Communities* in **Appendix C**).

Additional details regarding sensitive species and surveys conducted for these species at Arnold AFB can be found in Section 3.0 of the Natural Resources Report (**Appendix C**).

3.8 CULTURAL RESOURCES

Cultural resources encompass properties documenting human activity. Such resources can include prehistoric and historic archaeological sites, traditional cultural properties, buildings, structures, objects, districts, and landscapes. In addition to NEPA, several federal laws and regulations govern the consideration and treatment of cultural resources in federal undertakings, including the NHPA of 1966, as amended, the Archaeological and Historic Preservation Act of 1974, the American Indian Religious Freedom Act of 1978, the Archaeological Resources Protection Act (1970), and the Native American Graves Protection and Repatriation Act (1990).

The NHPA created the National Register of Historic Places (NRHP) as a planning tool to recognize cultural resources that possess significance and integrity applying the National Register Criteria for Evaluation (36 CFR 60.4[a-d]). Properties listed in, or eligible for listing in, the NRHP legally are defined as historic properties that require consideration under Section 106 (54 USC 306108) of NHPA in federal actions. Under Section 106 of NHPA, federal agencies take into account the effects of proposed undertakings on historic properties in the planning process applying 36 CFR 800 – *Protection of Historic Properties*. The goal of the regulatory process is to "identify historic properties potentially affected by the undertaking, assess its effects and seek ways to avoid, minimize or mitigate any adverse effects on historic properties" (36 CFR 800.1).

Arnold AFB has an established cultural resources management (CRM) program that is in compliance with DoDI 4715.16 - *Cultural Resources Management* (18 September 2008, updated 31 August 2018) and AFMAN 32-7003, *Environmental Conservation* (20 April 2020). Arnold AFB also conducts tribal consultation in accordance with DAFI 90-2002, *Interactions with*

Federally Recognized Tribes (24 August 2020). In 2014, AEDC, Arnold AFB, the Tennessee SHPO, tribal representatives, local governmental jurisdictions, and other parties consulted on a *Programmatic Agreement (PA) between Arnold Engineering Development Complex, Arnold Air Force Base and the Tennessee State Historic Preservation Officer Regarding Management of Historic Properties at Arnold Air Force Base, Tennessee Pursuant to 36 CFR Part 800.14* regarding the management of historic properties at the installation. The PA is effective until 2024 and may be modified, terminated, or extended dependent on review by the signatories. The PA establishes alternative procedures to implement Section 106, standards and procedures for the treatment of historic properties, classes of undertakings exempt from further review, standardized treatments for project effects, and documentation, reporting, and monitoring requirements. Implementation of the PA and its terms fulfills Arnold AFB's responsibilities under Section 106 of NHPA for all individual undertakings of the program.

As part of the NEPA process for this Installation Development PEA, a Cultural Resources Report (**Appendix C**) has been prepared.

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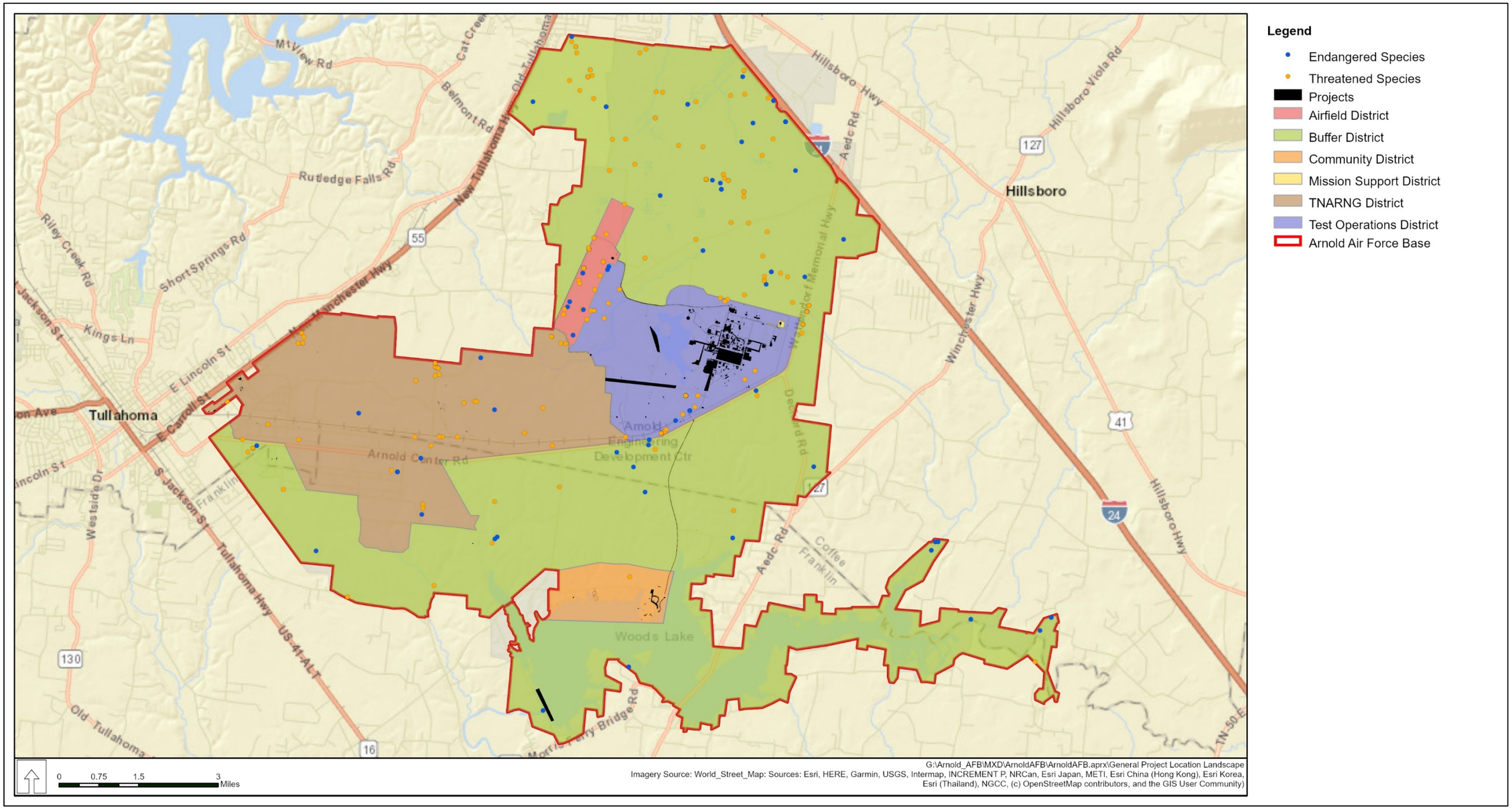

Figure 3-2. Proposed Installation Development Plan Projects and Known Locations of Federally and State-Listed Threatened and Endangered Species at Arnold Air Force Base

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3.8.1 Area of Potential Effect

Installation development at Arnold AFB would improve and update facilities and infrastructure that are no longer adequate to meet technologically advanced and specialized aerospace testing and flight simulation requirements. For the purposes of this analysis, the Area of Potential Effects (APE) is defined as the Arnold AFB installation boundaries. The Proposed Action at Arnold AFB comprises 357 projects. These projects were analyzed individually and collectively for their potential to affect historic properties.

3.8.2 Cultural and Historic Resources Studies

Arnold AFB has been the subject of numerous studies to identify and to evaluate cultural resources at the Installation. These studies have identified a number of archaeological sites and built resources. Some resources have been evaluated as possessing the qualities of significance necessary for listing in the NRHP.

Archaeological investigations at Arnold AFB have been conducted over three decades and identified a total of 187 prehistoric and historic sites bridging nearly the entire span of human settlement in the region. Numerous Phase I archaeological surveys were completed at the installation, encompassing all of the land currently managed by Arnold AFB. These investigations have included several very large identification surveys, including Investigations encompassing 40,000 acres (Matternes 1997) and 16,825 acres (Wampler et al. 2010) of the Installation. Many other investigations encompassed smaller areas conducted in accordance with Section 106 undertakings, such as timber harvests or construction of facilities. Other studies focused on evaluating the eligibility of sites. The eligibility status of most archaeological sites was assessed during these studies. Of the 187 sites identified on Arnold AFB, 14 sites were determined eligible for listing in the NRHP, 152 sites were determined not eligible for listing, and 21 sites are considered potentially eligible. Two archaeological sites and one plant species have been identified as Traditional Cultural Properties (USAF 2019). Based on the previous archaeological investigations, the archaeological inventory is complete, but some evaluations are outstanding.

Architectural investigations at Arnold AFB have been focused on built resources constructed between 1946 and 1991, which have been surveyed and evaluated in five architectural reports. The architectural survey efforts completed in 2014 and 2017 resulted in a 100 percent comprehensive survey and evaluation for architectural resources constructed during the Cold War era (1946 to 1991) applying the NRHP Criteria for Evaluation (36 CFR 60.4[a-d]) (Prybylski et al. 2014: 3 Vols.; Prybylski and Edge 2017: Vol. 4). The four-volume Cold War Report recommended NRHP eligibility for the Arnold AFB Test Facility Historic District, the Elk River Dam-Woods Reservoir Historic Landscape, and the Test Utilities Historic Landscape, five individual buildings, and contributing buildings to the historic district and landscapes. The results and evaluation recommendations were accepted by the Tennessee SHPO. The list of 85 NRHP-eligible buildings was codified in a 2017 memorandum (Allen 2017; Prybylski et al. 2014: 3 Vols.; Prybylski and Edge 2017: Vol. 4) and was recently updated in 2021 (Allen 2021; see **Appendix A**). These historic properties are discussed in greater detail in the Cultural Resources Report in **Appendix C**.

3.8.3 Evaluated Properties Included in Arnold AFB Installation Development

The footprints of the individual projects comprising the Proposed Action intersect with four archeological sites, 84 historic built resources, one historic district, and two historic landscapes

at Arnold AFB. The four archaeological sites located within the project footprints have been determined not eligible for listing in the NRHP. The four sites are 40CF293 (Cochrane et al. 2006), 40CF334 (Wampler et al. 2010), 40FR502, and 40CF310 (Wampler et al. 2010; Schenker et al. 2010). Previously documented Traditional Cultural Properties are not located within, or in the vicinity of, the proposed projects.

The Proposed Action comprises work to both individually eligible built resources and contributing resources within the identified historic district and the two historic landscapes. Projects are planned for the five individually NRHP eligible buildings (Buildings 100, 350, 451, 1476, and 1478) and for 65 of the 66 contributing resources to the Arnold AFB Test Facility Historic District, as well as for contributing areas and for noncontributing resources within the district (USAF 2020b).

Projects are planned for the four contributing resources to the Elk River Dam-Woods Reservoir Historic Landscape. These resources are the Elk River Dam (Facility 3101), the reservoir (Facility 20007), and the pumping station (Building 3038) and its equipment (Facility 3039) (Prybylski et al. 2014: Vol. 2:274-276). In addition, projects are planned for noncontributing resources and areas located within the historic landscape boundary.

Projects also are planned for the 10 contributing buildings to the Test Utilities Historic Landscape, including the embankment dam (Facility 2102), the retention reservoir (Facility 20008), the aboveground reservoir (Facility 1506), treating and pumping equipment (Facility 1502), water treatment building (Building 1504), secondary pumping station (Building 1507), the power control house (Building 1525), the oil pump house-main station (Building 1526), the Rowland cooling water ditch (Facility 1545), and the industrial waste treatment and disposal reservoir (Facility 1560). The Proposed Action also includes projects for noncontributing resources and areas located within the historic landscape boundary.

3.8.4 Area of Potential Effect

Installation development at Arnold AFB would improve and update facilities and infrastructure that are no longer adequate to meet technologically advanced and specialized aerospace testing and flight simulation requirements. The Proposed Action at Arnold AFB comprises 357 projects. These projects were analyzed individually and collectively for their potential to affect historic properties.

3.9 HAZARDOUS MATERIALS AND WASTES

Hazardous wastes are defined by the RCRA, as amended, as any solid, liquid, contained gaseous, or semisolid waste, or any combination of wastes that pose a substantial present or potential hazard to human health or the environment. Hazardous materials are defined by the CERCLA, as amended, as any substance with physical properties of ignitability, corrosivity, reactivity, or toxicity that might cause an increase in mortality, serious irreversible illness, or incapacitating reversible illness, or pose a substantial threat to human health or the environment. Issues associated with hazardous materials and wastes typically center on underground storage tanks, aboveground storage tanks, and the storage, transport, and use of pesticides, fuels, and other petroleum-based products, lubricants, antifreeze, and paint solvents. When such resources are improperly used in any way, they can threaten the health and well-being of wildlife species, vegetation communities, soil systems, water resources, and people.

To protect habitats and people from inadvertent and potentially harmful releases of hazardous substances, USAF, through AFIs 10-2510, *Emergency Management Program* and 32-7002, *Hazardous Materials Management*, has dictated that all facilities develop and implement Hazardous Materials Management Plans, Hazardous Waste Management Plans, and/or Spill Prevention, Control, and Countermeasure Plans. Also, the DoD has developed the ERP to facilitate the thorough investigation and cleanup of contaminated sites located at military installations. These plans and programs, in addition to established legislation (e.g., CERCLA, RCRA), effectively form the "safety net" intended to protect the ecosystems on which most living organisms depend.

3.9.1 Environmental Restoration Program

ERP sites at Arnold AFB include areas where hazardous wastes, substances, or pollutants, radioactive wastes, or petroleum were released. Investigations at Arnold AFB have identified 28 ERP sites since the program was initiated in 1982. Of the 28 identified sites, nine sites required no further action and are considered closed, four are undergoing remedial action operations, one is in remedial action construction, eight are undergoing long-term monitoring, and six have land use controls in place. Two additional sites SS-C502 (C Plant Fuel Spill) and OT-C508 (J-3 Test Cell Hydrazine Spills) are undergoing site inspection. Arnold AFB developed a Land Use Control Assurance Manual (LUCAM) to manage sites where levels of hazardous constituents remain in soil and/or groundwater above appropriate risk levels for unrestricted use. Land Use Control Implementation Plans, which outline the specific types of physical and administrative mechanisms to be maintained at the respective sites, are prepared for each applicable site. Sixteen sites are currently managed in the LUCAM process, some of which include long-term monitoring or operation activities (AEDC 2013b).

ERP sites at Arnold AFB are associated with Solid Waste Management Unit (SWMU) numbers. The USEPA defines a SWMU as "any discernible unit at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste. Such units include any area at a facility at which solid wastes have been routinely and systematically released" (USEPA 1990). Multiple SWMUs may occur within a single ERP site. All active ERP sites are depicted in **Figure 3-3.** Additional details regarding active ERP sites at Arnold AFB can be found in in **Table C-1** in **Appendix C.**

3.9.2 Hazardous Materials and Wastes

Hazardous substances are corrosive, toxic, flammable, and reactive materials that, when spilled or released into the environment, are dangerous to public health. Hazardous substances include those materials used in the cleaning, maintenance and repair of buildings, equipment, and

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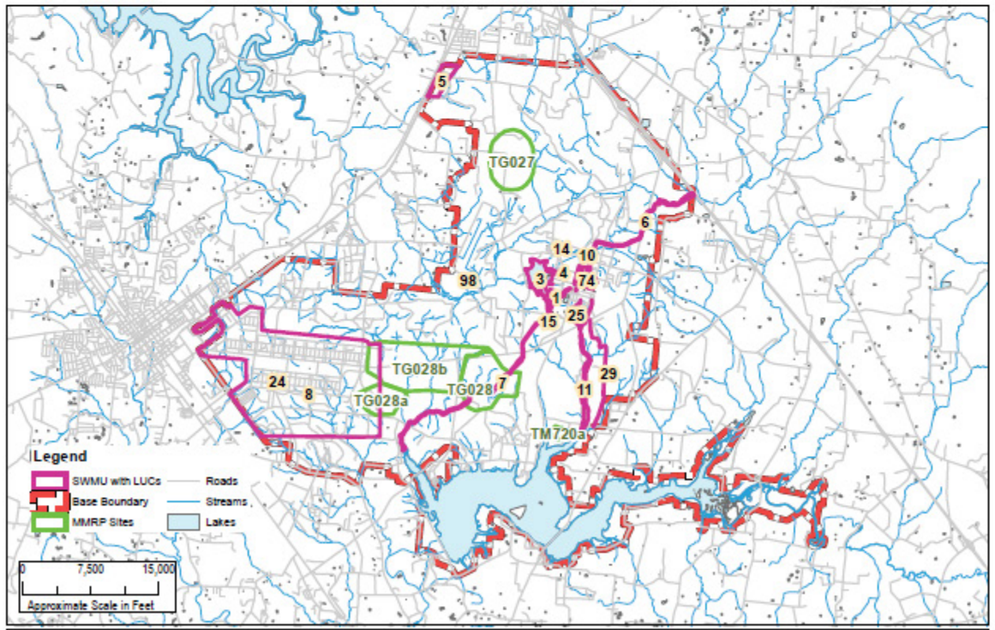
Installation Restoration Program Sites and Associated Solid Waste Management Units

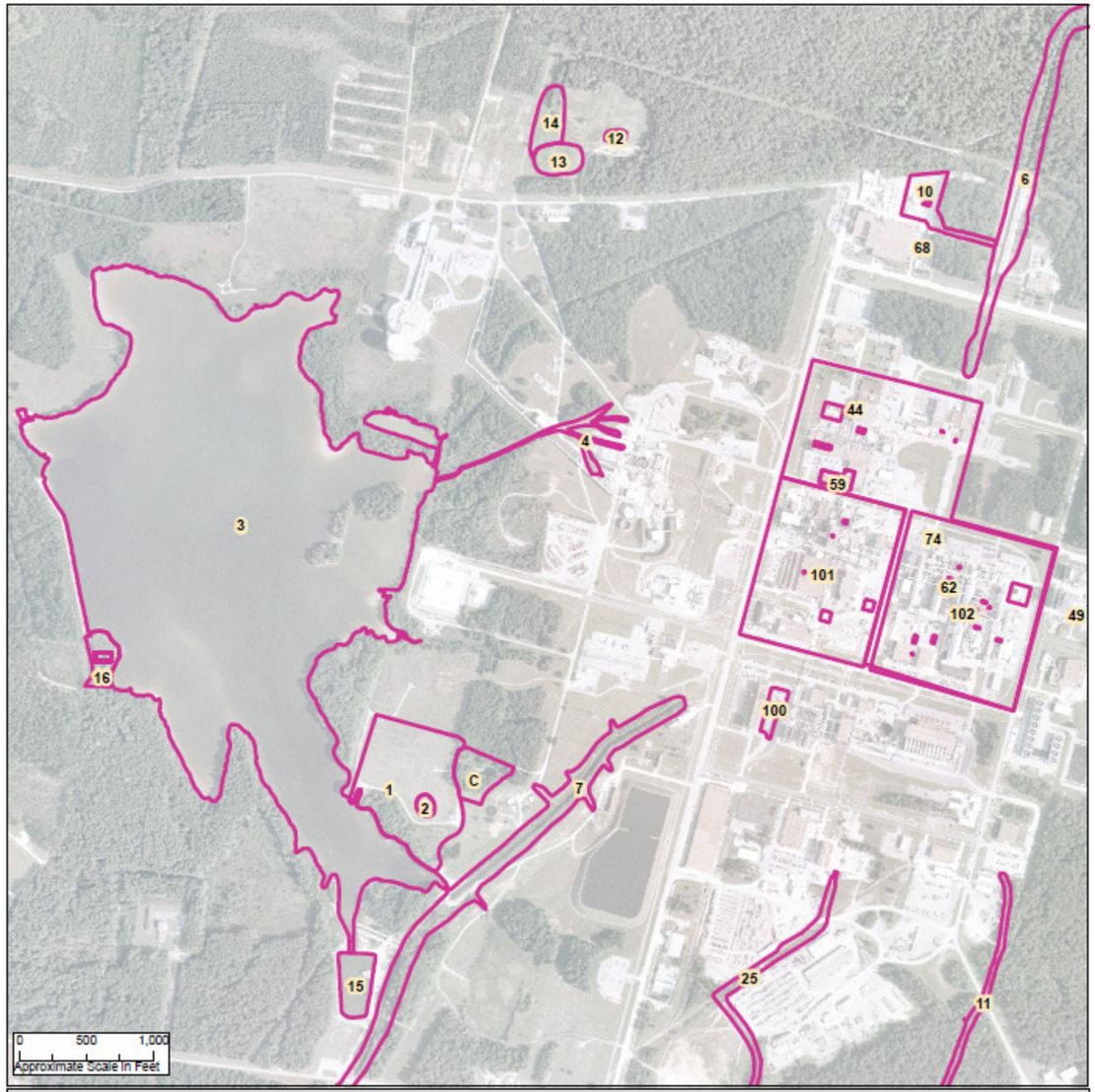
IRP Site ID	SWMU Number	Site Name
ED501	98	Former EOD Range
FT010	12	Former Fire Training Area 2
FT010	13	Burn Area 1
FT010	14	Landfill 1
LF001	1	Landfill 2
LF001	2	Leach Pit 2
LF001	AOC C	Former Nursery
LF003	5	Coffee County Landfill
SD004	6	Bradley Creek
SD005	7	Rowland Creek
SD009	11	Brumalow Creek
SD009	29	Hunters Road
SS019	24	Camp Forrest
SS022	44	Former Satellite Accumulation Area
SS022	49	Former Satellite Accumulation Area
SS022	59	Former Satellite Accumulation Area
SS022	62	Former Drip Pan
SS022	74	Undifferentiated GW/Northwest Plume
SS025	101	Engine Test Facility
SS026	102	Propulsion Wind Tunnel
SS-C504	100	Aerospace Test Facility
WP002	3	Retention Reservoir
WP002	4	J-4 Drainage Area
WP006	8	Camp Forrest Water Treatment Plant
WP008	10	Leach Pit 1
WP008	68	Chemical Metallurgical Lab Accumulation Area
WP011	15	Former Chemical Treatment Pond
WP012	16	Former Leach/Burn Area
WP020	25	Former Steam Plant Ash Pits

Military Munitions Response Program Sites

TG027, TG028, TG028a, TG028b, TM720a



RCRA SWMUS and AOCs with Land Use Controls at Arnold AFB



RCRA SWMUS and AOCs with Land Use Controls at in the Main Test Area at Arnold AFB

Figure 3-3. Active Environmental Restoration Program Sites at Arnold Air Force Base

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vehicles. Examples include motor oil, gasoline, jet fuel, coolants, hydraulic fluids, paints, paint thinners, strippers, and degreasing agents. At Arnold AFB, up to 55 gallons of hazardous waste or one quart of acutely hazardous waste may be stored at Initial Accumulation Points before being picked up by the Hazardous Waste Operations Group and transferred to 90-day accumulation points. From the 90-day accumulation points, hazardous waste is moved to Building 1456, the RCRA-permitted storage facility at Arnold AFB. Final disposition of hazardous waste is managed by the Defense Logistics Agency Disposition Services at Anniston, Alabama (AEDC 2013b).

The USEPA identification number for Arnold AFB is TN8 570 024 044 (AEDC 2013a). Under RCRA, Arnold AFB is a *Large Quantity Generator* of hazardous waste (i.e., generating 2,200 pounds per month or greater) and maintains a RCRA-permitted storage facility. Hazardous wastes that are regulated under RCRA are defined as any solid, liquid, contained gaseous, or semisolid waste, or any combination of wastes that either exhibit one or more of the hazardous characteristics of ignitability, corrosivity, toxicity, or reactivity, or are listed as a hazardous waste under 40 CFR 261.

3.9.1 Asbestos

Asbestos is a mineral fiber that was historically added to products to strengthen them and provide heat insulation and fire resistance. Breathing high levels of asbestos has been associated with some types of cancer. Many building products contained asbestos prior to the 1970s.

AFI 32-1052, *Facility Asbestos Management*, provides direction for the management of asbestos containing material (ACM) at USAF Installations. AFI 32-1052 21 outlines requirements for an asbestos management plan and an asbestos operating plan. The objective of the asbestos management plan is to document the status and condition of ACM within an Installation. The asbestos operating plan provides direction for conducting asbestos-related work within the Installation.

AEDC has implemented an Asbestos Management and Operations Program to provide proper procedures for the inspection, monitoring, abatement, and disposal of ACMs. The program is designed to prevent potential health hazards from the inhalation of unsafe levels of airborne asbestos fibers (AEDC 2013a).

Detailed inspections of all facilities at have been performed at Arnold AFB. During these surveys several buildings that were inspected were found to contain ACM and each has been included in a database cataloging the location of ACM and its condition at Arnold AFB. When existing facilities are demolished or renovated, ACM is removed in accordance with all appropriate regulations and best management practices (BMPs). The base has one on-site TDEC authorized asbestos landfill. This landfill is in compliance with landfill permits and state regulation (AEDC 2013a). The Proposed Action includes the removal of asbestos from buildings basewide (see Project ANZY9901154 in **Table B-1** in **Appendix B**).

3.9.2 Lead-based Paint

Lead-based paints are also considered hazardous materials. AEDC implemented a Lead and Heavy Metal Management Program to educate and protect base personnel and the surrounding environment from the dangers of lead and materials containing heavy metals.

Lead based paint is found in most of the base facilities because of their age and industrial-type use. When renovations are done to existing facilities, replacement of paint is completed, in

accordance with all appropriate regulations and BMPs, when economically feasible. For example, previous renovations of structures within the Arnold Village area have been completed to Department of Housing and Urban Development standards (AEDC 2013a).

3.10 TRANSPORTATION AND TRAFFIC

Transportation is defined as the movement of goods and individuals from place to place and the associated infrastructure. In general, transportation refers to air, water, and ground vehicles and the services that make use of these infrastructures.

Major roads near Arnold AFB are Interstate (I-) 24 and State Route 41 (Hillsboro Highway) to the north, Highway 55 (New Manchester Highway) to the west, Alternate State Route 41/State Highway 16 (Tullahoma Highway) to the south, and State Highway 127 (Winchester Highway) to the east. I-24 provides easy access to and from Nashville and Chattanooga. Access to the base is provided by Wattendorf Memorial Highway from the north, Decherd Road to the east, and Arnold Center Road to the southwest (from Tullahoma). Existing traffic volumes along most roads in the area are suitable for the existing infrastructure (USAF 2016a, 2016b).

Within Arnold AFB, existing roads are sufficient to accommodate traffic flow of the workforce and delivery of materials and supplies. The on-base road network consists of 105 miles of improved roads, half of which are paved. The Main Gate and Gate 2 are open to allow ingress and egress of traffic, with Gate 2 providing access for commercial vehicles. There are 42.4 acres of parking lots, with more than 5,000 spaces. About 70 percent of the lots are asphalt, 25 percent are stone, and 5 percent are concrete (Arnold AFB 2020a).

The Caney Fork and Western Railroad lines connect to on-base rail lines. Approximately 16 miles of government-owned railroad main lines are located on the base, but rail service is no longer used on Arnold AFB. Approximately 2 miles of unused and abandoned-in-place lines were demolished in the early part of FY13. The main lines meet Class II railroad requirements and are in fair condition. A steel railroad trestle passes over Rowland Creek. The railroad crossing at Tullahoma is maintained by the base.

3.11 UTILITY INFRASTRUCTURE

3.11.1 Utilities

Utility infrastructure on Arnold AFB includes the electric transmission lines and associated ROWs, water, sewer, and solid waste systems, aboveground and belowground steam and gas lines, and the water treatment plant.

3.11.2 Public Water Systems

Two Public Water Systems (PWS) are operated at Arnold AFB. The Arnold AFB Complex Water Treatment Plant (WTP) is classified as a nontransient, noncommunity (NTNC) system serving approximately 2,600 people (Arnold AFB 2019). The Golf Course PWS obtains water from an on-site well that is supplied by the Manchester aquifer and is classified as a transient, noncommunity system (Arnold AFB 2019).

Raw water is pumped from Woods Reservoir to a secondary reservoir in the AEDC complex via a from a 60-inch water main. The secondary reservoir supplies the base WTP and the cooling water system. Treated potable water is stored in two clear wells and an elevated tank. The water distribution system that supplies the AEDC property is a 13-mile grid of 6- to 12-inch-diameter mains. Other areas of the base, including the Arnold Village family housing area, the

visiting officers' quarters, the Crockett's Cove Campground, and the AEDC recreation area are supplied by the Estill Springs Utility District. Other outlying areas are supplied by groundwater wells (AEDC 2004).

3.11.3 Cooling Water System

A recirculating water system provides cooling water for base operations via 17.5 miles of supply and return mains, a cooling tower, and water pumps in Bradley, Brumalow, and Rowland creeks (AEDC 2004).

3.11.4 Sanitary Sewer System

The wastewater collection system for the AEDC area consists of 9 miles of gravity flow and forced sewer lines, 28 lift stations, and the AEDC sewage treatment plant (AEDC 2004). Wastewater at Arnold AFB is treated by either the Main Sewage Treatment Plant, the Arnold Village Recirculating Sand Filter, or septic tanks systems. The industrial area is covered by a NPDES permit (TN0003751) which includes domestic wastewater, industrial wastewater, and storm water (Arnold AFB 2019). The military family housing area, which includes the Wingo Inn and the Arnold Lakeside Club, is serviced by a recirculating media filter operated under Standard Operating Procedure #06006 (Arnold AFB 2019). Twenty-eight septic tanks located at various locations at Arnold AFB are covered under Underground Injection Control Permit # COF-0000007 (Arnold AFB 2019).

3.11.5 Stormwater Drainage System

The stormwater collection system consists of curbs, gutters, underground storm mains, and open ditches. The system consists of 150 sump pumps, 20 miles of underground mains, and 19 miles of open ditches and conveys water to Rowland, Bradley, and Brumalow creeks (AEDC 2004).

3.11.6 Natural Gas System

Natural gas is supplied to Arnold AFB from the Elk River Public Utilities District. A 1.8-mile nonlooped system distributes the gas to various facilities on the Installation.

3.11.7 Electrical Distribution System

Electricity is supplied from the Tennessee Valley Authority. Four 161-kilovolt (kV) lines and two 500 kV lines supply Arnold AFB. Two 161 kV lines feed the AEDC's main substation. Underground 161 kV lines feed eight distributing substations. Underground and overhead 6.9 kV to 13.8 kV overhead lines supply power to most of AEDC's buildings (AEDC 2004).

3.11.8 Steam System

Steam is provided by two central plants and distributed via 16 miles of piping. The distribution system includes shallow-trench, aboveground, and buried piping (AEDC 2004).

3.11.9 Solid Waste System

A variety of wastes are generated at Arnold AFB. Arnold AFB maintains two active permitted landfills, a construction and demolition landfill and an asbestos landfill. Municipal waste is transported off-site for disposal. A permitted Treatment, Storage, and Disposal Facility and three 90-day accumulation sites are active within the industrial area (Arnold AFB 2019).

Arnold AFB also participates in a basewide reduction, reuse, and recycling program. Over

the past few years, total waste generated has been reduced by more than 50 percent. Activities include the recycling of paper, cardboard, scrap steel, and used oil; recycling programs at Arnold Village family housing and recreational sites; and continued communication with and education of base personnel and the public about the benefits of waste reduction and reuse.

3.12 SAFETY

A safe environment is one in which there is no, or an optimally reduced, potential for death, serious injury, or illness. The elements of an accident-prone environment include the presence of unnecessary hazards and an exposed population at risk of encountering hazards. This section addresses the current conditions for military personnel and civilian safety.

3.12.1 Explosive Safety Quantity Distance

Siting requirements for explosive materials storage (e.g., munitions) and handling facilities are based on safety and security criteria. Air Force Manual (AFM) 91-201, *Explosives Safety Standards*, requires that defined distances be Explosive Safety Quantity Distance (ESQD) safety zones are determined by the type and quantity of explosive materials to be stored; each explosive material storage or handling facility has a ESQD safety zone extending outward from its sides and corners for a prescribed distance. Within ESQD safety zones, development is either restricted or altogether prohibited in order to maintain safety of personnel and minimize the potential for damage to other facilities in the event of an accident. ESQD safety zones for multiple facilities at a single site may overlap, leaving a series of arcs as edges of the safety zone. Explosive materials storage and built-up facilities must be located in areas where security can be assured.

Numerous AEDC facilities, such as the test cells and propellant storage tanks, have the potential for large-scale destruction should uncontrolled detonation of explosive materials occur. For this reason, ESQD safety zones have been established to limit development around test and storage facilities. These ESQD safety zones consist of two areas based on levels of safety. The intraline zone delineates the minimum distance that all test essential personnel (i.e., technicians and test engineers) must maintain during actual test operations. The inhabited building distance zone, or the outer most area, is the minimal distance that nontest essential personnel (maintenance personnel and administrative personnel) must maintain at all times (AEDC 2013a).

The base does not provide long-term storage of explosives. Only materials needed for ongoing test projects are kept at AEDC. The locations of all explosive storage facilities are approved by the DoD Explosive Safety Board. Several known projectile impact areas with unexploded ordnance exist where field weapons training occurred during World War II. It is probable that exposed projectiles still remain in these areas, requiring constraining safety clearances. The TNARNG also has a live firing range located on the base that is used during training exercises (AEDC 2013a).

3.12.2 Antiterrorism/Force Protection

The DoD has developed AT/FP standards, which are designed to reduce the likelihood of casualties from potential terrorist attacks. Requirements include mandated setbacks of parking areas from buildings, increased security measures such as barricades at military facility entrances and exits, and AT/FP-compliant perimeter fences. Requirements also include mandates regarding emergency notification systems and procedures. The *United States Air Force Installation Force Protection Guide* contains information on installation planning, engineering design, and construction techniques that can preclude or minimize the effects of

terrorist attacks upon existing and future facilities. It addresses the comprehensive planning process, facility site design, and building systems design. Additional criteria are available in UFC 4-010-01 *DoD Minimum Antiterrorism Standards for Buildings*. At Arnold AFB, the AT/FP office is included in the design meetings for facilities and reviews plans against UFC 4-010-01.

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4.0 ENVIRONMENTAL CONSEQUENCES

Environmental impacts which would result from implementation of the Proposed Action at Arnold AFB are evaluated in this section. Analyses are presented by resource area, as described in Section 3. As described in Section 1.6, this environmental assessment is programmatic in nature and evaluates the proposed implementation of the Arnold AFB IDP holistically. The analyses within the PEA reflect major broad/general environmental issues and trends that might result from making broad programmatic decisions relating to the IDP and effectively frames the scope of future analysis when details of the site- and/or project-specific actions are known allowing for subsequent follow-on tiered NEPA analysis. All projects listed in Table B-1 of the *Programmatic Environmental Assessment for Installation Development at Arnold Air Force Base, Tennessee* will have subsequent follow-on, narrower, and site- or proposal-specific analysis to be tiered from this PEA. Further, as described in Section 4.6 and Section 4.7, consultation and coordination with the USFWS and the SHPO would be conducted under the existing Programmatic BO and PA.

As described in Section 2.1, the Proposed Action includes six demolition projects, 20 new construction projects, and nine road maintenance projects, which were determined to individually have the potential to have a significant impact on the human and natural environment and were identified for further detailed analysis in this PEA. Collectively, the proposed demolition projects would remove an estimated 1.76 acres of facilities over the next five FYs. New construction projects would have an estimated 75.6 acres of ground disturbance, and collectively the proposed road projects would maintain or improve upon an estimated 18.3 acres of roadways.

The USAF has determined that individually the remaining 322 projects do not have the potential to have a significant impact on the human and natural environment; however, some effects, as described below, may be realized during implementation of some or all of the 322 proposed projects in combination with the 35 proposed projects that were determined to individually have the potential to have a significant impact on the human and natural environment at Arnold AFB, as well as other planned on-base and off-base activities.

***On-Base Activities*.** Additional direct and indirect effects may occur when there is a relationship between a proposed action and other reasonably foreseeable actions expected to occur in a similar location or during a similar time period. Reasonably foreseeable actions overlapping with or proximate to the Proposed Action can be expected to have more potential for effects on "shared resources" than actions that may be geographically separated. Similarly, reasonably foreseeable actions that coincide temporally would tend to offer a greater potential for effects. For the purposes of this PEA, a review of recently completed, in-progress, and planned construction and demolition projects was conducted. The Arnold AFB IDP is intended to project and guide development over the five-year planning horizon and beyond. Consequently, all planned and programmed (i.e., reasonably foreseeable) development at Arnold AFB has been included in the Arnold IDP and analyzed in this PEA.

***Off-Base Activities*.** The majority (329) of the proposed projects are located within the Test Operations District, which is located in the central area of Arnold AFB and more than 2 miles from residential and other potentially sensitive land use activities. A Love's Travel Stop was completed near Arnold AFB in April 2021. It is located across I-24 from the base. It was a large undertaking (approximately 17 acres), and directly impacted 10 acres of wetlands in the region, which were mitigated through an USACE Section 404 permit. In addition, across I-24 from Arnold AFB is the Manchester Industrial Park, which is large enough to support additional industry in the future. However, there are currently no additional facilities planned at the industrial park. As such, the off-base projects would not have a reasonably close causal

relationship to the Proposed Action. Franklin and Coffee counties are both currently in attainment for all criteria pollutants; therefore, regional air quality impacts would be minor and would not contribute substantially to cumulative impacts. Additionally, Arnold AFB is located in a sparsely populated portion of Coffee and Franklin counties, and no planned or reasonably foreseeable substantial development projects are proposed in the vicinity of Arnold AFB.

4.1 NOISE

Effects on the noise environment would be significant if the Proposed Action would change the existing noise environment such that it increased exposure to unacceptable noise levels. Potential changes in the noise environment because of the Proposed Action could also be (1) beneficial (i.e., if they reduce the number of sensitive receptors exposed to unacceptable noise levels), (2) negligible (i.e., if the total area exposed to unacceptable noise levels is essentially unchanged), or (3) adverse. Further, an increase in noise levels due to introduction of new noise sources could create an impact on the surrounding environment.

4.1.1 Proposed Action

Short- and long-term negligible adverse effects would be expected. Short-term effects would be due to the use of heavy equipment during demolition and construction activities. Long-term effects would be due to the potential use of backup generators, HVAC systems, cooling towers, and chiller units at the proposed facilities. These effects would be negligible.

Individual pieces of demolition and construction equipment typically generate noise levels of 80 to 90 dBA at a distance of 50 feet (USEPA 1971; Federal Highway Administration [FHWA] 2006). With multiple items of equipment operating concurrently, noise levels can be relatively high during daytime periods at locations within several hundred feet of active sites. All noise sensitive areas within 800 feet of construction and demolition activities would experience some amounts of noise. However, construction and demolition activities would be confined to on-base areas and conducted primarily during daytime hours. Due to the temporary nature of the projects and the distance to nearby off-base areas, these effects would be negligible. Although construction- and demolition-related noise effects would be negligible, the following BMPs would be performed to reduce the already limited noise effects:

- Construction and demolition would primarily occur during daytime hours;
- Equipment mufflers would be properly maintained and in good working order; and
- On-site personnel, and particularly equipment operators, would don adequate personal hearing protection to limit exposure and ensure compliance with federal health and safety regulations.

There would be no changes in the number or types of aircraft, use of weaponry, or associated ground-based training at the Installation. Therefore, no changes in the existing noise environment associated with these sources would be expected. Backup generators at the proposed facilities would generate noise during periodic testing and use during power outages. In addition to backup generators, noise producing equipment at facilities proposed for repair or replacement include HVAC systems, cooling towers, and chiller units. There would be limited changes in traffic patterns and associated noise to support the proposed facilities at the Installation. These changes to the overall noise environment would not be readily perceptible when compared to existing conditions, particularly in areas off the Installation.

As described previously, the majority of the proposed projects are located within the Test Operations District. Implementation of the Proposed Action over the next five years, in conjunction with other reasonably foreseeable projects that may be planned in the near future,

would not change the character or nature of the noise environment at Arnold AFB. Noise impacts would not be expected to be significant as demolition and construction-related noise associated with the Proposed Action would be short-term and temporary and would be similar in nature to existing noise environment. Long-term noise impacts associated with the implementation of the Proposed Action in combination with reasonably foreseeable projects would remain negligible as described above and would not contribute substantially to long-term impacts at Arnold AFB.

4.1.2 No Action Alternative

No effects on the current noise environment would occur. Implementation of the IDP at Arnold AFB would not take place. There would be neither beneficial nor adverse effects on noise from these activities, and the current noise environment would not change when compared to existing conditions; Arnold AFB operations (e.g., use of backup generators, HVAC systems, cooling towers, and chiller units) would continue to generate noise.

4.2 LAND USE

Effects on land use would be significant if the Proposed Action would (1) be inconsistent or in noncompliance with applicable land use plans or policies, (2) preclude the viability of existing land use, (3) preclude continued use or occupation of an area, (4) be incompatible with adjacent or vicinity land use to the extent that public health or safety is threatened, or (5) conflict with USAF planning criteria established to ensure the safety and protection of human life and property.

4.2.1 Proposed Action

Implementation of the Proposed Action would not result in substantial changes to land use at or in the vicinity of Arnold AFB. Arnold AFB analyzed the capacity for future development or mission expansion during the IDP process by examining several variables, including land use. For instance, construction and demolition associated with industrial and testing facilities would be located in areas already designated for industrial land uses, and upgrades to administrative facilities under the Proposed Action would occur at facilities already sited outside of the 85 dBA noise contours and have been sited and designed to include appropriate AT/FP setbacks. Therefore, impacts on land use from implementation of the Proposed Action would be minor.

As described previously, Arnold AFB analyzed the capacity for future development or mission expansion during the IDP process by examining several variables, including land use. Implementation of the Proposed Action over the next five years, in conjunction with other projects that may be planned in the near future, would not change the land use at or in the vicinity of Arnold AFB. Long-term land use impacts associated with the implementation of the Proposed Action in combination with reasonably foreseeable future projects would remain negligible as described above and would not contribute substantially to long-term impacts at Arnold AFB.

4.2.2 No Action Alternative

No effects on land use would occur. Implementation of the IDP at Arnold AFB would not take place. There would be neither beneficial nor adverse effects on land use from these activities, and land use would not change when compared to existing conditions.

4.3 AIR QUALITY

Effects on air quality would be considered significant if air emissions resulting from the Proposed Action would (1) exceed the PSD major source thresholds or (2) contribute to a violation of any local, state, or federal air quality regulation.

4.3.1 Proposed Action

The Proposed Action would have short- and long-term minor adverse effects on air quality. Short-term effects would be due to the use of heavy equipment and generation of fugitive dust during construction and demolition activities. Long-term effects would be due to additional heating of facilities and the potential addition of stationary sources of air emissions, such as backup generators. The Proposed Action would not (1) exceed the PSD major source thresholds or (2) contribute to a violation of any local, state, or federal air quality regulation. The Air Conformity Applicability Model (ACAM) was used to estimate emissions resulting from the Proposed Action (**Table 4-1**). Construction and demolition emissions were estimated for fugitive dust, on- and off-road diesel equipment and vehicles, worker trips, architectural coatings, and paving off-gases. Operational emissions were estimated for changes in heated space and backup generators. Estimated annual emissions from the Proposed Action would be less than the PSD major source thresholds for all criteria pollutants; therefore, the level of effects would be minor. ACAM output files containing detailed emissions calculations are included in **Appendix C.**

Table 4-1. Annual Emissions Compared to Significance Indicators

Pollutant	Emissions (tpy)		Significance Indicator (tpy)	Exceedance (Yes or No)
	Construction	Operations		
VOC	3.7	0.3	250	No
NO_x	6.7	1.6	250	No
CO	7.5	1.2	250	No
SO_x	<0.1	0.2	250	No
PM_{10}	17.3	0.2	250	No
$PM_{2.5}$	0.3	0.2	250	No
Pb	<0.1	<0.1	25	No
CO_2e	1,696	1,016	-	-

Sources: USAF 2020a and 40 CFR 52.21

tpy – tons per year; **VOC** – volatile organic compound; **NO_x** – nitrogen oxides; **CO** – carbon monoxide; **SO_x** – sulfur oxides; **PM_{10}** – particulate matter less than 10 microns in diameter; **$PM_{2.5}$** – particulate matter less than 2.5 microns in diameter; **Pb** –lead; **CO_2e** – carbon dioxide equivalent

For purposes of analysis, it was assumed that all construction and demolition activities of all the projects would be compressed into a single 12-month period. Therefore, regardless of the ultimate implementation schedule, annual emissions would be less than those specified herein. Small changes in facilities siting and ultimate design, and moderate changes in quantity and types of equipment used would not substantially change these emission estimates, the determination under the general conformity rule, or level of effects under NEPA. Notably, the emissions for all criteria pollutants would be below the *de minimis* thresholds; therefore, the general conformity rule would not apply regardless of any changes in the attainment status of the region for any criteria pollutant.

New stationary sources of air emissions could be subject to federal and state air permitting regulations, including New Source Review, PSD, National Emission Standards for Hazardous Air Pollutants, or New Source Performance Standards. All new on-base stationary sources of air

emissions would be added to the Installation's air permit, as necessary. Permitting scenarios would vary based on the types and sizes of new stationary sources, timing of the projects, and the types of controls ultimately selected. These can differ in specific features from the ones described in this PEA. It is not anticipated that the stationary sources of air emissions at Arnold AFB would exceed the PSD major source thresholds; however, during the final design stage and the permitting process either (1) the actual equipment, controls, or operating limitations would be selected to reduce the potential to emit less than the PSD major source threshold; or (2) the PSD permitting process would require detailed dispersion modeling to ensure that any new emission sources at the base would not allow for concentrations above the NAAQS. This process is inherent to federal and state air regulations and leads to a built-in protection of air quality in attainment areas. Therefore, regardless of the ultimate equipment selected or permitting scenario, these effects would be minor.

In addition to permitting of new stationary sources of air emissions, the TDEC outlines requirements with which the USAF must comply when constructing the new facilities, such as controlling fugitive dust and open burning. All persons responsible for any operation, process, handling, transportation, or storage facility that could result in fugitive dust would take reasonable precautions to prevent such dust from becoming airborne. Reasonable precautions might include using water to control dust from building construction and demolition, road grading, or land clearing. In addition, construction and demolition would proceed in full compliance with TDEC requirements, with compliant practices or products.

Greenhouse Gases and Climate Change. This PEA examines GHGs as a category of air emissions. It also considers issues of temperature and precipitation trends to determine whether the affected environment or the proposed development would be affected by climate change. This PEA does not attempt to measure the actual incremental impacts of GHG emissions from the development at Arnold AFB. There is a lack of consensus on how to measure such impacts. Existing climate models have substantial variation in output and do not have the ability to measure the actual incremental impacts of a project on the environment. There are also no established criteria identifying monetized values that are to be considered significant for NEPA purposes. **Table 4-2** compares the estimated GHG emissions from all development combined compared to the global, nationwide, and statewide GHG emissions. The estimated increase in GHG emissions would be minute.

Table 4-2. Global, Countrywide, and Statewide Greenhouse Gas Emissions

Scale	C02e Emissions (MMT/year)	Change from the Proposed Action
Global	43,125	0.00000003%
United States	6,870	0.00001%
Tennessee	99.8	0.0009%
All Development Combined	0.00092	—

Sources: USAF 2020a and US Energy Information Administration 2016
MMT – million metric tons

Table 4-3 outlines potential climate stressors and their effects on the development at Arnold AFB. The proposed projects in and of themselves are only indirectly dependent on any of the elements associated with future climate scenarios (e.g., meteorological changes). At this time, no future climate scenario or potential climate stressor would have appreciable effects on any element of the proposed development.

Table 4-3. Effects of Potential Climate Stressors

Potential Climate Stressor	Effects on the Proposed Development
More frequent and intense heat waves	Negligible
Longer fire seasons and more severe wildfires	Negligible
Changes in precipitation patterns	Negligible
Increased drought	Negligible
Harm to water resources, agriculture, wildlife, ecosystems	Negligible

Source: NCA 2019

Short-term effects of the Proposed Action in combination with reasonably foreseeable future projects would be due to the use of heavy equipment and generation of fugitive dust during construction and demolition activities during the development projects. Long-term effects of the Proposed Action in combination with reasonably foreseeable future projects would be due to the potential addition of stationary sources of air emissions, such as backup generators at the proposed facilities. However, the Proposed Action would not (1) have emissions that would exceed the PSD major source thresholds or (2) contribute to a violation of any federal, state, or local air regulation.

By directly inventorying all emissions in nonattainment regions and monitoring concentrations of criteria pollutants in attainment regions, Tennessee takes into account the effects of all past and present emissions in the state. This structure of rules and regulations is contained in the State Implementation Plan (SIP). SIPs contain the regulations and other materials for meeting clean air standards and associated CAA requirements. SIPs include (1) USEPA-approved and state-implemented air quality regulations, (2) USEPA-approved and state-implemented pollution controls for individual sources of air emissions, and (3) planning documents such as areawide emissions estimates, modeling analyses, and regulatory requirements that ensure that the state will meet air quality standards.

The SIP process applies either specifically or indirectly to all activities in the region. No projects or proposals have been identified that, when combined with the proposed development at Arnold AFB, would threaten the attainment status of the region, would have substantial GHG emissions, or would lead to a violation of any federal, state, or local air regulation.

4.3.2 No Action Alternative

No effects on air quality would occur. Implementation of the IDP at Arnold AFB would not take place. There would be neither beneficial, nor adverse, effects on air quality from these activities, and air quality would not change when compared to existing conditions. The release of minor amounts of fugitive dust from unpaved roads and air quality effects from Arnold AFB operations would continue.

4.4 GEOLOGICAL RESOURCES

Effects on geological resources would be considered significant if implementation of the Proposed Action would (1) increase potential occurrences of erosion, siltation, or geological hazards (e.g., landslides); (2) incorporate engineering or construction techniques that do not adequately address potential geologic hazards; or (3) expose people or structures to substantial geological hazards. Generally, impacts with regard to geological resources can be avoided or minimized if proper construction techniques, erosion/siltation control measures, and structural engineering designs are incorporated into project development.

4.4.1 Proposed Action

***Geology*.** Potential impacts on geological resources associated with the Proposed Action would be limited to ground-disturbing activities occurring during demolition, road maintenance, site preparation, and new construction. Minor impacts would result from the proposed new construction and demolition projects; however, the majority of these activities would take place on previously disturbed land at Arnold AFB, which is capable of supporting such development. Additionally, ground-disturbing activities associated with the proposed projects would be localized and would not impact sensitive or regionally significant geologic or physiographic features. Therefore, impacts on geological resources at Arnold AFB as a result of the Proposed Action would be minor.

***Seismicity*.** As described in Section 3.5, seismic hazards in Middle Tennessee are relatively low. There are no known active faults underlying Arnold AFB, and consequently no known potential for fault rupture (USGS 2014). Therefore, implementation of the Proposed Action would result in negligible impacts associated with seismicity or geologic hazards.

***Topography*.** Topography across Arnold AFB is gently sloping, and there are no excessive slopes (i.e., greater than 8 percent) at the proposed project sites. Further, the proposed projects have been sited away from slopes toward water features, and the proposed project locations are generally level. The Proposed Action would not pose a substantial erosion hazard as the new construction components are largely sited in previously disturbed, graded locations. However, where erosion hazards may exist, the use of BMPs, including erosion and turbidity control structures would substantially reduce the potential for erosion and siltation. Therefore, impacts on topography resulting from implementation of the Proposed Action would be negligible.

***Soils*.** Implementation of the Proposed Action would include excavation and site preparation activities associated with construction. As described in Section 3.5, soils at Arnold AFB include the Dickson silt loam series; the Guthrie silt loam soil series; the Lawrence silt loam soils; the Lobelville silt loam soils; the Mountview silt loam soils series; the Mountview gravely silt series; the Purdy silt loam series; and the Waynesboro loam soil series. Some of these soils pose development limitations due to issues such as shrink-swell potential, flooding, and depth to saturated zone (NRCS 2013). However, buildings across the Installation have been constructed on the same soils and using similar construction techniques as would be used for all proposed new construction projects under the Proposed Action.

To minimize potential erosion, siltation, and soil compaction during new construction and road maintenance activities, BMPs would be incorporated as part of the Proposed Action, including erosion and siltation prevention measures (e.g., watering for dust suppression, use of netting and silt fencing), covering stockpiled soils and excavated areas during rains, and limiting the use of heavy equipment to the extent practicable. With implementation of these BMPs, construction and road-maintenance-related impacts on soils would be minimal and localized to the proposed project footprints. Therefore, implementation of the Proposed Action would result in short-term, minor, site-specific impacts on soils. Once the proposed facilities are operational, potential impacts on soils would be negligible. All project components would be engineered so that potential impacts resulting from erosion, siltation, and geological hazards (e.g., landslides) would be minimized. Therefore, implementation of the Proposed Action would result in negligible long-term impacts on geological resources.

Important Farmlands. All soils in the Dk, La, Lh, and Mt series are considered prime farmland; however, there are no unique farmlands present on Arnold AFB that are suitable for the production of specific high-value food and fiber crops (Arnold AFB 2020a). Therefore, implementation of the Proposed Action would have no effect on important farmlands.

Potential effects on geological resources associated with implementation of the Proposed Action would be limited to ground-disturbing activities (e.g., excavation, grading) during demolition, construction, or operational maintenance activities within developed areas of Arnold AFB. BMPs would be implemented to minimize potential erosion, siltation, and soil compaction, and any impacts would be minor and would last only for the duration of ground-disturbing activities. Implementation of the Proposed Action over the next five years, in conjunction with other reasonably foreseeable projects, would not result in long-term direct or indirect impacts on regional geology, topography, seismicity, soils, or important farmlands.

4.4.2 No Action Alternative

No effects on geologic resources would occur. Implementation of the IDP at Arnold AFB would not take place. There would be neither beneficial, nor adverse, effects on geological resources or soils from these activities, and these resources would not change when compared to existing conditions.

4.5 WATER RESOURCES

Effects on water resources would be significant if the Proposed Action would (1) reduce water availability to or interfere with the supply of existing users, (2) create or contribute to the overdraft of groundwater basins or exceed decreed annual yields of water supply sources, (3) adversely affect surface or groundwater quality, (4) threaten or damage unique hydrologic characteristics, or (5) violate established laws or regulations, including management plans adopted by Arnold AFB, that have been adopted to protect or manage water resources.

4.5.1 Proposed Action

Surface Water. Surface runoff at Arnold AFB is collected by the Woods Reservoir through Bradley, Brumalow, and Rowland creeks as well as the retention reservoir. Construction, demolition, and road maintenance activities associated with the Proposed Action could potentially temporarily increase the turbidity of surface waters at Arnold AFB due to increased airborne dust and siltation from soil erosion. However, as the majority of the soils underlying the Installation are moderately well drained and because of the considerable distance between most project sites and potential receiving waters, the majority of the demolition and grading activities associated with the Proposed Action would be expected to have minor impacts on surface waters at Arnold AFB. Additionally, the implementation of BMPs and erosion control measures described in the Arnold AFB's Stormwater Pollution Prevention Plan (SWPPP) (AEDC 2019) would further reduce impacts associated with the Proposed Action.

Since the Proposed Action would result in the disturbance or redisturbance of more than 1 ac, a NPDES Construction General Permit would be required to address stormwater discharges from construction projects. In addition to the BMPs that would be implemented under the Proposed Action, the proposed construction, demolition, and road maintenance projects would comply with the measures outlined in the NPDES permit. Further, in accordance with Section 438 of the Energy Independence and Security Act (requiring federal facility projects over 5,000 SF to maintain or restore the predevelopment hydrology of the property), low-impact development techniques would be incorporated into proposed new construction projects. Consequently,

implementation of the Proposed Action would result in only minor short-term and long-term impacts on surface waters.

Groundwater. As described in Section 3.5.2, groundwater at Arnold AFB is located within unconfined gravel and limestone aquifers, including the St. Louis, Manchester, and Fort Payne aquifers, at depths of 10 to 40 feet below the ground surface (AEDC 2013a). The Manchester aquifer is the region's primary groundwater well source and is located between the perched shallow unit of the St. Louis aquifer and the deeper Fort Payne aquifer (USGS 2002). Unconfined aquifers do not have any impermeable layers above them and are vulnerable to contamination by leaching from infiltrating precipitation. Consequently, impacts on groundwater in the vicinity of the proposed project sites could result from spills of diesel fuel or lubricants from construction equipment. However, the volume of any potential spill, while unlikely, would be small. Further, any potential spills would be the responsibility of the construction contractor and cleanup would be conducted in compliance with the Spill Prevention, Control, and Countermeasure Plan (AEDC 2019). Therefore, potential short-term impacts on groundwater would be minor.

Additionally, implementation of the Proposed Action would result in a negligible change in impervious surface area at Arnold AFB. As the Installation's boundaries encompass approximately 20,339 acres of undeveloped forestland dedicated to ecosystem management (AEDC 2013a), this minor increase in impervious area would result in negligible changes to regional groundwater recharge. Therefore, long-term impacts on groundwater would be minor.

Floodplains. While the developed portions of the installation, particularly the AEDC and the Arnold Village area, do not experience substantial flooding problems, there are areas that lie within 100-year floodplains associated with the reservoirs, tributaries, and creeks on Arnold AFB. Under the Proposed Action, one of the proposed new construction projects would occur in the floodplain (ANZY030047A at the Elk River Dam). The proposed Elk River Dam project would construct a 650-linear-foot watercraft barrier at the already existing dam. Because this project would not alter the floodplain and is a proposed project associated with water control structure protection, there would be no significant impacts on floodplains on Arnold AFB associated with the Proposed Action.

Wetlands. The majority of proposed projects included in the Proposed Action have been sited such that impacts on wetlands are limited to the maximum extent feasible. However, four projects (ANZY060075, ANZY080033, ANZY1500261, and ANZY190012) could not be sited (see **Figure 3-1**) such that their implementation would both avoid impacts on wetlands and accomplish their purpose and need. Any wetland loss could adversely affect a sensitive habitat that supports individual plants and animals, but population-level effects would be unlikely based on the size and regional context of the affected area. A Section 404 Individual Permit would be obtained pursuant to the CWA for the four projects sited in wetlands, prior to commencement of any construction activities within jurisdictional waters and potential wetlands. Mitigation would be specified in the permit requirements, and USAF would comply with all appropriate mitigation requirements included in the permit.

Reduced habitat would also occur as a result of any wetlands fill. For example, wading bird foraging area and amphibian habitat could be decreased. However, the total area of wetland habitat affected would be minor. Soil disturbance and changes to stormwater flow could result in discharge of sediments and pollutants into the surrounding wetlands, reducing water quality and value as wildlife habitat on the Installation and in downstream areas. However, the USAF would continue to implement species- and habit-specific management consideration and measures to offset potential impacts (see Section 5.0, *Management Considerations and Measures to Offset*

Potential Impacts, of the Natural Resources Report in **Appendix C**). Consequently, long-term impacts on wetlands from the Proposed Action would be less than significant.

There would be a minor increase in the impervious area at Arnold AFB from the Proposed Action and other reasonably foreseeable actions but would not significantly impact hydrology and water quality away from the Installation. The existing infrastructure for handling stormwater runoff in combination with the numerous proposed IDP project improvements would be able to accommodate the slight increase in stormwater runoff resulting from implementation of the Proposed Action. While it is conceivable that future development within Arnold AFB would exceed the ability of existing infrastructure to accommodate stormwater runoff, improvements in the stormwater infrastructure at the Installation would offset any such potential. All proposed and future development at Arnold AFB would comply with the CWA, which would preclude any direct impacts on water resources from those projects.

Further, construction, demolition, and road maintenance activities under the Proposed Action would incorporate BMPs to minimize erosion, runoff, and sedimentation, and a NPDES General Permit would be required for any construction project included in the Proposed Action that would disturb more than one acre of land. Additionally, the implementation of BMPs and erosion control measures described in the SWPPP (AEDC 2019) would further reduce impacts associated with the Proposed Action. Consequently, implementation of the Proposed Action over the next five years, in conjunction with other reasonably foreseeable projects, would result in negligible direct or indirect impacts on regional water resources.

4.5.2 No Action Alternative

No effects on water resources would occur. Implementation of the IDP at Arnold AFB would not take place. There would be neither beneficial, nor adverse, effects on water resources from these activities, and water resources would not change when compared to existing conditions. Minor amounts of sediments and runoff from unpaved roads and erosion at the Elk River Dam would continue under the No Action Alternative.

4.6 BIOLOGICAL RESOURCES

The significance criteria for effects of the Proposed Action on biological resources are based on (1) the importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource, (2) the proportion of the resource that would be affected relative to its occurrence in the region, (3) the sensitivity of the resource to the proposed activities, and (4) the duration of ecological ramifications. Effects on biological resources would be considered significant if implementation of the Proposed Action would adversely impact a threatened or endangered species, greatly diminish habitat for a plant or animal species, substantially diminish a regionally or locally important plant or animal species, interfere with wildlife movement or reproductive behavior, and/or result in an infusion of exotic plant or animal species.

4.6.1 Proposed Action

Vegetation. Most of the proposed projects would occur in developed, improved, or maintained areas. Examples of these types of areas include existing facilities and associated parking lots, landscaped or mowed parcels, and roadside shoulders. Although a relatively small number of wildlife species may occur in such areas (generally those tolerant of human presence and activity), the limited habitat value substantially decreases the biological importance of these sites. Therefore, impacts on vegetation and the associated wildlife resulting from projects located within developed or maintained areas would be minor.

Vegetation removal associated with new construction projects would represent long-term habitat loss. Trees and other vegetation may support foraging, nesting, and other behaviors for mammals, birds (including migratory birds), reptiles, and amphibians. While any habitat loss could adversely affect individual plants and animals, the amount of impacted forest, grassland, and wetland habitat is relatively small compared with similar habitat available in the vicinity, and most of the proposed project locations are in areas near current human activity. Overall, population-level effects on any species are not expected as a result of vegetation removal. To the extent practicable, Arnold AFB would schedule any tree and vegetation removal associated with the proposed projects to occur outside of times of increased migratory bird and bat activity.

Fish and Wildlife. Construction activities within or adjacent to forests, grasslands, and wetland areas could potentially result in injury, mortality, or disturbance of wildlife species. The potential for injury or mortality would result from direct strike by vehicles or construction equipment. Mobile species, such adult birds, would not be as susceptible to physical strikes, while others, such as smaller and/or less mobile species, would have greater potential to be impacted. It is not expected that substantial numbers of wildlife would be physically impacted by the Proposed Action.

In addition, most of the wildlife species expected in the project areas are locally and regionally common, and mortality or injury to a small number of individuals would not result in an overall decrease in population diversity, abundance, or fitness of any species. Fish and wildlife in the proposed project areas could also be temporarily disturbed or displaced due to increased noise and human activity associated with the proposed construction, demolition, and road maintenance projects. It is expected that these effects would be short term and would affect only animals in the immediate project areas. Affected individuals would generally be able to return to the area after completion of activities. While some individuals might avoid project sites for the long term, the affected areas are small compared with other, similar available habitat nearby.

Sensitive Species. As described in Section 3.7.3, *Sensitive Species*, three federally listed bats, the federally endangered gray bat and Indiana bat and the federally threatened northern long-eared bat, are known to occur at Arnold AFB. Removal of vegetation associated with the proposed new construction projects could result in potential direct and indirect impacts on federally listed bat species and state listed protected species. However, the USAF would consult with the USFWS on a project-by-project basis. The USFWS' 2016 Biological Opinion/Incidental Take Statement (see the Natural Resources Report in **Appendix C** for additional details) would provide a framework for mitigation and adaptive management measures that would be negotiated for each project with the potential to affect federally listed species. In addition, in accordance with Arnold AFB's INRMP (Arnold AFB 2020a), the USAF would continue to implement species and habit-specific management consideration and measures to offset potential impacts on protected species (see Section 5.0, *Management Considerations and Measures to Offset Potential Impacts*, of the Natural Resources Report in **Appendix C**). Further, operational procedures outlined in the Woods Dam Reservoir Management Plan for the protection of gray bats (see Section 3.1.1.1 of the Natural Resources Report in **Appendix C**) would continue to be implemented. Consequently, impacts on federally listed bat species and state-listed protected species from the Proposed Action would be less than significant.

Construction activities would result in localized impacts to vegetation and wildlife due to demolition and construction activities, including, excavation, grading, and site preparation. Minor removal of trees associated with the some of the proposed construction projects could

potentially reduce habitat for federally listed bat species. Additionally, demolition activities could have potential impacts on roosting habitat for gray bat and northern long-eared bat. As such, the Proposed Action would have minor reasonably foreseeable effects on federally listed bats. Arnold AFB would consult with the USFWS under the existing BO for projects that have the potential to affect habitat for federally listed bat species. Arnold AFB would incorporate all existing requirements and recommendations (which are included in the Natural Resources Report in **Appendix C** of this PEA) and any new requirements and recommendations provided by the USFWS.

4.6.2 No Action Alternative

No effects on biological resources would occur. Implementation of the IDP at Arnold AFB would not take place. There would be neither beneficial nor adverse effects on vegetation, fish and wildlife, or sensitive species, and these resources would not change when compared to existing conditions.

4.7 CULTURAL RESOURCES

The NEPA process requires that effects to the environment from federal actions be considered. Under NEPA, effects include impacts to cultural and historic resources. Similarly, Section 106 (54 U.S.C. 306108) of the NHPA requires that federal agencies take into account the effects of proposed undertakings on any historic properties. In addition, Section 111 of the NHPA requires Federal agencies to the extent practicable, establish and implement alternatives (including adaptive use) for historic property that is not needed for current or projected agency purposes. At Arnold AFB, the procedures for assessing the impacts of proposed projects on historic properties and mitigation of any adverse effects to those properties are managed through the *Programmatic Agreement (PA) between Arnold Engineering Development Complex, Arnold Air Force Base and the Tennessee State Historic Preservation Officer Regarding Management of Historic Properties at Arnold Air Force Base, Tennessee Pursuant to 36 CFR Part 800.14* negotiated in 2014 and remaining in effect until 2024. The PA establishes alternative procedures to implement Section 106. The PA defines which projects are exempt from review; defines effect determinations for “no effect,” “no adverse effect,” and “adverse effect”; stipulates documentation for each effect determination; and details mitigation treatments for adverse effects and standardized treatments for demolitions.

4.7.1 Proposed Action

The Proposed Action includes implementation of 357 individual projects at Arnold AFB. The analysis of the potential for individual projects to affect historic properties was conducted in accordance with the 2014 PA This analysis is presented in greater detail in the Cultural Resources Report in **Appendix C**. The stipulations of the 2014 PA establish the standards, the process for effects determinations, and the treatment of all historic properties affected by the proposed 357 projects. All effects determinations, including adverse effects to historic properties, would be mitigated through the provisions of the executed PA. The results of the effects analysis for individual proposed projects are presented in **Appendix C.** A summary of the analysis from the report is provided below.

Nonhistoric Properties. The four archaeological sites located within the proposed project footprints have been determined not eligible for listing in the NRHP. The four sites are 40CF293 (Cochrane et al. 2006), 40CF334 (Wampler et al. 2010), 40FR502, and 40CF310 (Wampler et al. 2010; Schenker et al. 2010). No previously documented Traditional Cultural Properties are located near the individual proposed projects. A total of 42 projects are planned for nonhistoric

buildings located in nonhistoric areas of the Installation. Projects planned for these nonhistoric resources were eliminated from further analysis in accordance with the 2014 PA Stipulation IV.E.3.

***Exempted and Mission Critical Projects*.** Stipulation II of the 2014 PA identifies two categories of projects exempted from further review: projects in the exempted work categories outlined in Appendix B of the PA and mission critical projects. A total of 103 projects are exempt from further review based on Appendix B of the PA. The majority of the exempted projects fall under the category *Structural elements, support systems, and heavy equipment*. Fifty-seven projects are exempted under Appendix B.1.b - *Installation, maintenance, repair, or replacement of ancillary systems or components.* This subcategory includes installation and repair of HVAC, electrical systems, fire alarm and suppression systems, security alarm systems, and lighting systems. Projects identified as limited to HVAC, plumbing, fire suppression, and lighting systems qualify as exempt from further review. Nineteen exempted projects qualify under Appendix B.1.a - *Maintenance, repair, or replacement of doors, windows, gutters, down spouts, flashing, roofing, siding, foundation, and entryways when done in kind to match existing materials and design.* These proposed projects would maintain the historical integrity of the buildings' design and materials. Six exterior painting projects are classified as exempt under Appendix B.2.a with the condition that new paint will match the existing or original color and that abrasive methods of cleaning would be avoided.

Arnold AFB has classified 70 projects as mission critical. Of those, 47 projects are planned for historic properties, while seven projects are planned for nonhistoric properties in historic districts. The remaining 16 mission critical projects are planned for nonhistoric properties. Mission critical projects require no further review by the Tennessee SHPO, but historic properties need to be documented prior to the start of each project. Documentation requirements are detailed in Stipulations II.C and VIII of the PA and comprise photographs and historical information, such as documents and diagrams. This documentation will "serve as sufficient record of changes to these historic properties as well as sufficient mitigation of any project-related adverse effects."

***Historic Properties*.** The remaining 142 proposed projects are planned for historic properties. These projects were analyzed according to the three possible effects determinations defined in Stipulation V of the 2014 PA. The effects determinations are "no historic properties affected" (Stipulation V.A.1), "no adverse effect" (Stipulation V.A.2), and "adverse effect" (Stipulation V.A.3). The PA details reporting requirements for each effect determination, as well as standardized treatments for addressing adverse effects (Stipulation VI), including the demolition of historic properties and the addition of new construction in the historic district or historic landscapes (Stipulation VII).

***Determination of No Historic Properties Affected*.** A total of 77 projects meet the requirements for a "no historic properties affected" determination applying the PA. Stipulation V.A.1 defines the finding of "no historic properties affected" as (1) no historic properties are located within the undertaking's APE or (2) the undertaking will have no effect on identified historic properties within the project APE.

Twenty projects are planned for noncontributing buildings within the boundaries of the historic district and/or historic landscapes. These projects are confined primarily to interior work, systems maintenance, and building envelopes and will result in no effects to historic properties.

Projects proposed for noncontributing elements to historic districts include window and door replacements, and envelope insulation. No effects on historic properties are anticipated since these projects will not impact the architectural character of the historic areas.

Fifty-seven projects are proposed for nonhistoric buildings that are located adjacent to individual historic properties, adjacent to the boundaries of the Arnold AFB Test Facility Historic District, or adjacent to the two historic landscapes identified on the Installation. These projects were reviewed to extrapolate possible effects to the adjacent historic properties. The results of the analysis indicated these projects had no potential to affect nearby historic properties.

Determination of No Adverse Effect. Stipulation V.A.2 of the 2014 PA states that a finding of "no adverse effect" is appropriate when a project will not alter the characteristics of a historic property "that qualify the property for inclusion in the NRHP in a manner that would diminish its integrity of location, design, setting, materials, workmanship, feeling, or association" (36 CFR 800.5(a)(1), (b)).

Sixty-four proposed projects would result in "no adverse effects" on historic properties. Examples of such projects include interior work in historic buildings where interior elements are not significant character-defining features as documented in the 2014 Cold War Report (Prybylski et al. 2014: Vol. 2), changes to exterior roofing cladding on flat roofs where the existing roof profile will not be altered, and minor alterations to buildings, such as small awnings and the installation of removable roofs over equipment. Other complex projects also are classified as "no adverse effect" provided that that the historic character of the buildings are maintained in accordance with the Secretary of the Interior Standards for Rehabilitation with concurrence by the Tennessee SHPO.

Determination of Adverse Effect. The 2014 PA defines an adverse effect on historic properties in accordance with the Federal regulations governing Section 106 compliance - 36 CFR 800.5(a) (Stipulation V.A.3). Adverse effects occur when a project alters, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP in a manner that diminishes the integrity of the property's location, design, setting, materials, workmanship, feeling, or association (36 CFR 800.5(a)). Examples of adverse effects include physical destruction of or damage to a property, alterations that affect character-defining features, and/or changes of the character of a property's use or of physical features within the property's setting. Projects involving demolition of historic properties, major new construction within a historic district or the historic landscapes, new additions to historic and nonhistoric buildings located within a historic district or historic landscapes, and substantial alterations to historic properties generally are classified as adverse effects.

One proposed project meets the criteria for an adverse effect. Project ANZY139052 is planned for Building 721, a historic property in the Arnold AFB Test Facility Historic District. Building 721 is a one-story metal building with a shallow gable metal roof. In its current configuration, the building does allow use of the top coils of the existing C reactors it contains. This project proposes either extensive roof alterations or building demolition, dependent upon further investigation and project development, to allow operation of the C reactors to meet current and future mission needs. Mitigation for this project will be completed in accordance with the PA either under Stipulation V.A.3, which requires a Decision Full Report to the Tennessee SHPO, or under Stipulation VII that establishes standardized treatment measures for the demolition of

historic properties. Therefore, the adverse effect of this project would be mitigated in accordance with the 2014 PA.

The Proposed Action would have no effect on cultural resources at Arnold AFB when the projects are completed in accordance with the 2014 PA. The 2014 PA was negotiated to streamline the Section 106 consultation process and contains comprehensive provisions for the management of historic properties. The proposed 357 IDP projects are covered by the terms and conditions of 2014 PA. Implementation of the PA demonstrates that Arnold AFB has taken historic properties into account and has satisfied NHPA Section 106 responsibilities for the 357 individual projects proposed as part of the Proposed Action.

A comprehensive inventory and evaluation of historic properties has been completed at Arnold AFB. The results of these investigations, including determinations of NRHP eligibility, were reviewed and accepted by the Tennessee Historical Commission in its role as the Tennessee SHPO. Historic properties at Arnold AFB comprise five individual historic buildings and 80 contributing buildings within Arnold AFB Test Facility Historic District, the Test Utilities Historic Landscape, and the Elk River Dam-Woods Reservoir Historic Landscape. Numerous archaeological surveys conducted at Arnold AFB have identified 14 sites determined eligible for NRHP listing and 18 sites as potentially eligible for the NRHP.

There would be no reasonably foreseeable effects on cultural resources from the Proposed Action in combination with other proposed projects. Historic properties at Arnold AFB are managed in accordance with the provisions of the 2014 PA, which applies best preservation practices within the mission of the AFB. The stipulations of the 2014 PA establish the standards, process for effects determination, and treatment of all historic properties affected by the proposed 357 projects proposed in the IDP as well as other reasonably foreseeable projects. All effects determinations, including potential adverse effects on historic properties, would be mitigated through the provisions of the executed agreement.

4.7.2 No Action Alternative

No effects on cultural resources would occur. Implementation of the IDP at Arnold AFB would not take place. There would be neither beneficial nor adverse effects on cultural resources or historic properties from these activities, and these resources would not change when compared to existing conditions.

4.8 HAZARDOUS MATERIALS AND WASTES

Numerous local, state, and federal laws regulate the storage, handling, disposal, and transportation of hazardous materials and wastes, with the purpose of protecting public health and the environment. The severity of potential impacts associated with hazardous substances is based on their toxicity, ignitability, and corrosivity. Impacts associated with hazardous materials and wastes would be considered significant if the storage, use, transportation, or disposal of hazardous substances substantially increases the human health risk or environmental exposure. Impacts on identified ERP sites would be considered significant if the Proposed Action disturbed or created contaminated sites would result in adverse effects on human health or the environment.

4.8.1 Proposed Action

Hazardous Materials and Waste Storage and Generation. The use and storage of minor amounts of hazardous materials related to the proposed construction and road maintenance activities would increase temporarily during implementation of the Proposed Action. Any

hazardous materials used or hazardous wastes generated as a result of implementation of the Proposed Action would be accumulated and removed in compliance with the procedures included in the Installation's existing Hazardous Materials Management Plan (Arnold AFB 2020b). Therefore, short-term construction-related impacts associated with hazardous materials and wastes would be negligible.

Operationally, implementation of the Proposed Action would not be expected to result in any substantial changes in storage of hazardous materials at Arnold AFB. A minor increase in storage of hazardous materials and production of hazardous waste may occur as a result of Proposed Action, particularly the proposed new nitrogen conversion facility (ANZY119050), the proposed Petroleum Operations/Fuels Lab Facility (ANZY020049), and the proposed ethylene glycol storage facility for C-Airside (ANZY189067). However, these proposed projects would only represent a small portion of the hazardous materials and wastes generated at Arnold AFB. The Installation would continue to operate and be regulated as a large-quantity generator. Consequently, the Proposed Action would result in minor impacts on hazardous materials and waste generation and storage at Arnold AFB.

Asbestos. Collectively, the proposed demolition projects included in the Proposed Action would remove an estimated 76,650 SF (1.76 ac) of facilities over the next five FYs. Most of the facilities at Arnold AFB, including the facilities proposed for demolition, are expected to have building materials that include ACM. The removal of asbestos from buildings basewide (Project ANZY9901154) is also included in the Proposed Action and would constitute a minor beneficial impact at Arnold AFB. Prior to demolition, facilities would be examined for ACM, and all potential ACM in the buildings proposed for demolition under the Proposed Action would be handled and disposed of according to the Installation's Asbestos Management Plan as well as in compliance with all applicable federal, state, and local regulations. Additionally, appropriate BMPs would be followed during all demolition activities (e.g., trained workers, personal protective equipment, medical surveillance, recordkeeping). Therefore, impacts associated with asbestos would be minor under implementation of the Proposed Action. Further, removal of ACM would constitute a minor beneficial impact at Arnold AFB.

Lead-based Paint. Most of the facilities at Arnold AFB, including the facilities proposed for demolition and revocation, are expected to have building materials that include lead-based paint. When demolition and renovations are done to existing facilities, including the replacement of paint, the USAF would do so in accordance with all appropriate regulations, BMPs, and Department of Housing and Urban Development standards.

Environmental Restoration Program. As described in Section 3.9.1, the majority of the ERP sites at Arnold AFB are in a long-term operation/long-term monitoring phase. These sites cover a large portion of land at Arnold AFB, and many projects under the Proposed Action would be sited within or adjacent to one or more of these sites (see **Figure 3-3**). However, all of the ERP sites are in the long-term operation/long-term monitoring phase and are no longer undergoing active restoration measures. Because these sites are relatively large and the projects proposed within the sites would not cover the sites entirely and would in most cases include minor renovation of upgrades to existing facilities and infrastructure, the Proposed Action would not likely interfere with the long-term monitoring of ERP sites at Arnold AFB.

The use and storage of minor amounts of hazardous materials related to the proposed construction activities would increase temporarily during the construction phases of the Proposed Action. However, operationally, implementation of the Proposed Action along with other reasonably foreseeable actions would not be expected to result in any substantial changes in storage or generation of hazardous materials at Arnold AFB. All ACM and lead-

based paint from the Proposed Action and generated from other reasonably foreseeable projects would be disposed of according to the installation Asbestos Management Plan as well as in compliance with all applicable federal, state, and local regulations. Implementation of appropriate BMPs would further limit potential reasonably foreseeable direct and indirect impacts associated with hazardous materials, which are anticipated to be minor.

4.8.2 No Action Alternative

No effects on hazardous materials and wastes would occur. Implementation of the IDP at Arnold AFB would not take place. There would be neither beneficial nor adverse effects regarding hazardous materials and wastes, and these resources would not change when compared to existing conditions. However, the removal of asbestos from buildings basewide would not occur under the No Action Alternative.

4.9 TRANSPORTATION AND TRAFFIC

Potential impacts to transportation and traffic are assessed with respect to (1) anticipated disruption or improvement of current transportation patterns and systems, (2) deterioration or improvement of existing levels of service, and (3) changes in existing levels of transportation safety. Beneficial or adverse impacts may arise from physical changes to circulation (e.g., closing, rerouting, or creating roads), construction activity, introduction of construction-related traffic on local roads, or changes in daily or peak-hour traffic volumes created by Installation workforce and population changes. Adverse impacts on roadway capacities would be considered significant if roads with no history of exceeding capacity were forced to operate at or above their full design capacity.

4.9.1 Proposed Action

The Proposed Action would have short-term minor adverse effects and long-term moderate beneficial effects on transportation and traffic. Short-term effects would result from construction vehicles, and small changes in localized traffic patterns due to the construction and demolition projects. Long-term beneficial effects would result from upgrades at Gate 2 and the roadway maintenance projects included in the IDP. Effects on transportation and traffic would primarily be confined to on-base areas but would have short-term negligible adverse effects on off-base traffic. These effects would be from incremental increases in the number of vehicles accessing Arnold AFB in support of the demolition and construction activities.

The construction and demolition activities would require use of personal operating vehicles and delivery trucks to and from the sites. Construction traffic would compose a small percentage of the total existing traffic both on and off the Installation and would occur at various times and various locations throughout Arnold AFB over a five-year period. Road closures or detours to accommodate utility system work would be expected in some on-base areas, creating short-term traffic delays. These effects would be primarily confined to on-base areas, temporary in nature, and would end with the construction phase.

There would be an incremental increase in off-base traffic from worker commutes and delivery trucks in support of the on-base demolition and construction activities. The local roadway infrastructure would be sufficient to support this limited increase in construction vehicle traffic, and there would be no perceptible change in off-base traffic conditions when compared to existing conditions. These effects would be minor. Although the effects would be minor, the following measures would be implemented: all demolition and construction vehicles would be equipped with backing alarms, two-way radios, and slow-moving-vehicle signs, when

appropriate; demolition and construction traffic would be routed and scheduled to minimize conflicts with other traffic; and staging areas would be located to minimize traffic impacts. The Proposed Action would not introduce long-term increases in personnel or traffic at the base. There would be no new permanent ongoing sources of congestion; therefore, no long-term changes in traffic would occur. The improvements at Gate 2 (Project 9: ANZY180017) and the roadway maintenance activities would have long-term moderate beneficial effects to on-base transportation infrastructure and traffic.

The Proposed Action in combination with other reasonably foreseeable projects would have long-term moderate beneficial effects on transportation and traffic. These effects would result from upgrades at Gate 2 (ANZY180017) and the roadway maintenance projects included in the IDP. The size and scope of the changes in the transportation systems associated with the Proposed Action would be extremely small when compared to other reasonably foreseeable planned transportation related projects in the area. No projects or proposals have been identified that, when combined with the proposed development at Arnold AFB, would have greater than significant effects to transportation and traffic.

4.9.2 No Action Alternative

No effects on transportation and traffic would occur. Implementation of the IDP at Arnold AFB would not take place. There would be neither beneficial, nor adverse, effects on transportation or traffic from these activities, and transportation and traffic would not change when compared to existing conditions. However, traffic congestion at Gate 2 would continue under the No Action Alternative.

4.10 UTILITY INFRASTRUCTURE

Effects on utility infrastructure would be significant if the Proposed Action would (1) reduce the utilities availability to or interfere with the supply of existing users, (2) create or contribute to exceedance of capacity of the current supply sources, or (3) permanently damage or eliminate currently available utilities at Arnold AFB.

4.10.1 Proposed Action

***Utilities*.** The proposed demolition, construction, and road maintenance projects included in the Proposed Action would cause temporary impacts on utilities. Utilities would be interrupted temporarily on various portions of Arnold AFB during the proposed demolition, construction, and road maintenance activities; however, the Proposed Action would not introduce long-term increases or disruptions in utility use on base. There would be no new permanent ongoing utility users, and the capacity of utilities on the Installation would not be exceeded with implementation of the Proposed Action; therefore, no long-term changes in utilities would occur. Further, 123 projects are proposed which would upgrade utilities on base and would have long-term moderate beneficial effects.

***Public Water Systems*.** The proposed demolition, construction, road maintenance, and utility upgrade projects included in the Proposed Action would cause temporary impacts on the public water systems on base. The current water system would be interrupted temporarily on various portions of Arnold AFB during the proposed demolition, construction, road maintenance, and utility upgrade activities; however, the Proposed Action would not introduce long-term increases or disruptions in water use or availability on base. There would be no new permanent ongoing water users, and the capacity of the water system on the Installation would not be exceeded

with implementation of the Proposed Action; therefore, no negative long-term changes in the public water system would occur. Instead, numerous projects are proposed which would upgrade existing water lines on base and would have long-term moderate beneficial effects.

Cooling Water System. The proposed demolition, construction, road maintenance, and utility upgrade projects included in the Proposed Action would cause temporary impacts on the cooling water system on base. The current cooling water system would be interrupted temporarily on various portions of Arnold AFB during the proposed demolition, construction, road maintenance, and utility upgrade activities; however, the Proposed Action would not introduce long-term increases or disruptions in cooling water use or availability on base. There would be no new permanent ongoing cooling water system users, and the capacity of the water system on the Installation would not be exceeded with implementation of the Proposed Action; therefore, no negative long-term changes in the cooling water system would occur. Instead, numerous projects are proposed which would upgrade the existing cooling water system on base to meet current and future mission needs and would have long-term moderate beneficial effects.

Sanitary Sewer System. The proposed demolition, construction, road maintenance, and utility upgrade projects included in the Proposed Action would cause temporary impacts on the sanitary sewer water system on base. The current sewer water system would be interrupted temporarily on various portions of Arnold AFB during the proposed demolition, construction, road maintenance, and utility upgrade activities; however, the Proposed Action would not introduce long-term increases or disruptions in sanitary sewer system use on base. There would be no new permanent ongoing sanitary sewer system users, and the capacity of the sanitary sewer system on the Installation would not be exceeded with implementation of the Proposed Action; therefore, no negative long-term changes in the sanitary sewer system would occur. Instead, projects are proposed which would upgrade the existing sanitary sewer system on base to meet current and future mission needs and would have long-term moderate beneficial effects.

Stormwater Drainage System. The proposed demolition, construction, and road maintenance, projects included in the Proposed Action would cause temporary impacts on the stormwater drainage system on base. The current sewer water system consists of 150 sump pumps, 20 miles of underground mains, and 19 miles of open ditches and conveys water. Implementation of the Proposed Action would increase the area of impervious surfaces on base; however, implementation of BMPs and erosion control measures described in the Arnold AFB's SWPPP would further reduce stormwater drainage impacts associated with the Proposed Action. Since the Proposed Action would result in the disturbance or redisturbance of more than 1 acre, a NPDES Construction General Permit would be required to address stormwater discharges from construction projects. In addition to the BMPs that would be implemented under the Proposed Action, the proposed construction, demolition, and road maintenance projects would comply with the measures outlined in the NPDES permit. Further, the capacity of the stormwater drainage system on the Installation would not be exceeded with implementation of the Proposed Action; therefore, no long-term changes would occur.

Natural Gas System. The proposed demolition, construction, road maintenance, and utility upgrade projects included in the Proposed Action would cause temporary impacts on the natural gas system on base. The current natural gas system would be interrupted temporarily during replacement of the current steam-using equipment in Facilities 2124, 2123, 2132, and 563 with natural gas and hot-water equipment; however, the Proposed Action would not introduce long-

term increases or disruptions in natural gas system use on base. Therefore, no negative long-term changes in the natural gas system would occur. Instead, an approximately 20 percent efficiency gain in the use of the natural gas for Facilities 2124, 2123, 2132, and 563 would result from implementation of the Proposed Action, which would have long-term moderate beneficial effects.

***Electrical Distribution System*.** The proposed demolition, construction, road maintenance, and utility upgrade projects included in the Proposed Action would cause temporary impacts on the electrical distribution system on base. The current electrical distribution system would be interrupted temporarily on various portions of Arnold AFB during the proposed demolition, construction, road maintenance, and utility upgrade activities; however, the Proposed Action would not introduce long-term increases or disruptions in electrical use or availability on base. There would be no new permanent ongoing electrical users, and the capacity of the electrical distribution system on the Installation would not be exceeded with implementation of the Proposed Action; therefore, no negative long-term changes in the public water system would occur. Instead, numerous projects are proposed which would upgrade existing electrical systems at facilities throughout the base and would have long-term moderate beneficial effects.

***Steam System*.** The proposed demolition, construction, road maintenance, and utility upgrade projects included in the Proposed Action would cause temporary impacts on the steam system on base. The current steam system would be interrupted temporarily during the various proposed projects that would repair deficiencies and modernize the current steam distribution system on base; however, the Proposed Action would not introduce long-term increases or disruptions in stem system use on base. Therefore, no negative long-term changes in the natural gas system would occur. Instead, numerous projects are proposed which would upgrade the existing steam system on base to meet current and future mission needs and would have long-term moderate beneficial effects.

***Solid Waste System*.** The proposed demolition, construction, road maintenance, and utility upgrade projects included in the Proposed Action would cause temporary impacts on the solid waste system on base; however, Arnold AFB maintains active permitted construction and demolition landfills. The capacity is more than sufficient for disposal of the debris that would be generated by the proposed demolition, construction, road maintenance, and utility upgrade projects. Therefore, no negative long-term changes in the solid waste system would occur. Overall, there would be no new permanent ongoing utility users, and the capacity of utilities at Arnold AFB would not be exceeded nor would utility use affect the regional utility infrastructure or users due to reasonably foreseeable projects. Implementation of the Proposed Action includes 123 utility projects over the next five years, which in conjunction with other projects that may be planned in the near future, could result in long-term moderate beneficial effects to the utility infrastructure.

4.10.2 No Action Alternative

No effects on utility infrastructure would occur. Implementation of the IDP at Arnold AFB would not take place. There would be neither beneficial, nor adverse, effects on utility infrastructure from these activities, and utilities would not change when compared to existing conditions. However, current utility infrastructure deficiencies would not be addressed, and the USAF would continue to operate using its antiquated and out-of-date utility infrastructure.

4.11 SAFETY

As described in Section 3.11.1, development is either restricted or altogether prohibited within ESQD arcs in order to maintain safety of personnel and to minimize the potential for damage to other facilities in the event of an accident. DoD has also developed AT/FP standards, which are designed to reduce the likelihood of mass casualties from potential terrorist attacks. If implementation of the Proposed Action would result in incompatible with established safety criteria such as ESQD arcs or AT/FP setbacks, impacts would be considered to be significant.

4.11.1 Proposed Action

***Explosives Safety*.** Implementation of the Proposed Action would have no impacts on the quantity of explosives stored on Arnold AFB, and ESQD arcs would remain as described in Section 3.11.1. Further, no new facilities would be placed within these arcs. Additionally, several proposed IDP projects were chosen for implementation because they would have beneficial impacts on explosives safety. Therefore, implementation of the Proposed Action would result in minor beneficial impacts on explosives safety.

***Antiterrorism/Force Protection*.** Under the Proposed Action, all of the proposed IDP projects would follow AT/FP guidelines. The design and siting of the proposed facilities has been conducted in consultation with the Arnold AFB Security Forces Office in order to ensure that they are designed with appropriate AT/FP setbacks. Further, the upgrade of infrastructure and existing facilities would improve safety and security at Arnold AFB. Therefore, the Proposed Action would result in moderate beneficial impacts associated with AT/FP.

The identification of planning constraints at Arnold AFB integrated a multitude of considerations, including operational safety requirements. The Proposed Action would remedy numerous safety risks associated with unused, outdated, unimproved, and space-limited existing infrastructure, as well as safety issues posed by the current conditions of the existing infrastructure. For example, all proposed road maintenance projects would increase vehicle safety and the stability of the road. Overall, implementation of the Proposed Action over the next five years, in conjunction with other reasonably foreseeable projects, would result in moderate beneficial direct and indirect impacts on regional safety.

4.11.2 No Action Alternative

Safety would be unaffected at Arnold AFB. Implementation of the IDP at Arnold AFB would not take place. There would be neither beneficial nor adverse effects on safety, and ESQD arcs and AT/FP setbacks would not change when compared to existing conditions. However, current health, safety, and force protection concerns would not be addressed, and the USAF would continue to assume the increased risk of operating under noncompliant conditions.

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5.0 LIST OF PREPARERS

This PEA has been prepared under the direction of the USAF Civil Engineer Center, USAF, Arnold AFB, and AEDC. The individuals who contributed to the preparation of this PEA are listed below.

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APPENDIX A

Agency Correspondence

FORMAT PAGE

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT COMPLEX (AFMC)
ARNOLD AIR FORCE BASE TENNESSEE

24 November 2020

Colonel Jeffrey T. Geraghty
Commander
Arnold Engineering Development Complex
100 Kindel Drive, Suite A-303
Arnold AFB TN 37389

Governor Edwina Butler-Wolfe
Absentee Shawnee Tribe of Oklahoma
2025 S. Gordon Cooper Dr.
Shawnee OK 74801

Dear Governor Butler-Wolfe

Arnold Air Force Base (Arnold AFB) is preparing an Environmental Assessment (EA) under the National Environmental Policy Act to evaluate potential environmental impacts associated with Installation Development at Arnold AFB, TN. Per Section 306108 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800, Arnold AFB is accounting for various environmental concerns and engaging early with tribal governments as it formulates the undertaking.

As part of the proposed undertaking, Installation Development includes implementing a range of 360 selected projects, such as demolition of aging facilities, new facility construction, facility upgrades, facility repair and renovation, utilities upgrades, and infrastructure improvement, including road maintenance, that are projected to be funded during the next 5 years (from fiscal year [FY] 2021 to FY 2026). The draft Project Area Maps and Project List are attached, with the NHPA eligible facilities highlighted in yellow. Further details and environmental analysis will be provided as the Environmental Assessment development progresses. The purpose of the proposed undertaking is to support Arnold AFB and Arnold Engineering and Development Complex (AEDC) mission requirements by improving the facilities, infrastructure, and utilities for current and future use through Installation Development. The need for Installation Development at Arnold AFB is to improve and update facilities and infrastructure so that they are adequate to meet technologically advanced and specialized aerospace testing and flight simulation requirements.

In accordance with the NHPA, Arnold AFB would like to initiate government-to-government consultation regarding Installation Development. Arnold AFB requests your input in identifying any issues or areas of concern you feel should be addressed in the environmental analysis. Additionally, please let us know if you believe this undertaking might adversely affect any historic properties of religious and cultural significance to the Absentee Shawnee Tribe of Oklahoma.

If you have any questions, please contact Shannon Allen, Cultural Resources Manager and Installation Tribal Relations Officer at 931-454-5466; shannon.allen.1@us.af.mil; or 100 Kindel Drive, Arnold AFB, TN 37389. Thank you in advance for your assistance in this effort.

Sincerely

JEFFREY T. GERAGHTY, Colonel, USAF
Commander

Attachments:
Draft Project Maps
Draft Project List

cc:
AEDC/TSDCI (Shannon Allen)
FSS (Shawn Chapman)

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT COMPLEX (AFMC)
ARNOLD AIR FORCE BASE TENNESSEE

24 November 2020

Colonel Jeffrey T. Geraghty
Commander
Arnold Engineering Development Complex
100 Kindel Drive, Suite A-303
Arnold AFB TN 37389

First Chief Herbert Johnson Sr.
Alabama-Coushatta Tribe of Texas
571 State Park Road 56
Livingston TX 77351

Dear First Chief Johnson

Arnold Air Force Base (Arnold AFB) is preparing an Environmental Assessment (EA) under the National Environmental Policy Act to evaluate potential environmental impacts associated with Installation Development at Arnold AFB, TN. Per Section 306108 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800, Arnold AFB is accounting for various environmental concerns and engaging early with tribal governments as it formulates the undertaking.

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If you have any questions, please contact Shannon Allen, Cultural Resources Manager and Installation Tribal Relations Officer at 931-454-5466; shannon.allen.1@us.af.mil; or 100 Kindel Drive, Arnold AFB, TN 37389. Thank you in advance for your assistance in this effort.

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JEFFREY T. GERAGHTY, Colonel, USAF
Commander

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Draft Project List

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FSS (Shawn Chapman)

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT COMPLEX (AFMC)
ARNOLD AIR FORCE BASE TENNESSEE

24 November 2020

Colonel Jeffrey T. Geraghty
Commander
Arnold Engineering Development Complex
100 Kindel Drive, Suite A-303
Arnold AFB TN 37389

Chief Nelson Harjo
Alabama-Quassarte Tribal Town
P. O. Box 187
Wetumka OK 74883

Dear Chief Harjo

Arnold Air Force Base (Arnold AFB) is preparing an Environmental Assessment (EA) under the National Environmental Policy Act to evaluate potential environmental impacts associated with Installation Development at Arnold AFB, TN. Per Section 306108 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800, Arnold AFB is accounting for various environmental concerns and engaging early with tribal governments as it formulates the undertaking.

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If you have any questions, please contact Shannon Allen, Cultural Resources Manager and Installation Tribal Relations Officer at 931-454-5466; shannon.allen.1@us.af.mil; or 100 Kindel Drive, Arnold AFB, TN 37389. Thank you in advance for your assistance in this effort.

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JEFFREY T. GERAGHTY, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT COMPLEX (AFMC)
ARNOLD AIR FORCE BASE TENNESSEE

24 November 2020

Colonel Jeffrey T. Geraghty
Commander
Arnold Engineering Development Complex
100 Kindel Drive, Suite A-303
Arnold AFB TN 37389

Chief Chuck Hoskin Jr.
Cherokee Nation
P. O. Box 948
Tahlequah OK 74465-0948

Dear Chief Hoskin

Arnold Air Force Base (Arnold AFB) is preparing an Environmental Assessment (EA) under the National Environmental Policy Act to evaluate potential environmental impacts associated with Installation Development at Arnold AFB, TN. Per Section 306108 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800, Arnold AFB is accounting for various environmental concerns and engaging early with tribal governments as it formulates the undertaking.

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If you have any questions, please contact Shannon Allen, Cultural Resources Manager and Installation Tribal Relations Officer at 931-454-5466; shannon.allen.1@us.af.mil; or 100 Kindel Drive, Arnold AFB, TN 37389. Thank you in advance for your assistance in this effort.

Sincerely

JEFFREY T. GERAGHTY, Colonel, USAF
Commander

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FSS (Shawn Chapman)

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT COMPLEX (AFMC)
ARNOLD AIR FORCE BASE TENNESSEE

24 November 2020

Colonel Jeffrey T. Geraghty
Commander
Arnold Engineering Development Complex
100 Kindel Drive, Suite A-303
Arnold AFB TN 37389

Governor Bill Anoatubby
Chickasaw Nation
P. O. Box 1548
Ada OK 74821-1548

Dear Governor Anoatubby

Arnold Air Force Base (Arnold AFB) is preparing an Environmental Assessment (EA) under the National Environmental Policy Act to evaluate potential environmental impacts associated with Installation Development at Arnold AFB, TN. Per Section 306108 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800, Arnold AFB is accounting for various environmental concerns and engaging early with tribal governments as it formulates the undertaking.

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If you have any questions, please contact Shannon Allen, Cultural Resources Manager and Installation Tribal Relations Officer at 931-454-5466; shannon.allen.1@us.af.mil; or 100 Kindel Drive, Arnold AFB, TN 37389. Thank you in advance for your assistance in this effort.

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JEFFREY T. GERAGHTY, Colonel, USAF
Commander

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT COMPLEX (AFMC)
ARNOLD AIR FORCE BASE TENNESSEE

24 November 2020

Colonel Jeffrey T. Geraghty
Commander
Arnold Engineering Development Complex
100 Kindel Drive, Suite A-303
Arnold AFB TN 37389

Chairman David Sickey
Coushatta Tribe of Louisiana
1940 C C Bel Rd.
Elton LA 70532

Dear Chairman Sickey

Arnold Air Force Base (Arnold AFB) is preparing an Environmental Assessment (EA) under the National Environmental Policy Act to evaluate potential environmental impacts associated with Installation Development at Arnold AFB, TN. Per Section 306108 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800, Arnold AFB is accounting for various environmental concerns and engaging early with tribal governments as it formulates the undertaking.

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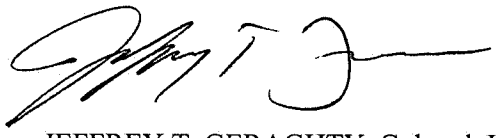
If you have any questions, please contact Shannon Allen, Cultural Resources Manager and Installation Tribal Relations Officer at 931-454-5466; shannon.allen.1@us.af.mil; or 100 Kindel Drive, Arnold AFB, TN 37389. Thank you in advance for your assistance in this effort.

Sincerely



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Commander

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ARNOLD AIR FORCE BASE TENNESSEE

24 November 2020

Colonel Jeffrey T. Geraghty
Commander
Arnold Engineering Development Complex
100 Kindel Drive, Suite A-303
Arnold AFB TN 37389

Chief Glenna Wallace
Eastern Shawnee Tribe of Oklahoma
P. O. Box 350
Seneca MO 64865

Dear Governor Wallace

Arnold Air Force Base (Arnold AFB) is preparing an Environmental Assessment (EA) under the National Environmental Policy Act to evaluate potential environmental impacts associated with Installation Development at Arnold AFB, TN. Per Section 306108 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800, Arnold AFB is accounting for various environmental concerns and engaging early with tribal governments as it formulates the undertaking.

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JEFFREY T. GERAGHTY, Colonel, USAF
Commander

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FSS (Shawn Chapman)

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT COMPLEX (AFMC)
ARNOLD AIR FORCE BASE TENNESSEE

24 November 2020

Colonel Jeffrey T. Geraghty
Commander
Arnold Engineering Development Complex
100 Kindel Drive, Suite A-303
Arnold AFB TN 37389

Principal Chief Richard Sneed
Eastern Band of Cherokee Indians
P. O. Box 455
Cherokee NC 28719

Dear Principal Chief Sneed

Arnold Air Force Base (Arnold AFB) is preparing an Environmental Assessment (EA) under the National Environmental Policy Act to evaluate potential environmental impacts associated with Installation Development at Arnold AFB, TN. Per Section 306108 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800, Arnold AFB is accounting for various environmental concerns and engaging early with tribal governments as it formulates the undertaking.

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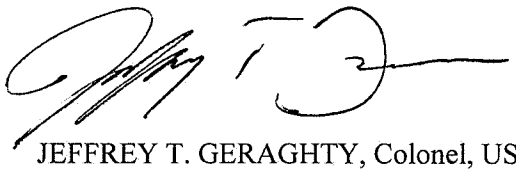
If you have any questions, please contact Shannon Allen, Cultural Resources Manager and Installation Tribal Relations Officer at 931-454-5466; shannon.allen.1@us.af.mil; or 100 Kindel Drive, Arnold AFB, TN 37389. Thank you in advance for your assistance in this effort.

Sincerely



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HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT COMPLEX (AFMC)
ARNOLD AIR FORCE BASE TENNESSEE

24 November 2020

Colonel Jeffrey T. Geraghty
Commander
Arnold Engineering Development Complex
100 Kindel Drive, Suite A-303
Arnold AFB TN 37389

Chief Joe Bunch
United Keetoowah Band of Cherokee
P. O. Box 746
Tahlequah OK 74464

Dear Chief Bunch

Arnold Air Force Base (Arnold AFB) is preparing an Environmental Assessment (EA) under the National Environmental Policy Act to evaluate potential environmental impacts associated with Installation Development at Arnold AFB, TN. Per Section 306108 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800, Arnold AFB is accounting for various environmental concerns and engaging early with tribal governments as it formulates the undertaking.

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JEFFREY T. GERAGHTY, Colonel, USAF
Commander

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FSS (Shawn Chapman)

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT COMPLEX (AFMC)
ARNOLD AIR FORCE BASE TENNESSEE

24 November 2020

Colonel Jeffrey T. Geraghty
Commander
Arnold Engineering Development Complex
100 Kindel Drive, Suite A-303
Arnold AFB TN 37389

Chief Jeremiah Hobia
Kialegee Tribal Town
P. O. Box 332
Wetumka OK 74883

Dear Chief Hobia

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cc:
AEDC/TSDCI (Shannon Allen)
FSS (Shawn Chapman)

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT COMPLEX (AFMC)
ARNOLD AIR FORCE BASE TENNESSEE

24 November 2020

Colonel Jeffrey T. Geraghty
Commander
Arnold Engineering Development Complex
100 Kindel Drive, Suite A-303
Arnold AFB TN 37389

Principal Chief David Hill
Muscogee (Creek) Nation of Oklahoma
P. O. Box 580
Okmulgee OK 74447

Dear Principal Chief Hill

Arnold Air Force Base (Arnold AFB) is preparing an Environmental Assessment (EA) under the National Environmental Policy Act to evaluate potential environmental impacts associated with Installation Development at Arnold AFB, TN. Per Section 306108 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800, Arnold AFB is accounting for various environmental concerns and engaging early with tribal governments as it formulates the undertaking.

As part of the proposed undertaking, Installation Development includes implementing a range of 360 selected projects, such as demolition of aging facilities, new facility construction, facility upgrades, facility repair and renovation, utilities upgrades, and infrastructure improvement, including road maintenance, that are projected to be funded during the next 5 years (from fiscal year [FY] 2021 to FY 2026). The draft Project Area Maps and Project List are attached, with the NHPA eligible facilities highlighted in yellow. Further details and environmental analysis will be provided as the Environmental Assessment development progresses. The purpose of the proposed undertaking is to support Arnold AFB and Arnold Engineering and Development Complex (AEDC) mission requirements by improving the facilities, infrastructure, and utilities for current and future use through Installation Development. The need for Installation Development at Arnold AFB is to improve and update facilities and infrastructure so that they are adequate to meet technologically advanced and specialized aerospace testing and flight simulation requirements.

In accordance with the NHPA, Arnold AFB would like to initiate government-to-government consultation regarding Installation Development. Arnold AFB requests your input in identifying any issues or areas of concern you feel should be addressed in the environmental analysis. Additionally, please let us know if you believe this undertaking might adversely affect any historic properties of religious and cultural significance to the Muscogee (Creek) Nation of Oklahoma.

If you have any questions, please contact Shannon Allen, Cultural Resources Manager and Installation Tribal Relations Officer at 931-454-5466; shannon.allen.1@us.af.mil; or 100 Kindel Drive, Arnold AFB, TN 37389. Thank you in advance for your assistance in this effort.

Sincerely

JEFFREY T. GERAGHTY, Colonel, USAF
Commander

Attachments:
Draft Project Maps
Draft Project List

cc:
AEDC/TSDCI (Shannon Allen)
FSS (Shawn Chapman)

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT COMPLEX (AFMC)
ARNOLD AIR FORCE BASE TENNESSEE

24 November 2020

Colonel Jeffrey T. Geraghty
Commander
Arnold Engineering Development Complex
100 Kindel Drive, Suite A-303
Arnold AFB TN 37389

Tribal Chair Stephanie Bryan
Poarch Band of Creek Indians
5811 Jack Springs Rd.
Atmore AL 36502

Dear Tribal Chair Bryan

Arnold Air Force Base (Arnold AFB) is preparing an Environmental Assessment (EA) under the National Environmental Policy Act to evaluate potential environmental impacts associated with Installation Development at Arnold AFB, TN. Per Section 306108 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800, Arnold AFB is accounting for various environmental concerns and engaging early with tribal governments as it formulates the undertaking.

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HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT COMPLEX (AFMC)
ARNOLD AIR FORCE BASE TENNESSEE

24 November 2020

Colonel Jeffrey T. Geraghty
Commander
Arnold Engineering Development Complex
100 Kindel Drive, Suite A-303
Arnold AFB TN 37389

Principal Chief Greg Chilcoat
Seminole Nation of Oklahoma
P. O. Box 1498
Wewoka OK 74884

Dear Principal Chief Chilcoat

Arnold Air Force Base (Arnold AFB) is preparing an Environmental Assessment (EA) under the National Environmental Policy Act to evaluate potential environmental impacts associated with Installation Development at Arnold AFB, TN. Per Section 306108 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800, Arnold AFB is accounting for various environmental concerns and engaging early with tribal governments as it formulates the undertaking.

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HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT COMPLEX (AFMC)
ARNOLD AIR FORCE BASE TENNESSEE

24 November 2020

Colonel Jeffrey T. Geraghty
Commander
Arnold Engineering Development Complex
100 Kindel Drive, Suite A-303
Arnold AFB TN 37389

Tribal Chairman Ron Sparkman
Shawnee Tribe of Oklahoma
P. O. Box 189
Miami OK 74355

Dear Tribal Chairman Sparkman

Arnold Air Force Base (Arnold AFB) is preparing an Environmental Assessment (EA) under the National Environmental Policy Act to evaluate potential environmental impacts associated with Installation Development at Arnold AFB, TN. Per Section 306108 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800, Arnold AFB is accounting for various environmental concerns and engaging early with tribal governments as it formulates the undertaking.

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HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT COMPLEX (AFMC)
ARNOLD AIR FORCE BASE TENNESSEE

24 November 2020

Colonel Jeffrey T. Geraghty
Commander
Arnold Engineering Development Complex
100 Kindel Drive, Suite A-303
Arnold AFB TN 37389

Mekko Ryan Morrow
Thlopthlocco Tribal Town
P. O. Box 188
Okemah OK 74859

Dear Mekko Morrow

Arnold Air Force Base (Arnold AFB) is preparing an Environmental Assessment (EA) under the National Environmental Policy Act to evaluate potential environmental impacts associated with Installation Development at Arnold AFB, TN. Per Section 306108 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800, Arnold AFB is accounting for various environmental concerns and engaging early with tribal governments as it formulates the undertaking.

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT COMPLEX (AFMC)
ARNOLD AIR FORCE BASE TENNESSEE

30 November 2020

AEDC/TSDCI
100 Kindel Drive, Suite B-322
Arnold AFB TN 37389-2322

U.S. Environmental Protection Agency Region 4
Attn: Ms. Mary Walker
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, GA 30303-8960

Dear Ms. Walker:

An environmental assessment (EA) is being prepared to evaluate potential environmental impacts of implementing a range of selected Installation development projects, such as demolition of aging facilities, new facility construction, facility upgrades, facility repair and renovation, utilities upgrades, and infrastructure improvements, including road maintenance that would be among those proposed to be completed or implemented during the next five years (from fiscal year [FY] 2021 to FY 2026) at Arnold Air Force Base (AFB), Tennessee. The general location of Arnold AFB and of the selected Installation development projects are shown in Figures 1 and 2, respectively. A copy of the Draft EA will be made available for your review and comment when complete.

With preparation of the EA, Arnold AFB intends to streamline National Environmental Policy Act (NEPA) compliance and facilitate the Installation development process by evaluating in one integrated document potential impacts on the natural and human environment from 357 projects proposed for implementation at Arnold AFB. However, only six demolition projects, 20 new construction projects, and nine road maintenance projects were determined to individually have the potential to have a significant impact on the human and natural environment and were identified for further detailed analysis in this EA. The US Air Force determined that individually the remaining 322 projects do not have the potential to have a significant impact on the human and natural environment, and collectively these projects are addressed in the cumulative impacts analysis of this EA.

Projects analyzed by the EA fall under two categories: demolition and infrastructure projects.

- **Demolition Projects.** Arnold AFB proposes six demolition projects that could occur over the next five years to achieve efficiency and support growth associated with its mission requirements. Facilities scheduled for demolition have been deemed too costly to repair or renovate, and no longer meet the needs of Arnold AFB. Demolition of these facilities would provide additional square feet of usable land and reduce the need to construct new facilities on undeveloped land.

- **Infrastructure Projects.** Arnold AFB proposes 351 infrastructure projects over the next five years. Of the infrastructure projects, 30 are new construction, 186 are facility renovations, 12 are road maintenance, and 123 are utility upgrades.

If you have any comments or concerns you would like to provide regarding the proposed action or its environmental impacts, please respond to us within 30 days of receipt of this letter. Please send your written responses via regular mail or e-mail (preferred) to Ms. Shannon Allen, NEPA, Natural & Cultural Resources Planner, AEDC/TSDCI, 100 Kindel Drive, Arnold AFB TN 37389-2322, or shannon.allen.1@us.af.mil.

Sincerely,

JOHN W. LAVIOLETTE
BASE CIVIL ENGINEER

Attachments:
1. Figure 1. Location of Arnold Air Force Base and Surrounding Area
2. Figure 2. Proposed Installation Development Projects at Arnold Air Force Base

cc:
AEDC/TSDCI, Shannon Allen
AEDC/TSDCI, David Carlon
JA, Lt Col Goins

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT COMPLEX (AFMC)
ARNOLD AIR FORCE BASE TENNESSEE

30 November 2020

AEDC/TSDCI
100 Kindel Drive, Suite B-322
Arnold AFB TN 37389-2322

U.S. Department of Agriculture Natural Resources Conservation Service Area 3
Cookeville Area Office
Attn: Mr. Chase Coakley
900 South Walnut Avenue, Room 3
Cookeville, TN 38501

Dear Mr. Coakley:

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HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT COMPLEX (AFMC)
ARNOLD AIR FORCE BASE TENNESSEE

30 November 2020

AEDC/TSDCI
100 Kindel Drive, Suite B-322
Arnold AFB TN 37389-2322

Tennessee Department of Environment and Conservation
Columbia Environmental Field Office
Attn: Ms. Jennifer Greer
1421 Hampshire Pike Columbia, TN 38401

Dear Ms. Greer:

An environmental assessment (EA) is being prepared to evaluate potential environmental impacts of implementing a range of selected Installation development projects, such as demolition of aging facilities, new facility construction, facility upgrades, facility repair and renovation, utilities upgrades, and infrastructure improvements, including road maintenance that would be among those proposed to be completed or implemented during the next five years (from fiscal year [FY] 2021 to FY 2026) at Arnold Air Force Base (AFB), Tennessee. The general location of Arnold AFB and of the selected Installation development projects are shown in Figures 1 and 2, respectively. A copy of the Draft EA will be made available for your review and comment when complete.

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ARNOLD AIR FORCE BASE TENNESSEE

30 November 2020

AEDC/TSDCI
100 Kindel Drive, Suite B-322
Arnold AFB TN 37389-2322

Tennessee Department of Environment & Conservation
Division of Natural Areas
Attn: Mr. Roger McCoy
William R. Snodgrass TN Tower
312 Rosa L. Parks Avenue, 2nd Floor
Nashville, TN 37243

Dear Mr. McCoy:

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HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT COMPLEX (AFMC)
ARNOLD AIR FORCE BASE TENNESSEE

30 November 2020

AEDC/TSDCI
100 Kindel Drive, Suite B-322
Arnold AFB TN 37389-2322

Tennessee Department of Environment and Conservation
Division of Natural Heritage
Attn: Mr. Reggie Reeves, Director
TN Tower DNA
312 Rosa L. Parks Avenue, 2nd Floor
Nashville, TN 37243

Dear Mr. Reeves:

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ARNOLD AIR FORCE BASE TENNESSEE

30 November 2020

AEDC/TSDCI
100 Kindel Drive, Suite B-322
Arnold AFB TN 37389-2322

Estes Kefauver Federal Building & Courthouse Annex
801 Broadway
Nashville, TN 37203
USACE Nashville District
Attn: Ms. Tammy Turley

Dear Ms. Turley:

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HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT COMPLEX (AFMC)
ARNOLD AIR FORCE BASE TENNESSEE

30 November 2020

AEDC/TSDCI
100 Kindel Drive, Suite B-322
Arnold AFB TN 37389-2322

Tennessee Division of Archaeology
Attn: Mr. Mike Moore
Cole Building #3
1216 Foster Avenue
Nashville, TN 37243

Dear Mr. Moore:

An environmental assessment (EA) is being prepared to evaluate potential environmental impacts of implementing a range of selected Installation development projects, such as demolition of aging facilities, new facility construction, facility upgrades, facility repair and renovation, utilities upgrades, and infrastructure improvements, including road maintenance that would be among those proposed to be completed or implemented during the next five years (from fiscal year [FY] 2021 to FY 2026) at Arnold Air Force Base (AFB), Tennessee. The general location of Arnold AFB and of the selected Installation development projects are shown in Figures 1 and 2, respectively. A copy of the Draft EA will be made available for your review and comment when complete.

With preparation of the EA, Arnold AFB intends to streamline National Environmental Policy Act (NEPA) compliance and facilitate the Installation development process by evaluating in one integrated document potential impacts on the natural and human environment from 357 projects proposed for implementation at Arnold AFB. However, only six demolition projects, 20 new construction projects, and nine road maintenance projects were determined to individually have the potential to have a significant impact on the human and natural environment and were identified for further detailed analysis in this EA. The US Air Force determined that individually the remaining 322 projects do not have the potential to have a significant impact on the human and natural environment, and collectively these projects are addressed in the cumulative impacts analysis of this EA.

Projects analyzed by the EA fall under two categories: demolition and infrastructure projects.

- **Demolition Projects.** Arnold AFB proposes six demolition projects that could occur over the next five years to achieve efficiency and support growth associated with its mission requirements. Facilities scheduled for demolition have been deemed too costly to repair or renovate, and no longer meet the needs of Arnold AFB. Demolition of these facilities would provide additional square feet of usable land and reduce the need to construct new facilities on undeveloped land.

- **Infrastructure Projects.** Arnold AFB proposes 351 infrastructure projects over the next five years. Of the infrastructure projects, 30 are new construction, 186 are facility renovations, 12 are road maintenance, and 123 are utility upgrades.

If you have any comments or concerns you would like to provide regarding the proposed action or its environmental impacts, please respond to us within 30 days of receipt of this letter. Please send your written responses via regular mail or e-mail (preferred) to Ms. Shannon Allen, NEPA, Natural & Cultural Resources Planner, AEDC/TSDCI, 100 Kindel Drive, Arnold AFB TN 37389-2322, or shannon.allen.1@us.af.mil.

Sincerely,

JOHN W. LAVIOLETTE
BASE CIVIL ENGINEER

Attachments:
1. Figure 1. Location of Arnold Air Force Base and Surrounding Area
2. Figure 2. Proposed Installation Development Projects at Arnold Air Force Base

cc:
AEDC/TSDCI, Shannon Allen
AEDC/TSDCI, David Carlon
JA, Lt Col Goins

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT COMPLEX (AFMC)
ARNOLD AIR FORCE BASE TENNESSEE

30 November 2020

AEDC/TSDCI
100 Kindel Drive, Suite B-322
Arnold AFB TN 37389-2322

Tennessee Historic Commission
Attn: Mr. Patrick McIntyre Jr.
Executive Director
2941 Lebanon Road
Nashville TN 37243-0442

Dear Mr. McIntyre:

An environmental assessment (EA) is being prepared to evaluate potential environmental impacts of implementing a range of selected Installation development projects, such as demolition of aging facilities, new facility construction, facility upgrades, facility repair and renovation, utilities upgrades, and infrastructure improvements, including road maintenance that would be among those proposed to be completed or implemented during the next five years (from fiscal year [FY] 2021 to FY 2026) at Arnold Air Force Base (AFB), Tennessee. The general location of Arnold AFB and of the selected Installation development projects are shown in Figures 1 and 2, respectively. A copy of the Draft EA will be made available for your review and comment when complete.

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT COMPLEX (AFMC)
ARNOLD AIR FORCE BASE TENNESSEE

30 November 2020

AEDC/TSDCI
100 Kindel Drive, Suite B-322
Arnold AFB TN 37389-2322

Tennessee Wildlife Resources Agency Region II
Attn: Mr. Richard Kirk
Ellington Agricultural Center
5105 Edmonson Pike
Nashville, TN 37211

Dear Mr. Kirk:

An environmental assessment (EA) is being prepared to evaluate potential environmental impacts of implementing a range of selected Installation development projects, such as demolition of aging facilities, new facility construction, facility upgrades, facility repair and renovation, utilities upgrades, and infrastructure improvements, including road maintenance that would be among those proposed to be completed or implemented during the next five years (from fiscal year [FY] 2021 to FY 2026) at Arnold Air Force Base (AFB), Tennessee. The general location of Arnold AFB and of the selected Installation development projects are shown in Figures 1 and 2, respectively. A copy of the Draft EA will be made available for your review and comment when complete.

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT COMPLEX (AFMC)
ARNOLD AIR FORCE BASE TENNESSEE

30 November 2020

AEDC/TSDCI
100 Kindel Drive, Suite B-322
Arnold AFB TN 37389-2322

U.S. Fish and Wildlife Service Tennessee Field Office
Attn: Mr. Lee Andrews
Acting Field Supervisor
446 Neal Street
Cookeville, TN 38501

Dear Mr. Andrews:

An environmental assessment (EA) is being prepared to evaluate potential environmental impacts of implementing a range of selected Installation development projects, such as demolition of aging facilities, new facility construction, facility upgrades, facility repair and renovation, utilities upgrades, and infrastructure improvements, including road maintenance that would be among those proposed to be completed or implemented during the next five years (from fiscal year [FY] 2021 to FY 2026) at Arnold Air Force Base (AFB), Tennessee. The general location of Arnold AFB and of the selected Installation development projects are shown in Figures 1 and 2, respectively. A copy of the Draft EA will be made available for your review and comment when complete.

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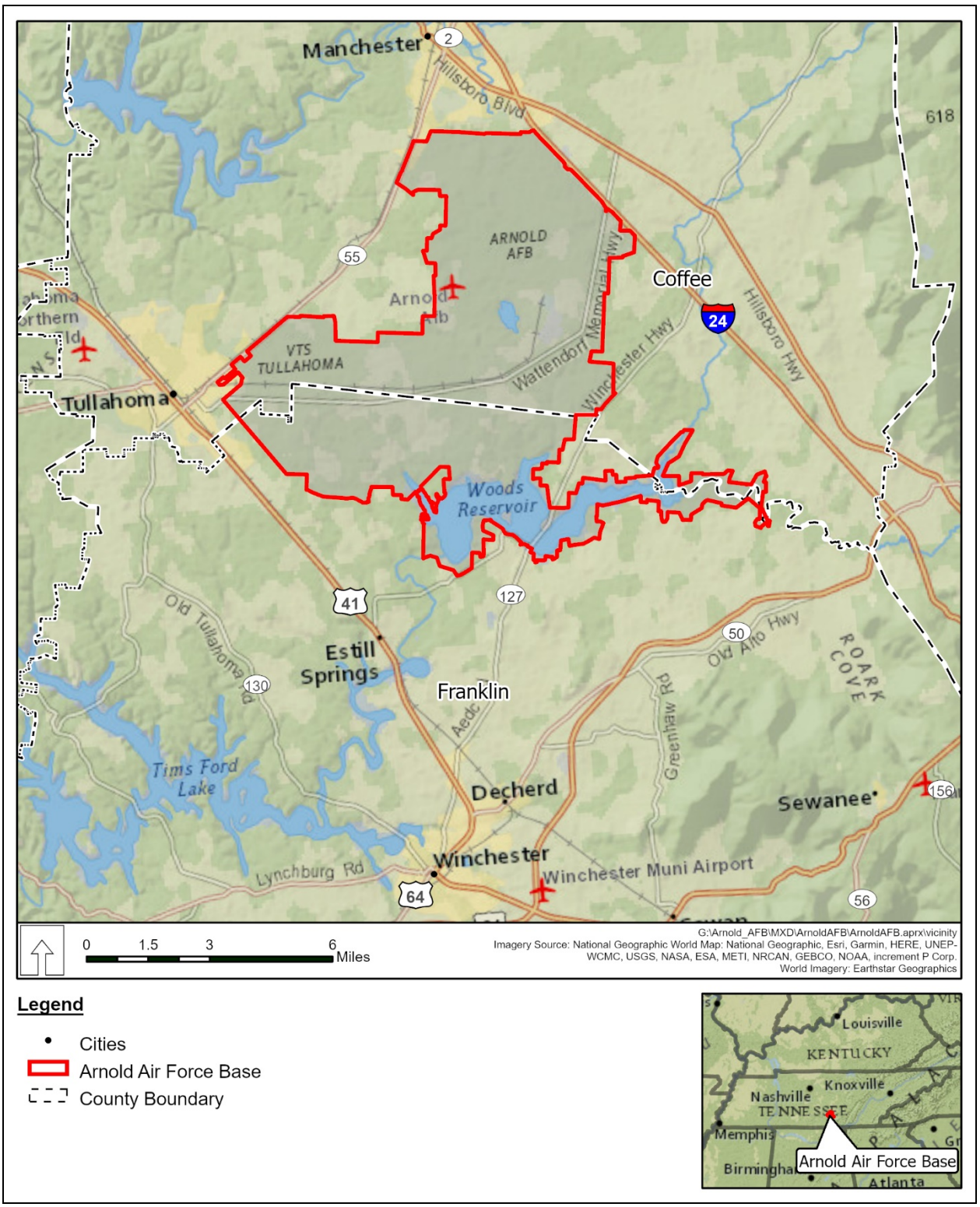

Figure 1. Location of Arnold Air Force Base and Surrounding Area

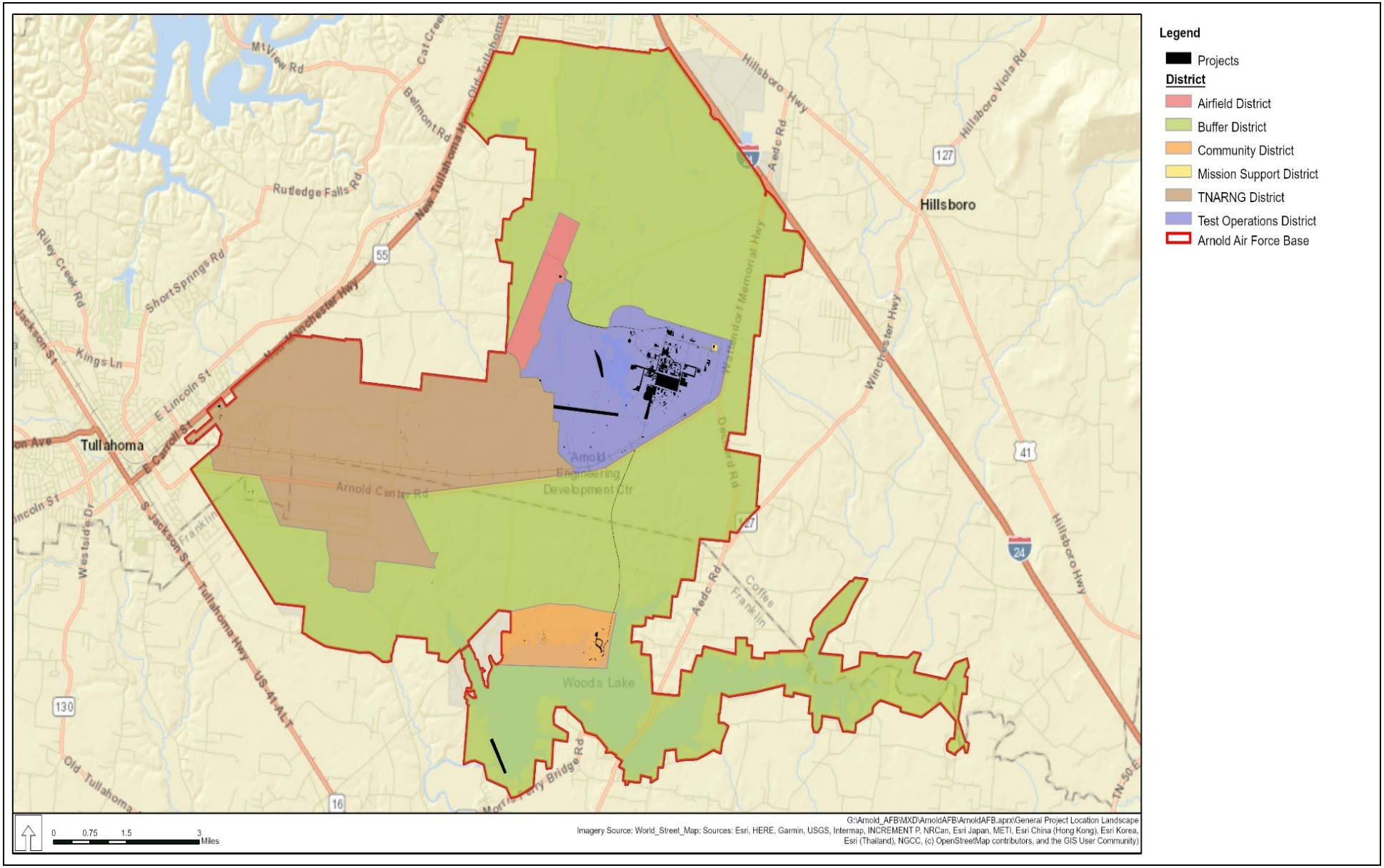

Figure 2. Proposed Installation Development Projects at Arnold Air Force Base

ply with the terms of sale for any reason. In such event, the Substitute Trustee shall also reserve the right to reopen and sell said Property at his option; and

3. The right is reserved to conduct the sale by or through his agents or attorneys acting in his place or stead, including the use of an auctioneer; and

4. The right is reserved to sell the secured property in such lots, parcels, segments, or separate estates as may accomplish the most advantageous sale and consequent discharge of his trust obligation under the circumstances, and

Crook, II, who died on October 12, 2020, were issued to the undersigned by the Chancery Court of Franklin County, Tennessee. All persons, resident and non-resident, having claims, matured or unmatured, against the said estate are required to file the same with the Clerk and Master of the above-named Court on or before the earlier of the dates prescribed in (1) or (2) otherwise their claims will be forever barred:

(1) (A) Four (4) months from the date of the first publication (or posting, as the case may be) of this notice if the creditor received an actual copy of this notice to creditors at least sixty (60) days before date that is

respect to the Estate of Margaret Donohue Orr, who died on November 5, 2020, were issued to the undersigned by the Chancery Court of Franklin County, Tennessee. All persons, resident and non-resident, having claims, matured or unmatured, against the said estate are required to file the same with the Clerk and Master of the above-named Court on or before the earlier of the dates prescribed in (1) or (2) otherwise their claims will be forever barred:

(1) (A) Four (4) months from the date of the first publication (or posting, as the case may be) of this notice if the creditor received an actual copy of this notice to creditors at

Testamentary with respect to the Estate of Richard Adrian Zimmerman, who died on September 2, 2020, were issued to the undersigned by the Chancery Court of Franklin County, Tennessee. All persons, resident and non-resident, having claims, matured or unmatured, against the said estate are required to file the same with the Clerk and Master of the above-named Court on or before the earlier of the dates prescribed in (1) or (2) otherwise their claims will be forever barred:

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PUBLIC NOTICE

ENVIRONMENTAL ASSESSMENT PREPARATION FOR INSTALLATION DEVELOPMENT AT ARNOLD AIR FORCE BASE, TENNESSEE

The US Air Force (USAF) is preparing a Draft Environmental Assessment (EA) to evaluate potential environmental impacts of implementing a range of selected Installation development projects ("the Project"), such as demolition of aging facilities, new facility construction, facility upgrades, facility repair and renovation, utilities upgrades, and infrastructure improvements, including road maintenance, that would be among those proposed to be completed or implemented during the next five years at Arnold Air Force Base (AFB), Tennessee. With preparation of the Draft EA, Arnold AFB intends to streamline National Environmental Policy Act (NEPA) compliance and facilitate the Installation development process by evaluating in one integrated document potential impacts on the natural and human environment from 357 projects proposed for implementation at Arnold AFB. However, only six demolition projects, 20 new construction projects, and nine road maintenance projects were determined to individually have the potential to have a significant impact on the human and natural environment and were identified for further detailed analysis in the Draft EA. The USAF determined that individually the remaining 322 projects would not have the potential to have a significant impact on the human and natural environment, and collectively these projects will be addressed in the cumulative impacts analysis of the Draft EA. Presently, no viable alternatives have been identified meeting the need for the proposed Project.

The Project is subject to Executive Order 11988, *Floodplain Management*, requirements and objectives because two of the proposed new construction projects are located within a floodplain. A Woods Reservoir project would restore the shoreline profile along the family housing portion of Woods Reservoir and would stabilize the reservoir bank against future erosion. An Elk River Dam project would construct a 650-linear-foot watercraft barrier. The USAF requests advance public comment to determine possible public concerns on potential project impacts. The USAF also solicits public comments on potential project alternatives. The USAF will analyze the proposed Project in the Draft EA, and the public will have the opportunity to comment on it.

The advance public comment period is 9 December 2020 through 8 January 2021. Please submit comments, or requests for more information to Ms. Shannon Allen, NEPA, Natural & Cultural Resources Planner, via email (shannon.allen.1@us.af.mil.) or by standard mail to: AEDC/TSDCI, Attn: Shannon Allen, 100 Kindel Drive, Arnold AFB, TN 37389-2322.

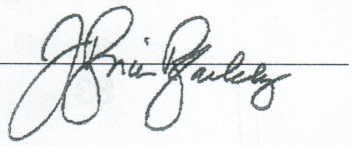
AFFIDAVIT OF PUBLICATION

STATE OF TENNESSEE
COUNTY OF COFFEE

Brian Blackley

Printed Name

Personally appeared before the undersigned authority and made oath that Brian Blackley is the Publisher of the Herald Chronicle and that the attached item was published in said newspaper on the following date(s)
12/10/2020

Signed 

Name of Account: AEDC Environmental
Order Number: 13255559

Sworn to, and subscribed before me at Tullahoma, Tennessee, this 4th day of January 2021.

D Wimsatt

Notary Public

Commission expires: 3-20-2022

Public Notice

Deed of Trust will on the 16th day of December, 2020, at 11:30 A.M. at the south door of the Courthouse in Manchester, Coffee County, Tennessee, sell to the highest bidder for cash, free from the equity and statutory rights of redemption and subject to all matters shown on any recorded plan; any unpaid taxes; any restrictive covenants, easements or

nessee.

This property is improved property, there being a building located on said property.

This conveyance is subject to any and all zoning regulations, building restrictions and setback lines, if any, easements and rights-of-way for public utilities of record.

This property is lo-

1116, page 829, Register's Office, Coffee County, Ten-

westerly margin Maple Street and b ing the southeaste corner of the la

Public Notice

The Board of United Utilitie Group will hold their annua virtual board meeting on Tuesday December 15, 2020 at 10:30 an EST. If members of the publi want to attend the ZOOM meetin they may contact Matt Ballard fo details at 865-453-3272.

PUBLIC NOTICE

A Public Hearing on "AN ORDINANCE AMENDING THE BUDGET ORDINANCE FOR FISCAL YEAR 2020-2021, ORDINANCE NO. 1592" will be held on January 5, 2021, at 6:30pm at the Manchester City Hall, 200 West Fort Street, Manchester, Tennessee via ZOOM link www.cityofmanchestertn.com

PUBLIC NOTICE

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AFFIDAVIT OF PUBLICATION

STATE OF TENNESSEE
COUNTY OF COFFEE

Brian Blackley

Printed Name

Personally appeared before the undersigned authority and made oath that Brian Blackley is the Publisher of the Mancheter Times and that the attached item was published in said newspaper on the following date(s)
12/09/2020

Signed _____

Name of Account: AEDC Environmental
Order Number: 13255559

Sworn to, and subscribed before me at Tullahoma, Tennessee, this 4th day of January 2021.

_____
Notary Public

Commission expires: 3-20-2022

DEBORAH WIMSATT
STATE OF TENNESSEE NOTARY PUBLIC
COFFEE COUNTY

Public Notice

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COUNTY OF COFFEE

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Commission expires: 3-20-2022

DEBORAH WIMSATT
STATE OF TENNESSEE NOTARY PUBLIC
COFFEE COUNTY

Public Notice

From: THPO
To: ALLEN, SHANNON L NH-03 USAF AFMC AEDC/TSDCI
Subject: [Non-DoD Source] RE: Arnold AFB Installation Development Environmental Assessment
Date: Monday, December 07, 2020 10:17:21 AM
Attachments: image002.png

THLOPTHLOCCO TRIBAL TOWN

Federal Charter 1938 – Creek Tribe
P.O. Box 188 • Okemah, Oklahoma 74859-0188
TRIBAL HISTORIC PRESERVATION OFFICE
Mr. Galen Cloud, Tribal Historic Preservation Officer

December 7, 2020

Shannon Allen
NEPA, Natural & Cultural Resources Planner, CWB®
AEDC/TSDCI
100 Kindel Drive
Arnold Air Force Base, TN 37389-2322
Office: 931-454-5466
DSN: 340-5466
Fax: 931-454-7270
E-mail: Shannon.allen.1@us.af.mil

RE: Arnold AFB Installation Development Environmental Assessment

Dear, Shannon Allen,

Thank you for contacting the Thlopthlocco Tribal Town Historic Preservation office requesting comments regarding the proposed undertaking. Our office has reviewed the documents provided and offer the following.

In keeping with the National Environmental Policy Act (NEPA)d, and Section 106 of the National Historic Preservation Act (NHPA), 36 CFR Part 800, this letter is to acknowledge that the Thlopthlocco Tribal Town has received notice of the proposed project at the above mentioned location.

Upon review of the documents and consulting our records, we are unaware of any culturally significant sites within the area of potential effects (APE). However, should any human remains or cultural resources be inadvertently discovered, please cease all work and contact our THPO at thpo@tttown.org immediately.

The THPO after reviewing our records and documents agree with the findings within the report and concurs with **No Historic Properties Affected for this undertaking**.

Sincerely,

Galen Cloud
Thlopthlocco Tribal town
Historic Preservation Officer

From: ALLEN, SHANNON L NH-03 USAF AFMC AEDC/TSDCI <shannon.allen.1@us.af.mil>
Sent: Monday, December 7, 2020 7:33 AM
To: THPO <THPO@tttown.org>
Subject: Arnold AFB Installation Development Environmental Assessment

Good Afternoon Mr. Cloud,

Our Commander mailed a NHPA consultation letter for our upcoming Arnold AFB Installation Development Environmental Assessment to Mekko Morrow. However, with so many people currently teleworking, I thought I should also email you the documents for your awareness. Please see the attached letter for your files. Please let me know if you have any questions and I hope you are well.

Thank You,
Shannon

Shannon Allen
NEPA, Natural & Cultural Resources Planner, CWB®
AEDC/TSDCI
100 Kindel Drive
Arnold Air Force Base, TN 37389-2322
Office: 931-454-5466
DSN: 340-5466
Fax: 931-454-7270
E-mail: Shannon.allen.1@us.af.mil

TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON PIKE
NASHVILLE, TENNESSEE 37243-0442
OFFICE: (615) 532-1550
www.tnhistoricalcommission.org

December 14, 2020

Mr. John W. Laviolette
Arnold Engineering Development Complex

RE: DOD / Department of Defense, Notice of EA for a Range of Selected Installation Development Projects, Arnold AFB, Arnold AFB, Coffee County, TN

Dear Mr. Laviolette:

In response to your request, we have reviewed the documents you submitted regarding your proposed undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. This Act requires federal agencies or applicants for federal assistance to consult with the appropriate State Historic Preservation Office before they carry out their proposed undertakings. The Advisory Council on Historic Preservation has codified procedures for carrying out Section 106 review in 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

Our office will need to review any undertaking not excluded per the Programmatic Agreement between Arnold Engineering Development Complex and our office.

You may direct questions or comments to Casey Lee (615) 253-3163.

Sincerely,

E. Patrick McIntyre, Jr.

cjl

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

EPM/cjl

DEPARTMENT OF THE ARMY
NASHVILLE DISTRICT, CORPS OF ENGINEERS
REGULATORY DIVISION
3701 BELL ROAD
NASHVILLE, TENNESSEE 37214

December 28, 2020

SUBJECT: File No. LRN-2012-01270, Department of the Air Force, Environmental Assessment Coordination, Arnold Air Force Base, Coffee County, Tennessee

Department of the Air Force
C/o Ms. Shannon Allen
100 Kindel Drive
Arnold AFB, Tennessee 37389

Dear Ms. Allen

This is in response to your November 30, 2020 request for our comments regarding a forthcoming Environmental Assessment (EA) to evaluate impacts of several Installation development projects to be implemented during the next five years. This project has been assigned file number LRN-2012-01270. Please refer to this number in future correspondence.

The U.S. Army Corps of Engineers (USACE) has regulatory responsibilities pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403) and Section 404 of the Clean Water Act (33 U.S.C. 1344). Under Section 10, the USACE regulates all work in, or affecting, navigable waters of the U.S. Under Section 404, the USACE regulates the discharge of dredged and/or fill material into waters of the U.S. (33 CFR Part 328).

A review of the information provided indicates the subject activities may involve work in wetlands/waters of the U.S.; therefore, Department of the Army permits may be required.

If you have questions regarding this matter, please contact Mr. Benjamin MacIntyre at the above address, by telephone (615) 369-7522, or email at Benjamin.W.MacIntyre@usace.army.mil. Thank you for the opportunity to review and comment on these proposed projects.

Sincerely,

Timothy C. Wilder
Chief, West Branch
Regulatory Division

United States Department of Agriculture

January 4, 2021

AEDC/TSDCI
100 Kindel Drive, Suite B-322
Arnold AFB TN 37389-2322

Dear Mr. Laviolette,

I have reviewed your notice regarding the proposed installation development projects at Arnold Air Force Base.

On behalf of USDA-NRCS I regularly complete reviews to ensure compliance with the Endangered Species Act (ESA). Upon review of my database I identified numerous conservation sites and listed species documented in the vicinity of Arnold AFB proposed projects. Since the proposed projects are not associated with any USDA-NRCS action I do not have objection to the proposal moving forward. However, if not already done I recommend you complete consultation with Tennessee Division of Natural Areas, Tennessee Wildlife Resources Agency, and U.S. Fish and Wildlife Service to ensure there are no regulatory implications, and that provisions of the Endangered Species Act are upheld.

For review assistance regarding the Farmland Protection Policy Act (FPPA) please contact Melissa Oliver, Resource Soil Scientist at melissa.oliver@usda.gov.

If you have questions please contact me at (615) 295-6114 or chase.coakley@usda.gov.

Sincerely,

Chase Coakley
Area Resource Biologist

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Tennessee Ecological Services Field Office
446 Neal Street
Cookeville, Tennessee 38501
(931) 528-6481

February 5, 2021

Mr. John LaViolette
Base Civil Engineer
AEDC/TSDCI
100 Kindel Drive, Suite B-322
Arnold AFB TN 37389-2322

Attn: Ms. Shannon Allen

Subject: FWS #2021-CPA-0069. Development of an Environmental Assessment for proposed activities from fiscal year 2021 to 2026 at Arnold Air Force Base (AAFB), Tennessee.

Dear Mr. LaViolette:

Thank you for your recent notification regarding an upcoming environmental assessment (EA) addressing activities in development at Arnold Air Force Base (AAFB). We understand that the draft EA will include detailed analyses for six demolition projects, 20 new construction projects, and nine road maintenance projects, which have the potential for significant impacts on human and natural environments, including federally listed species. We appreciate the opportunity to work with you and other AEDC staff on the EA and the proposed projects, to provide a coordinated review and analysis of all environmental requirements, and to facilitate AAFB's ability to efficiently perform its mission for the benefit of the Nation.

The projects mentioned above were characterized as being in the preliminary stages of development and are well positioned to benefit from cooperative and early planning efforts (i.e., before specific projects are fully designed). We would like to take advantage of this opportunity by offering our assistance to better synchronize your primary mission actions and programs with the conservation and recovery needs of federally listed, proposed, and candidate species. This proactive approach would reinforce and improve upon our longstanding relationship by increasing regulatory certainty and flexibility, decreasing regulatory conflict and delays, and significantly reducing the administrative burden of future consultations for both of our agencies. We believe that development of a programmatic consultation process would help both AEDC meets its mission requirements and reduce workloads for AAFB and the Service. Adopting this more strategic approach would acknowledge AAFB's ongoing and beneficial actions and further

identify how AAFB can achieve a conservation benefit for listed species and their habitats while performing its primary mission.

I would like to set up a video call with you and your staff to discuss the proposed projects and determine if a programmatic consultation approach would be beneficial to our respective agencies. Feel free to contact David Pelren of my staff at 931-261-5844 or by email at *david_pelren@fws.gov* if you would be interested in setting up a preliminary discussion of the EA and general environmental topics relative to Arnold Air Force Base.

Sincerely,

Daniel Elbert
Field Supervisor

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT COMPLEX (AFMC)
ARNOLD AIR FORCE BASE TENNESSEE

10 February 20

AEDC/TSDCI
100 Kindel Drive, Suite B-322
Arnold AFB TN 37389-2322

U.S. Fish and Wildlife Service Tennessee Field Office
Attn: Mr. Dan Elbert
Acting Field Supervisor
446 Neal Street
Cookeville, TN 38501

Dear Mr. Elbert:

The United States Air Force (Air Force) is preparing an Environmental Assessment (EA) to evaluate potential environmental impacts associated with Installation development at Arnold Air Force Base (AFB), Tennessee. Pursuant to Section 7 of the Endangered Species Act (ESA) of 1973 (16 USC 1531-1544), the Air Force has determined that the Installation development at Arnold AFB *may affect, but is not likely to adversely affect* the gray bat (*Myotis grisescens*), Indiana bat (*Myotis sodalis*), and northern long-eared bat (*Myotis septentrionalis*).

Proposed Action

As part of the Proposed Action, the Air Force would implement installation wide development projects (Attachment 1), identified in the Arnold AFB Installation Development Plan (IDP), that are intended to provide Installation improvements necessary to support the mission of the Installation and tenant units. The Arnold AFB IDP was created in accordance with Air Force Instruction (AFI) 32-7062, *Comprehensive Planning*, and with principles from Unified Facilities Criteria (UFC) 2-100-01, *Installation Master Planning*. Its content, especially regarding future development planning and plan implementation, was developed in a collaborative process with key stakeholders at Arnold AFB. The IDP identifies requirements for improvement of the physical infrastructure and functionality of Arnold AFB, including current and future mission and facility requirements, improvement constraints and opportunities, and land use relationships. The proposed projects are broadly divided into two categories: demolition of aging facilities and infrastructure projects. Specifically, the Proposed Action includes a total of 357 projects, six of which are demolition projects and 351 of which are infrastructure projects. Of the infrastructure projects, 30 are new construction, 186 are facility renovations, 12 are road maintenance, and 123 are utility upgrades.

Threatened, Endangered, and Candidate Species and Critical Habitat

The Arnold AFB Integrated Natural Resources Management Plan (INRMP) and the US Fish and Wildlife Service (USFWS) Information for Planning and Consultation System (Attachment 2) were reviewed to determine if any federally listed, proposed, candidate species, or their habitats, potentially occur in the vicinity of the Proposed Action. The gray bat, Indiana bat, and northern long-eared bat are federally listed and have the potential to occur on Arnold AFB (Table 1). Based on habitat identified in

the Arnold AFB INRMP, these are the only federally listed species with the potential to occur at Arnold AFB.

Table 1: Federally Listed Species with the Potential to Occur on Arnold AFB

Common Name	Scientific Name	Status	Preferred Habitat
Federal			
Gray Bat	*Myotis grisescens*	E	Gray bats live in caves year-round and appear to be restricted by dependence on major areas of water, as a direct correlation exists between the distribution of summer colonies and bodies of water. Winter: caves that are deep and vertical, provide large volume below the lowest entrance, and function as cold-air traps with multiple entrances and good air flow, with preferred temperatures range from 6 to 9 °C (43 to 48 °F) Summer: caves with temperatures that range from 14 to 25 °C (57 to 77 °F), configurations that trap heat including those with small chambers, high places in domed ceilings, and domes or small pockets within these locations, and depth of etching and porosity of the rock surface
Indiana Bat	*Myotis sodalist*	E	Winter: caves or mines with configurations that provide a suitable temperature and humidity microclimate Summer: roost trees in riparian, bottomland, and upland forests. Roost trees generally have exfoliating bark which allows the bat to roost between the bark and bole of the tree and have a southeast or south-southwest solar exposure and an open canopy
Northern Long-eared Bat	*Myotis septentrionalis*	T	Winter: hibernacula that include caves and abandoned mines, often in very high humidity areas; typically found roosting in small crevices or cracks in cave or mine walls or ceilings Summer: roost singly or in colonies underneath bark or in cavities or crevices of both live trees and snags; have also been observed roosting in colonies in humanmade structures, such as buildings, barns, a park pavilion, sheds, cabins, under eaves of buildings, behind window shutters, and in bat houses

E – Endangered; **T** – Threatened; **°C** – degrees Celsius; **°F** – degrees Fahrenheit

Gray bats were first documented in the mid-1970s using the Elk River Dam at the Woods Reservoir on Arnold AFB. Annual surveys of the dam itself began in 1998 and mist net and acoustic surveys throughout the base began in 2000. A gray bat maternity colony occurs on Arnold AFB at the Elk River Dam during the summer months. The maternity colony at Elk River Dam is the only known roost site at Arnold AFB. However, gray bats have been captured throughout Arnold AFB every year since 2000. A telemetry project in 2018 tracked gray bats to determine foraging areas, travel corridors, and day roost sites and found that males traveled great distances foraging on and off base and roosting in caves up to 46 kilometers away.

Arnold AFB has conducted surveys almost every year since 2000 and acoustic surveys during many of those years for the Indiana bat. Although abundant potential habitat is present on Arnold AFB for Indiana bats, no maternity roosts have been identified to date. The northern long-eared bat has been

documented as occurring on Arnold AFB since annual baseline bat surveys began in 2000. Potential suitable habitat for the northern long-eared bat occurs in forested areas throughout the base, encompassing approximately 12,397 acres (Arnold AFB Integrated Natural Resources Management Plan 2019). Maternity colonies are also known to occur at Arnold AFB. Based on previous survey efforts, northern long-eared bats utilize the base during the summer months.

In 2016, Arnold AFB prepared a Programmatic Biological Assessment (BA) for Routine Training, Land Management, and Elk River Dam Operations for the base (see Attachment 3 for additional details). This Programmatic BA addressed potential impacts on federally listed bat species as a result of ongoing routine testing, training, land management, recreation, and Elk River Dam operation activities. It also included a number of conservation measures, including implementation of the INRMP, additional monitoring of federally listed bats, maintaining forested noise buffers, limiting off-road vehicle use, and minimizing tree removal/clearing as well as other measures associated with the operation of the Elk River Dam at the Woods Reservoir.

As a result of the Programmatic BA, the USFWS concluded in its 2016 Biological Opinion (BO) (#04ET10000-2015-F-0420) that routine training, land management, and Elk River Dam Operations at the Woods Reservoir on Arnold AFB are not likely to jeopardize the continued existence of the gray bat, Indiana bat, or northern long-eared bat. This conclusion was reached by examining the current status of the species, the environmental baseline for the action area, and various possible effects on the species (including direct, indirect, interrelated and interdependent effects of the proposed federal action, and cumulative effects of other non-federal future actions that may occur in the action area, including state, tribal, local or private activities, and are reasonably certain to occur in the project area).

In the 2016 BO, it was determined that routine training, land management, and Elk River Dam Operations at the Woods Reservoir on Arnold AFB may result in incidental take of the gray bat, Indiana bat, and northern long-eared bat. Further, it was determined that incidental take would be exceeded when the take exceeds an unknown number of gray bats in 577 acres of summer foraging habitat, and an unknown number of Indiana bats and northern long-eared bats in 15,935 acres of suitable summer habitat, which is what has been exempted from the prohibitions of Section 9 of the BO. Reasonable and prudent measures (RPMs) to minimize the take, and terms and conditions, that must be observed when implementing those RPMs, are also included in the BO. Arnold AFB submits an annual report to the USFWS regarding actions taken related to the BO. The most recent annual report was submitted in January 2020.

The proposed demolition and new construction projects could result in potential direct and indirect impacts on federally listed species. In particular, a project proposed at Elk River Dam (ANZY030047A), which would construct a 650-linear-foot watercraft barrier at the dam, could affect the gray bat population there. However, the proposed watercraft barrier project would follow the mitigation and adaptive management measures outlined in the 2016 BO/Incidental Take Statement, such as timing of construction activities to avoid work during times of the year when active roosts occur, which would minimize any effects to the gray bat.

Further, the USFWS's 2016 BO/Incidental Take Statement will provide a framework for mitigation and adaptive management measures that would be implemented for each project with the potential to affect federally listed species. In addition, in accordance with the INRMP, the Air Force would continue to implement species and habitat-specific management consideration and measures to offset potential impacts on federally listed species, as well as the operational procedures outlined in the Arnold Air Force Base Woods Dam Reservoir Management Plan for the protection of gray bats (see Section 5.0 of Attachment 3).

Therefore, with the implementation of the mitigation and adaptive management measures described in the 2016 BO and in the Woods Dam Reservoir Management Plan, the Air Force has determined the Installation development at Arnold AFB *may affect, but is not likely to adversely affect*, the gray bat, Indiana bat, and northern long-eared bat on Arnold AFB. We request written concurrence with our determination as part of the informal consultation process. If you have any questions or concerns, please contact Ms. Shannon Allen, NEPA, Natural & Cultural Resources Planner, at shannon.allen.1@us.af.mil; 931-454-5466; or AEDC/TSDCI, Attn: Shannon Allen, 100 Kindel Drive, Arnold AFB TN 37389-2322. Thank you in advance for your assistance in this effort.

Sincerely,

JOHN W. LAVIOLETTE
BASE CIVIL ENGINEER

Attachments:
1. Map of Proposed Action Area at Arnold Air Force Base
2. USFWS Species List (Consultation Code: 04ET1000-2021-SLI-0340)
3. Final Natural Resources Report for the Environmental Assessment for Installation Development at Arnold Air Force Base, Tennessee – November 2020

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT COMPLEX (AFMC)
ARNOLD AIR FORCE BASE TENNESSEE

10 February 20

AEDC/TSDCI
100 Kindel Drive, Suite B-322
Arnold AFB TN 37389-2322

Tennessee Historic Commission
Attn: Mr. Patrick McIntyre Jr.
State Historic Preservation Officer
2941 Lebanon Road
Nashville TN 37243-0442

Dear Mr. McIntyre:

The United States Air Force (Air Force) is proposing to implement 357 Installation development projects at Arnold Air Force Base (AFB), Tennessee. To take into account various environmental concerns, the Air Force is engaging early with the appropriate resource and regulatory agencies as it formulates the undertaking. The Air Force is also preparing an Environmental Assessment (EA) under the National Environmental Policy Act to evaluate potential environmental impacts associated with Installation development at Arnold AFB.

In accordance with Section 306108 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 CFR Part 800, the Air Force, Arnold AFB, is advising you of a proposed undertaking that has the potential to affect historic properties. The undertaking proposes 357 individual projects that are broadly divided into two categories: demolition of aging facilities and infrastructure projects. The six proposed demolition projects would achieve efficiency and support growth associated with the Arnold AFB mission requirements. The facilities scheduled for demolition no longer support the needs of Arnold AFB; repair and/or renovation of these facilities has been assessed as cost prohibitive. The demolition of these facilities would result in available land for redevelopment within the existing developed area of the Installation and reduce the potential need for the construction of new facilities on undisturbed land. The proposed infrastructure projects encompass a wide range of projects that include new construction (30), facility renovation (186), utility upgrades (123), and road maintenance (12). Projects included this group range from exterior building painting, to interior and exterior building renovation, to asbestos abatement and removal for buildings throughout the Installation. Projects are planned that will address multiple building deficiencies and provide multiple building improvements.

The Area of Potential Effect (APE; Attachment 1) for this undertaking is therefore defined as the footprints of each of the proposed 357 Installation development projects at Arnold AFB. The footprints of the individual projects intersect with four archeological sites, five individually eligible historic buildings, 66 contributing built resources in the Arnold AFB Test Facility Historic District, 10 contributing resources within the Test Utilities Historic Landscape, and four contributing resources within the Elk River Dam-Woods Reservoir Historic Landscape. The four archaeological sites located within the project footprints have been determined not eligible for listing in the NRHP. The four sites are

40CF293 (Cochrane et al. 2006), 40CF334 (Wampler et al. 2010a), 40FR502, and 40CF310 (Wampler et al. 2010a; Schenker et al. 2010). Previously documented Traditional Cultural Properties are not located within, or in the vicinity of, the proposed projects.

The proposed projects were analyzed individually and collectively for their potential to affect historic properties. The analysis was conducted in accordance with the *Programmatic Agreement (PA) between Arnold Engineering Development Complex, Arnold Air Force Base and the Tennessee State Historic Preservation Officer Regarding Management of Historic Properties at Arnold Air Force Base, Tennessee Pursuant to 36 CFR Part 800.14* negotiated in 2014 and in effect until 2024. The proposed projects will have a range of effects, all of which are addressed in the stipulations of the 2014 PA. The results of the effects analysis for individual proposed projects are presented in Attachment 2: *Final Cultural Resources Report for the Environmental Assessment for Installation Development at Arnold Air Force Base, Tennessee*.

The proposed 357 projects encompassed by the current action are covered by the terms and conditions of 2014 PA. Implementation of the PA demonstrates that Arnold AFB has taken historic properties into account and has satisfied NHPA Section 106 responsibilities for the 357 individual projects proposed.

We request your comment and/or concurrence on these findings. If we do not receive your comments and/or concurrence within the required 30 days we will assume concurrence and proceed with the undertaking as described.

Please contact Ms. Shannon Allen, NEPA, Natural & Cultural Resources Planner, at shannon.allen.1@us.af.mil; 931-454-5466; or AEDC/TSDCI, Attn: Shannon Allen, 100 Kindel Drive, Arnold AFB TN 37389-2322 if you have any questions.

Sincerely,

JOHN W. LAVIOLETTE
BASE CIVIL ENGINEER

Attachments:
1. Area of Potential Effect for Installation Development at Arnold Air Force Base
2. *Final Cultural Resources Report for the Environmental Assessment for Installation Development at Arnold Air Force Base, Tennessee* – December 2020

TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON PIKE
NASHVILLE, TENNESSEE 37243-0442
OFFICE: (615) 532-1550
www.tnhistoricalcommission.org

March 1, 2021

Mr. John W. Laviotette
Arnold Air Force Base
100 Kindel Drive
Arnold AFB, TN 3789-2322

RE: DOD / Department of Defense, Arnold Air Force Base, 357 Installation Development Projects, Coffee and Franklin Counties, TN

Dear Mr. Laviotette:

At your request, our office has reviewed the proposed undertakings and attached cultural resources report. This review is a requirement of Section 106 of the National Historic Preservation Act for compliance by the participating federal agency or applicants for federal assistance. Procedures for implementing Section 106 of the Act are codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

We concur with your agency that continued implementation of the 2014 programmatic agreement (PA) is the appropriate process for meeting your Section 106 compliance obligation for these undertakings. Please continue to consult with our office as necessary under the stipulations of the agreement.

There are errors in the provided cultural resources report concerning some projects labeled as No Historic Properties Affected that should be listed as No Adverse Effect. One such instance is on page 27. On this page, the interior work on 34 historic resources is proposed. The document says this work would have no effect on historic resources. That is not the case. Any work done to a historic resource will affect it, with the result being either an adverse effect or no adverse effect. Just because the work is located inside these buildings does not mean that they are not affected. There are similar problems in the chart provided at the back of the document. Please refer to the terms of the PA and make the necessary corrections to your effect determinations.

Upon receipt of the revised report, we will continue our review of these undertaking as expeditiously as possible. Until such time as this office has rendered a final comment on this project, your Section 106 obligation under federal law has not been met. Questions and comments may be directed to Jennifer M. Barnett (615) 687-4780, Jennifer.Barnett@tn.gov or Ms. Casey Lee (615) 253-3163 Casey.Lee@tn.gov .

Your cooperation is appreciated.

Sincerely,

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

EPM/jmb

TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON PIKE
NASHVILLE, TENNESSEE 37243-0442
OFFICE: (615) 532-1550
www.tnhistoricalcommission.org

March 12, 2021

Ms. Shannon L. Allen
United States Air Force
Arnold Engineering Development Complex
100 Kindel Drive,Suite B-322
Arnold AFB, TN 37389-1322

RE: DOD / Department of Defense, 357 Installation Development Projects, Arnold Air Force Base, Multiple Counties County, TN

Dear Ms. Allen:

At your request, our office has reviewed the proposed undertakings and attached cultural resources report. This review is a requirement of Section 106 of the National Historic Preservation Act for compliance by the participating federal agency or applicant for federal assistance. Procedures for implementing Section 106 of the Act are codified at 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

Based on the information provided, it appears you addressed our previous comments on this report. Our office continues to concur with your agency that continued implementation of the 2014 programmatic agreement (PA) is the appropriate process for meeting your Section 106 compliance obligation for these undertakings. Please continue to consult with our office as necessary under the stipulations of the agreement.

Your continued cooperation is appreciated.

Sincerely,

E. Patrick McIntyre, Jr.

cjl

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

EPM/cjl

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS ARNOLD ENGINEERING DEVELOPMENT COMPLEX (AFMC)
ARNOLD AIR FORCE BASE TENNESSEE

16 April 2021

MEMORANDUM FOR AEDC/Real Property Officer

FROM: AEDC/TSDCI

SUBJECT: Historically Eligible Facilities Listing Concurrence

Through consultation with the Tennessee State Historic Preservation Officer (TN SHPO) as required in the National Historic Preservation Act (NHPA), and its implementing policy, 36 CFR 800; the Cultural Resources Manager has reviewed and concurs with the below listed facilities on Arnold AFB being designated either 1.) "Eligible as a Contributing Element to Arnold AFB Test Facilities Historic District" (NREC), or 2.) "Individually Eligible Under Criteria A and C" (NREI). Assessments and Recommendations are from "A Cultural Resources Survey of Cold War Era Resources At Arnold Air Force Base, Coffee and Franklin Counties, Tennessee."

100	NREI		675	NREC		786	NREC		882	NREC		1476	NREI	
350	NREI		676	NREC		787	NREC		884	NREC		1478	NREI	
451	NREI		678	NREC		789	NREC		885	NREC		1502	NREC	
520	NREC		685	NREC		790	NREC		890	NREC		1504	NREC	
522	NREC		707	NREC		793	NREC		891	NREC		1506	NREC	
530	NREC		710	NREC		795	NREC		893	NREC		1507	NREC	
559	NREC		711	NREC		830	NREC		898	NREC		1525	NREC	
560	NREC		720	NREC		850	NREC		899	NREC		1526	NREC	
561	NREC		721	NREC		860	NREC		903	NREC		1545	NREC	
578	NREC		722	NREC		868	NREC		911	NREC		1560	NREC	
579	NREC		740	NREC		869	NREC		912	NREC		2102	NREC	
607	NREC		745	NREC		871	NREC		913	NREC		3038	NREC	
646	NREC		750	NREC		876	NREC		914	NREC		3039	NREC	
648	NREC		760	NREC		877	NREC		916	NREC		3101	NREC	
651	NREC		775	NREC		878	NREC		921	NREC		20007	NREC	
653	NREC		780	NREI		879	NREC		922	NREC		20008	NREC	
670	NREC		784	NREC		880	NREC		929	NREC				
671	NREC		785	NREC		881	NREC		936	NREC				

Shannon Allen
Cultural Resources Manager
Civil Engineer Branch

2 Attachments:
1. TN SHPO Concurrence Letter, 21 June 2016
2. TN SHPO Concurrence Letter, 18 October 2017

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Tennessee Ecological Services Field Office
446 Neal Street
Cookeville, Tennessee 38501
(931) 528-6481

May 5, 2021

Mr. John LaViolette
Base Civil Engineer
AEDC/TSDCI
100 Kindel Drive, Suite B-322
Arnold AFB TN 37389-2322

Attn: Ms. Shannon Allen

Subject: FWS #2021-CPA-0069. Informal consultation on listed bats for activities to be conducted at Arnold Air Force Base, Tennessee.

Dear Mr. LaViolette,

Thank you for the recent notice of your determination in fulfillment of requirements of the Endangered Species Act (ESA) of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.). You provided us with a consultation letter regarding the gray bat (*Myotis grisescens*), Indiana bat (*Myotis sodalis*), and northern long-eared bat (*Myotis septentrionalis*). This ESA consultation is being conducted in association with an upcoming environmental assessment (EA) addressing activities in development at Arnold Air Force Base (AAFB).

We understand that the draft EA will include analyses for actions to be conducted during the period of fiscal years 2021 to 2026: six demolition projects, 30 new construction projects, 186 facility renovations, 12 road maintenance projects, and 123 utility upgrades. These projects would be conducted in accordance with a programmatic consultation between AAFB and the Fish and Wildlife Service, which concluded with a 2016 Biological Opinion (BO).

The Air Force has determined that, given implementation of mitigation and adaptive management measures as described in the 2016 BO and Woods Dam Reservoir Management Plan, development at AAFB may affect but is not likely to adversely affect the three bat species. We concur with that determination. AAFB has been compliant with the reasonable and prudent measures discussed in the BO and commitments as proposed in the associated Biological Assessment, and we anticipate ongoing cooperation in that regard. AAFB must reconsider section 7 obligations if (1) new information reveals that the proposed action may affect listed species in a manner not previously considered, (2) the proposed action is subsequently modified

to include activities which were not considered during this consultation, or (3) new species are listed or critical habitat is designated that might be affected by the proposed action.

Feel free to contact David Pelren, of my staff, at 931-261-5844 or by email at *david_pelren@fws.gov* if you would like to discuss this further.

Sincerely,

Daniel Elbert
Field Supervisor

APPENDIX B

Proposed Installation Development Project Locations on Arnold Air Force Base and Proposed Project Descriptions

FORMAT PAGE

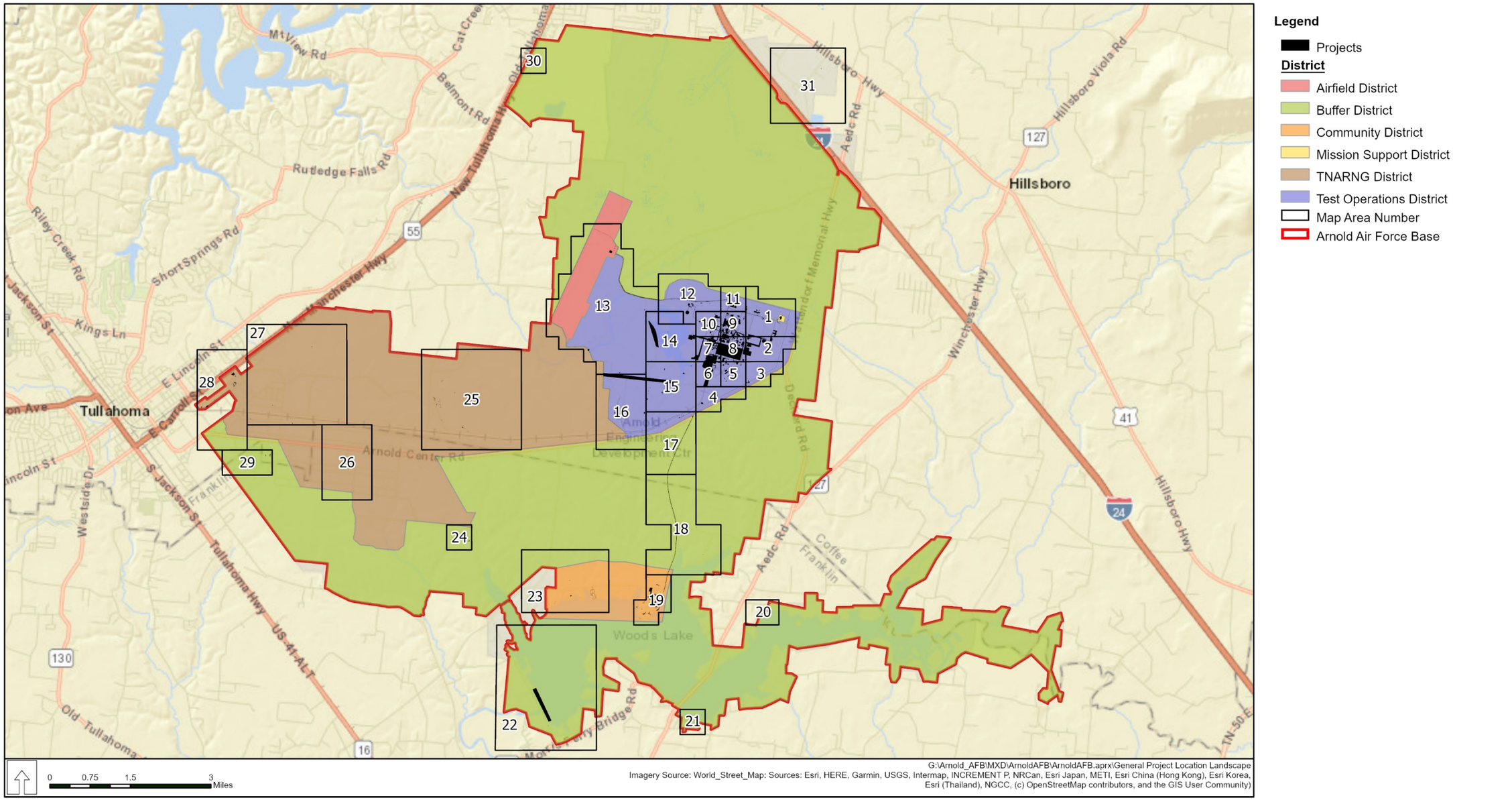

Figure B-1. Proposed Installation Development Projects on Arnold Air Force Base—Map Key

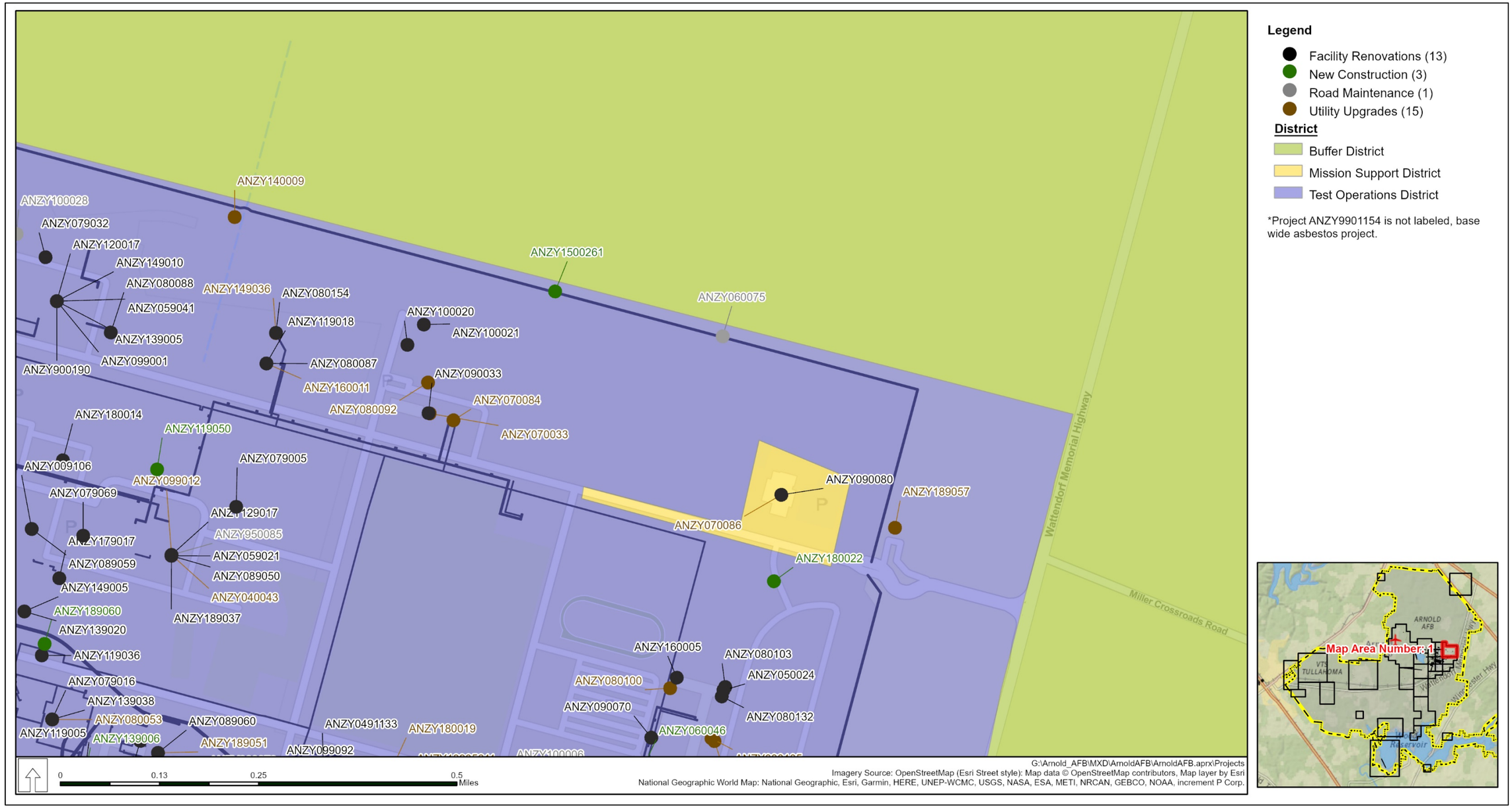

Figure B-2. Proposed Installation Development Projects on Arnold Air Force Base—Map Area 1

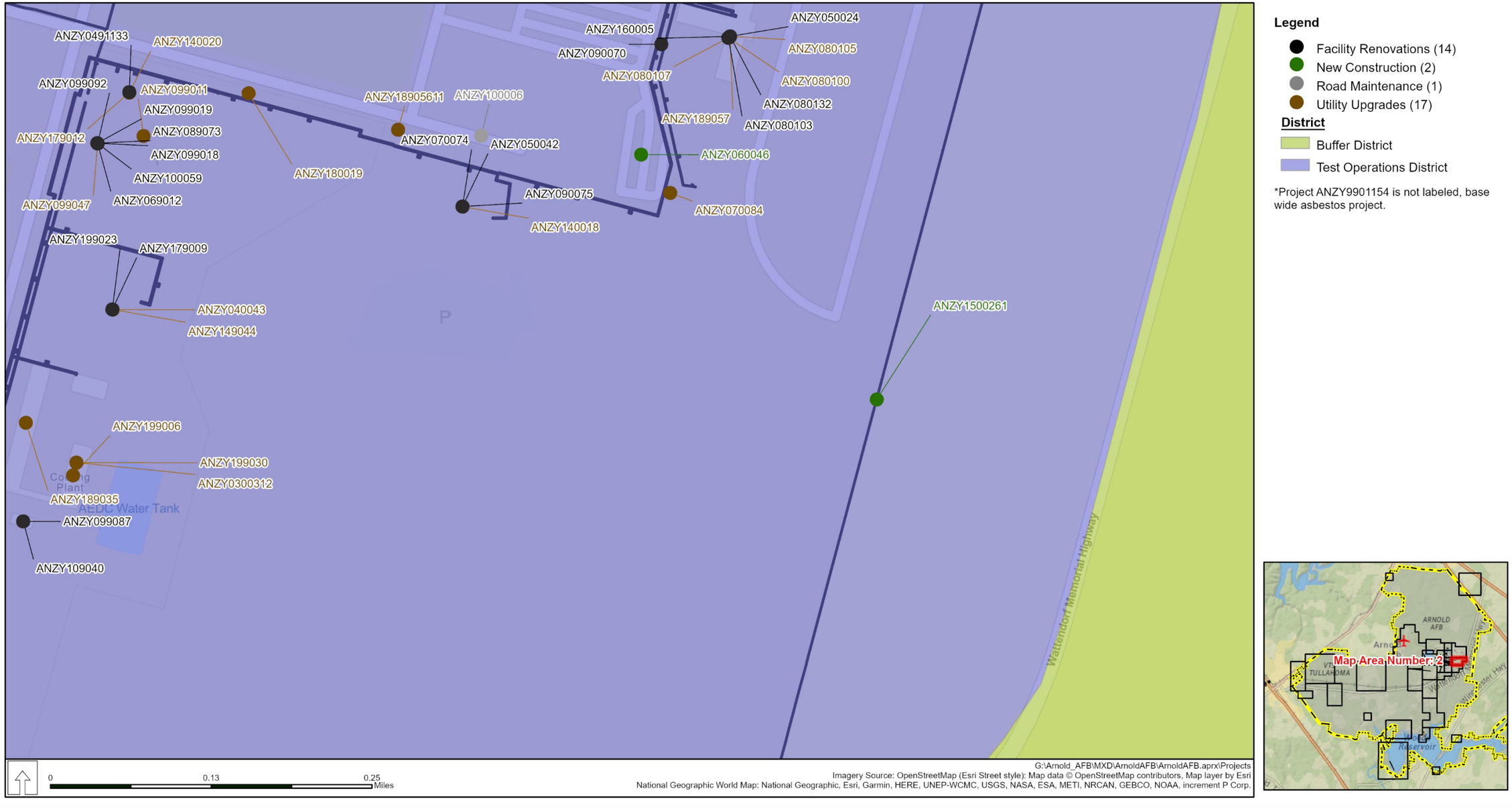

Figure B-3. Proposed Installation Development Projects on Arnold Air Force Base—Map Area 2

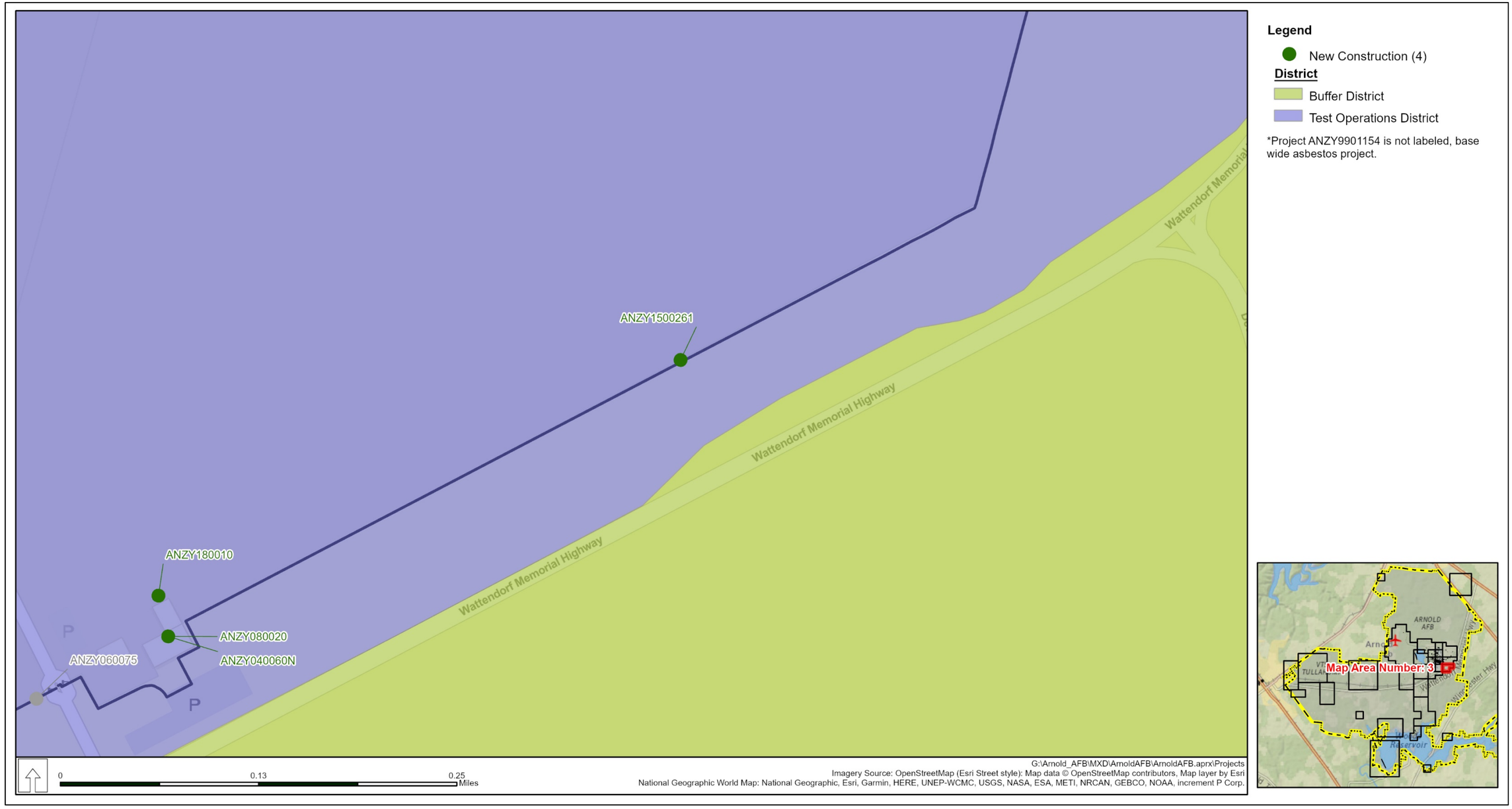

Figure B-4. Proposed Installation Development Projects on Arnold Air Force Base—Map Area 3

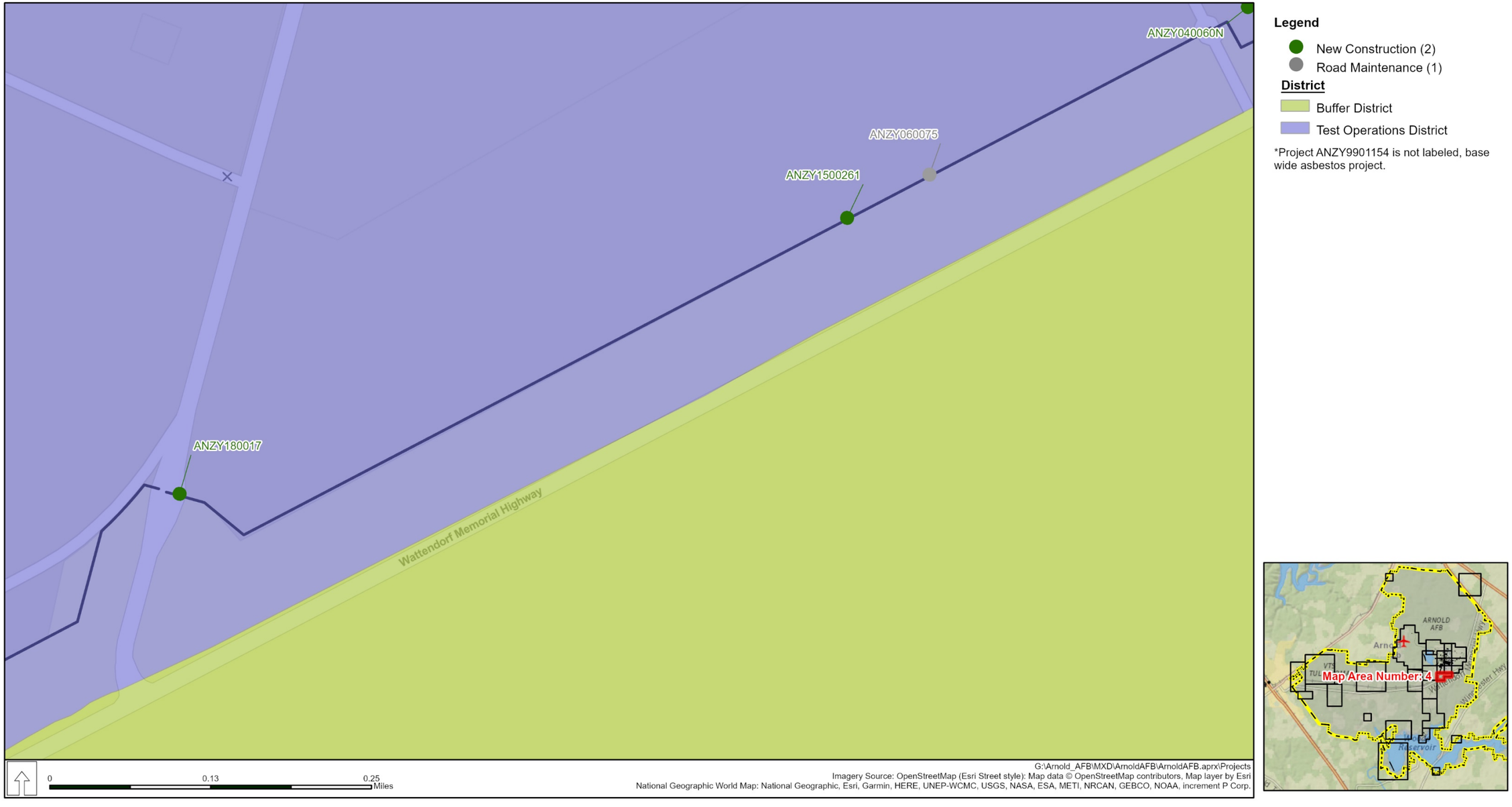

Figure B-5. Proposed Installation Development Projects on Arnold Air Force Base—Map Area 4

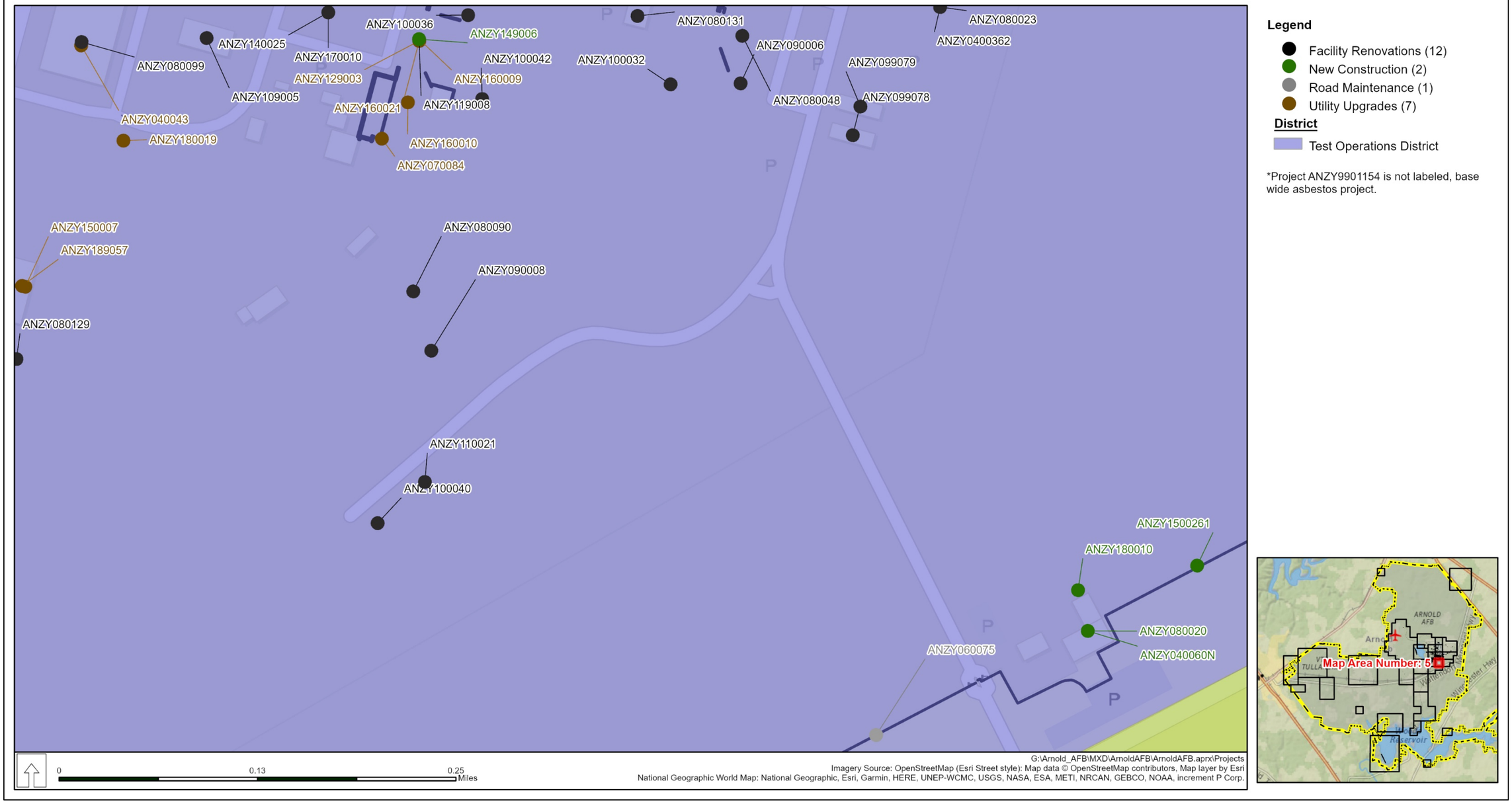

Figure B-6. Proposed Installation Development Projects on Arnold Air Force Base—Map Area 5

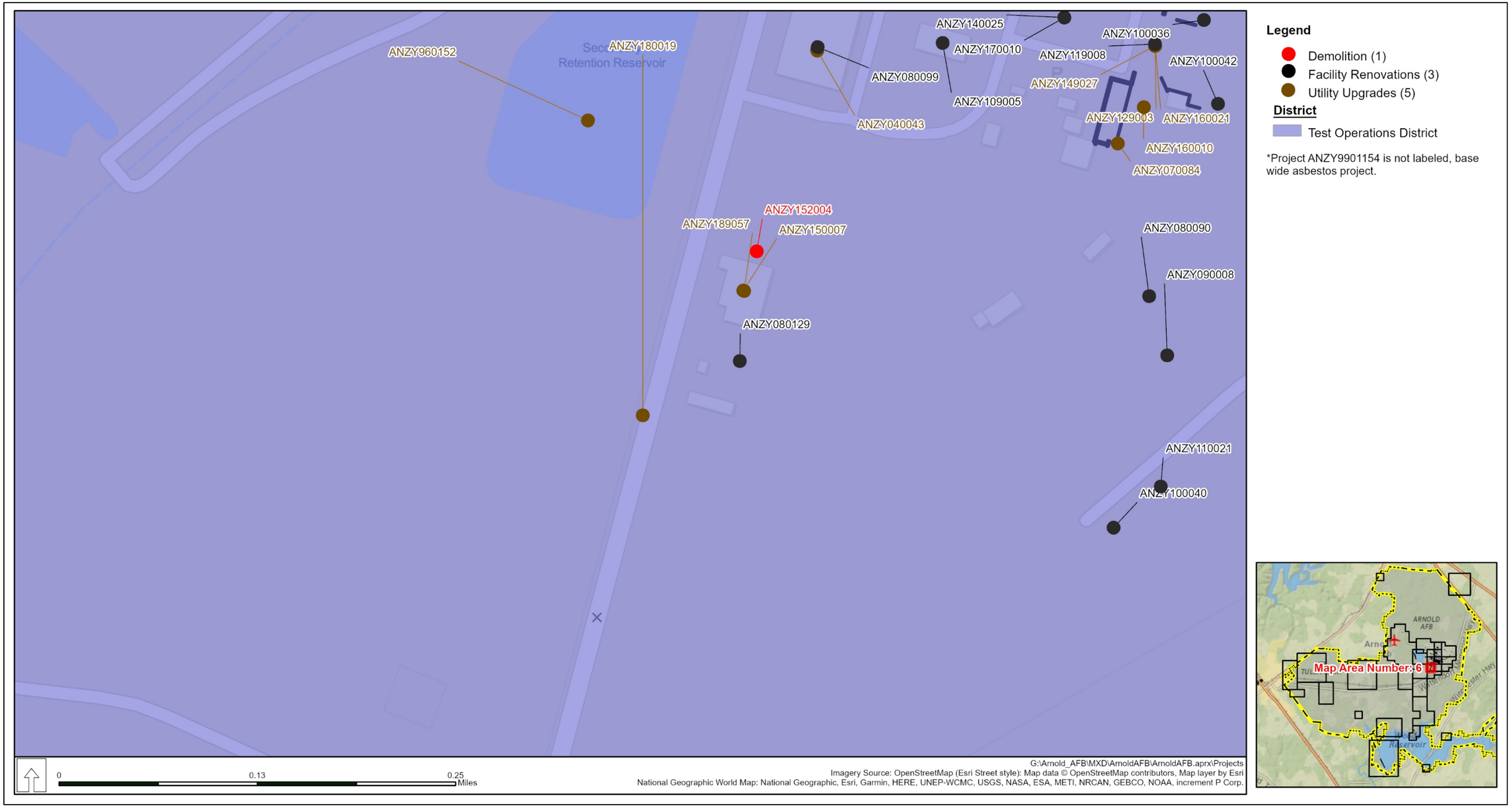

Figure B-7. Proposed Installation Development Projects on Arnold Air Force Base—Map Area 6

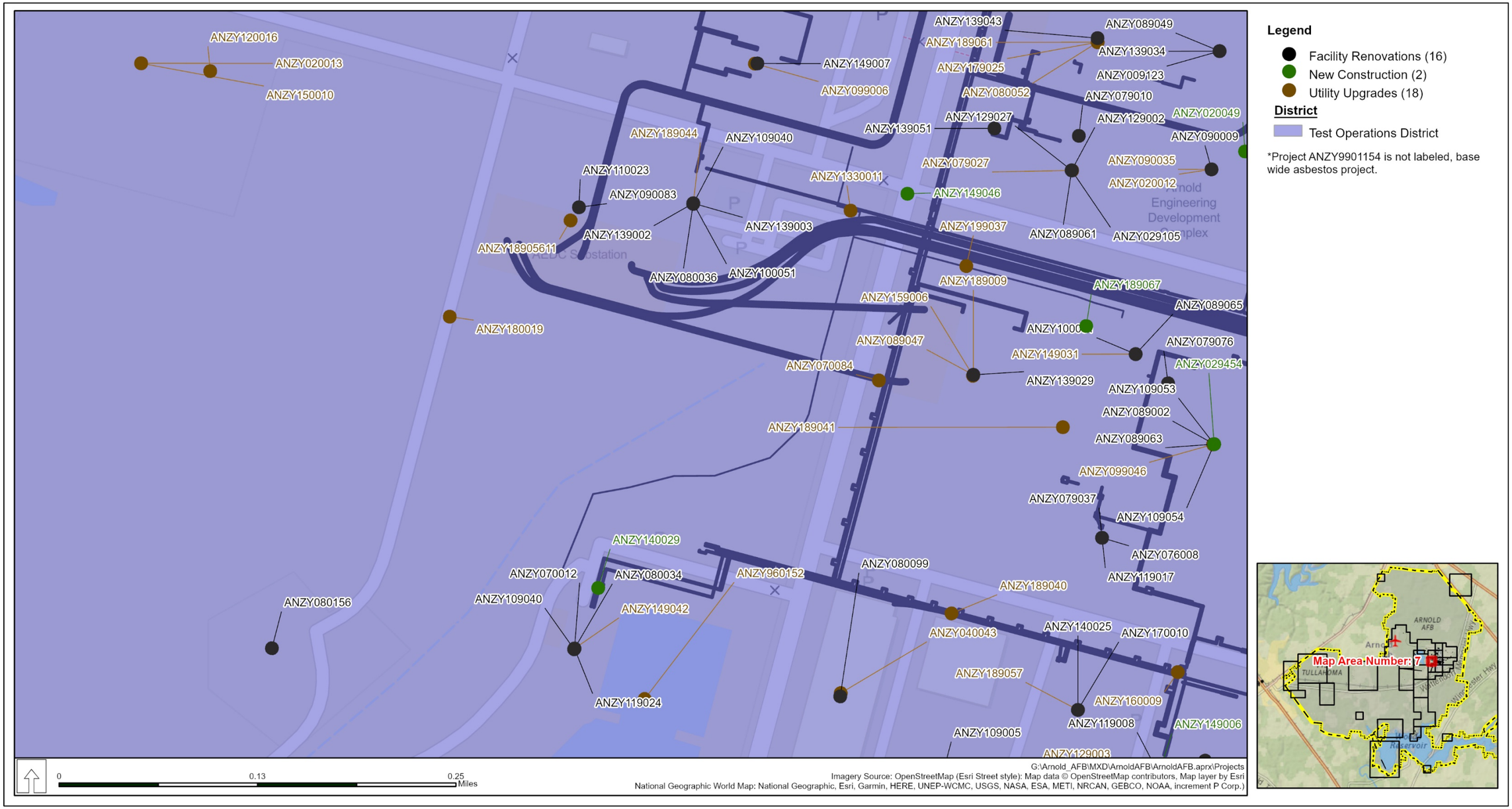

Figure B-8. Proposed Installation Development Projects on Arnold Air Force Base—Map Area 7

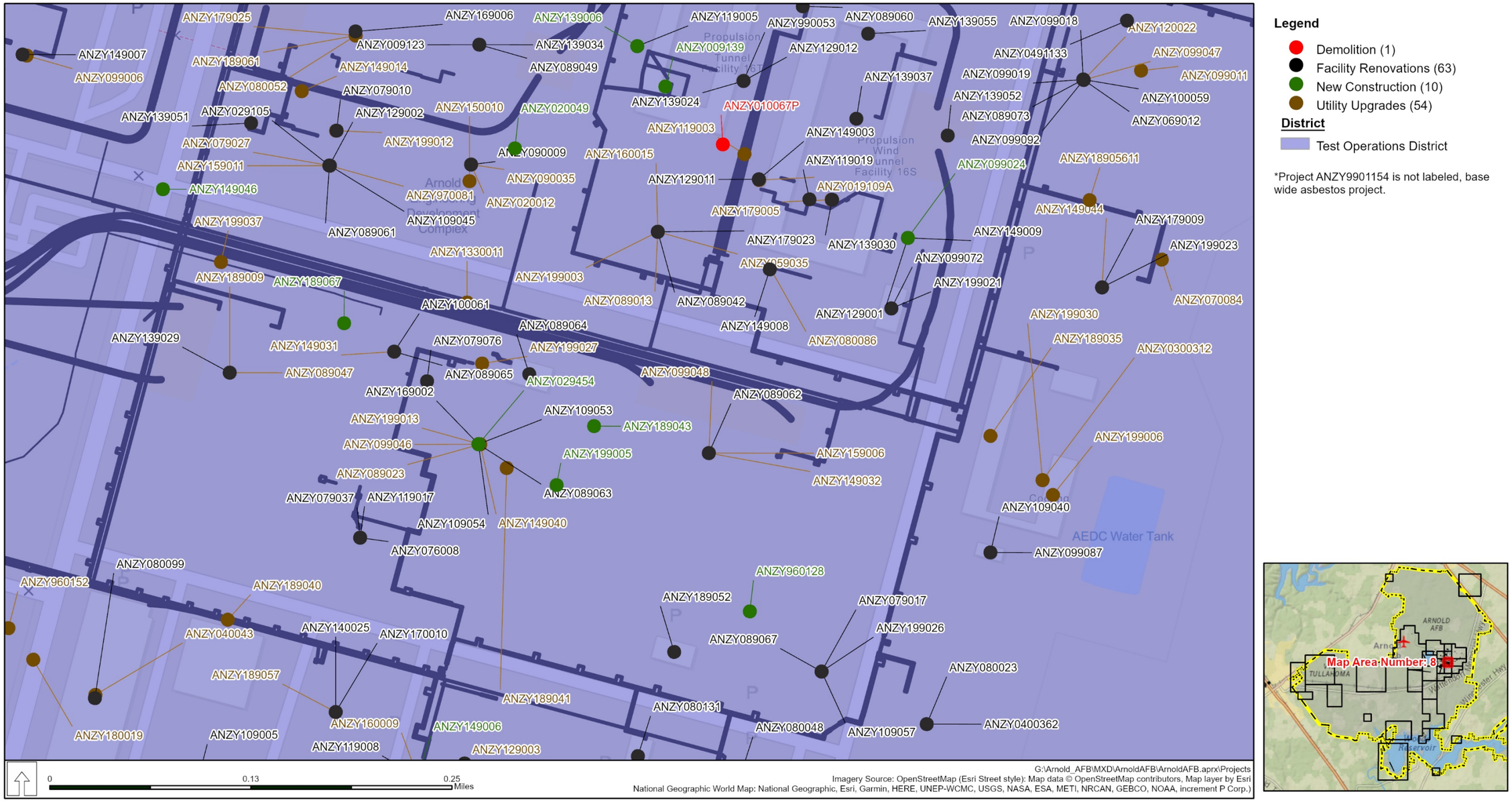

Figure B-9. Proposed Installation Development Projects on Arnold Air Force Base—Map Area 8

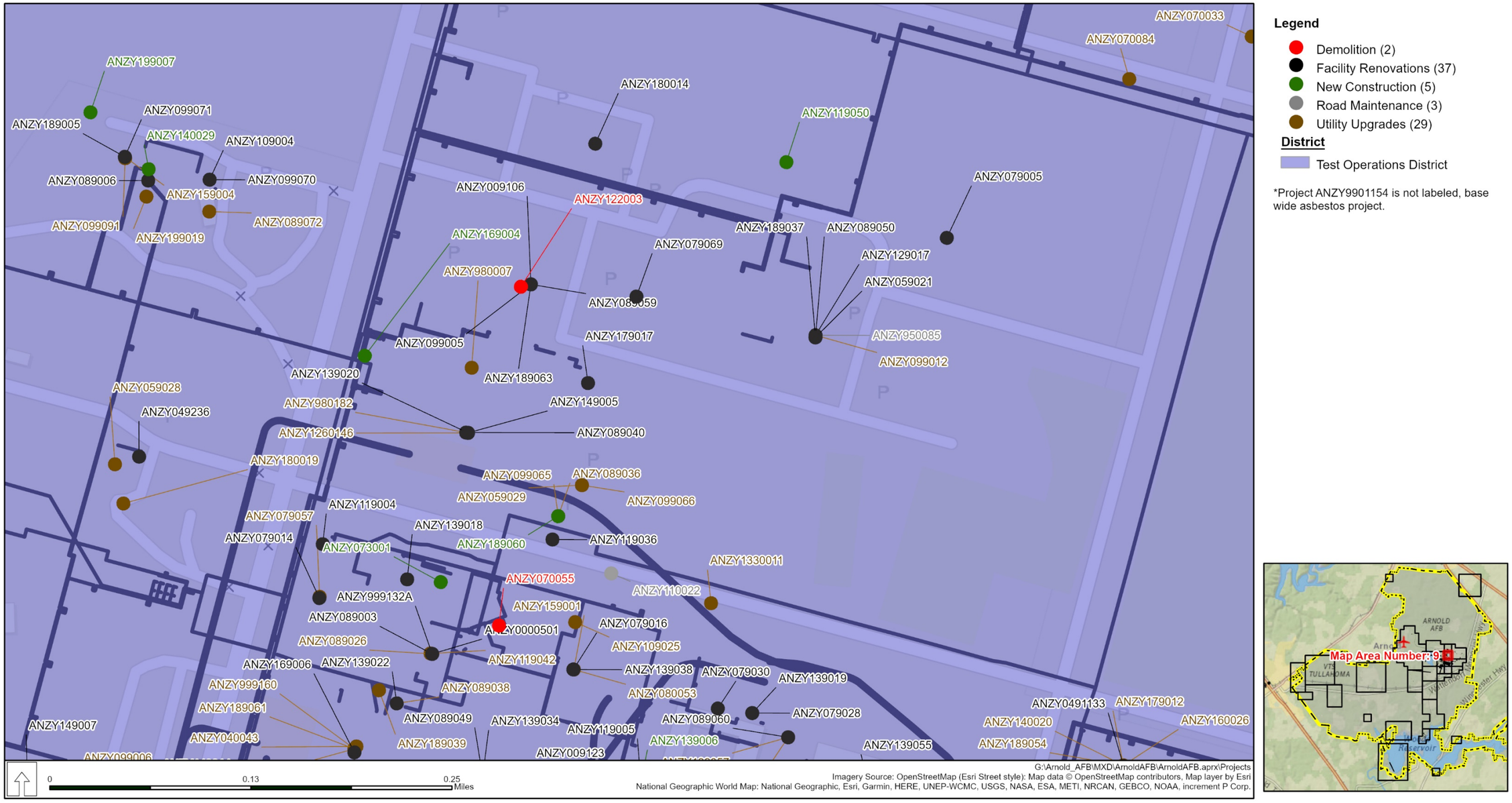

Figure B-10. Proposed Installation Development Projects on Arnold Air Force Base—Map Area 9

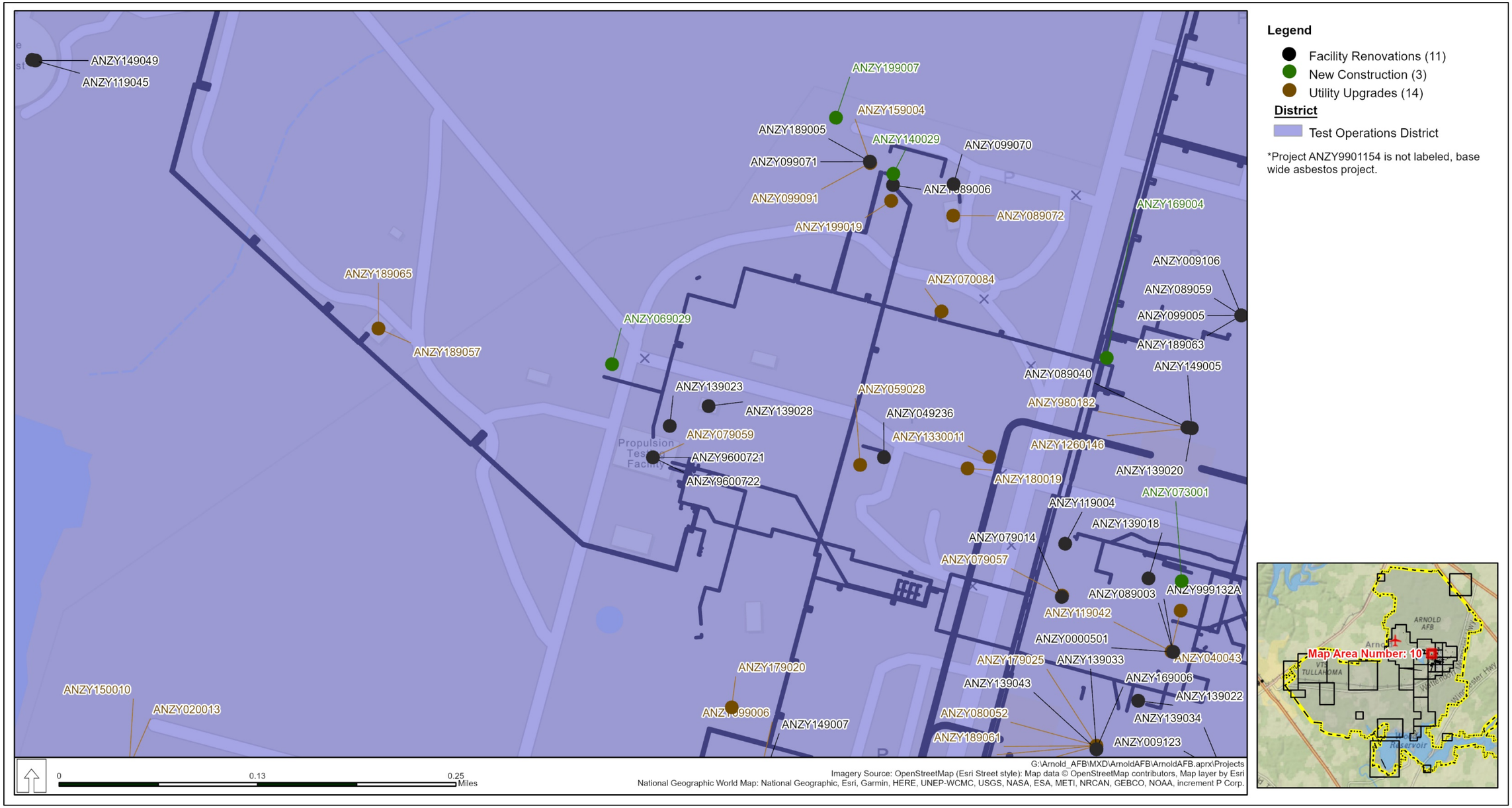

Figure B-11. Proposed Installation Development Projects on Arnold Air Force Base—Map Area 10

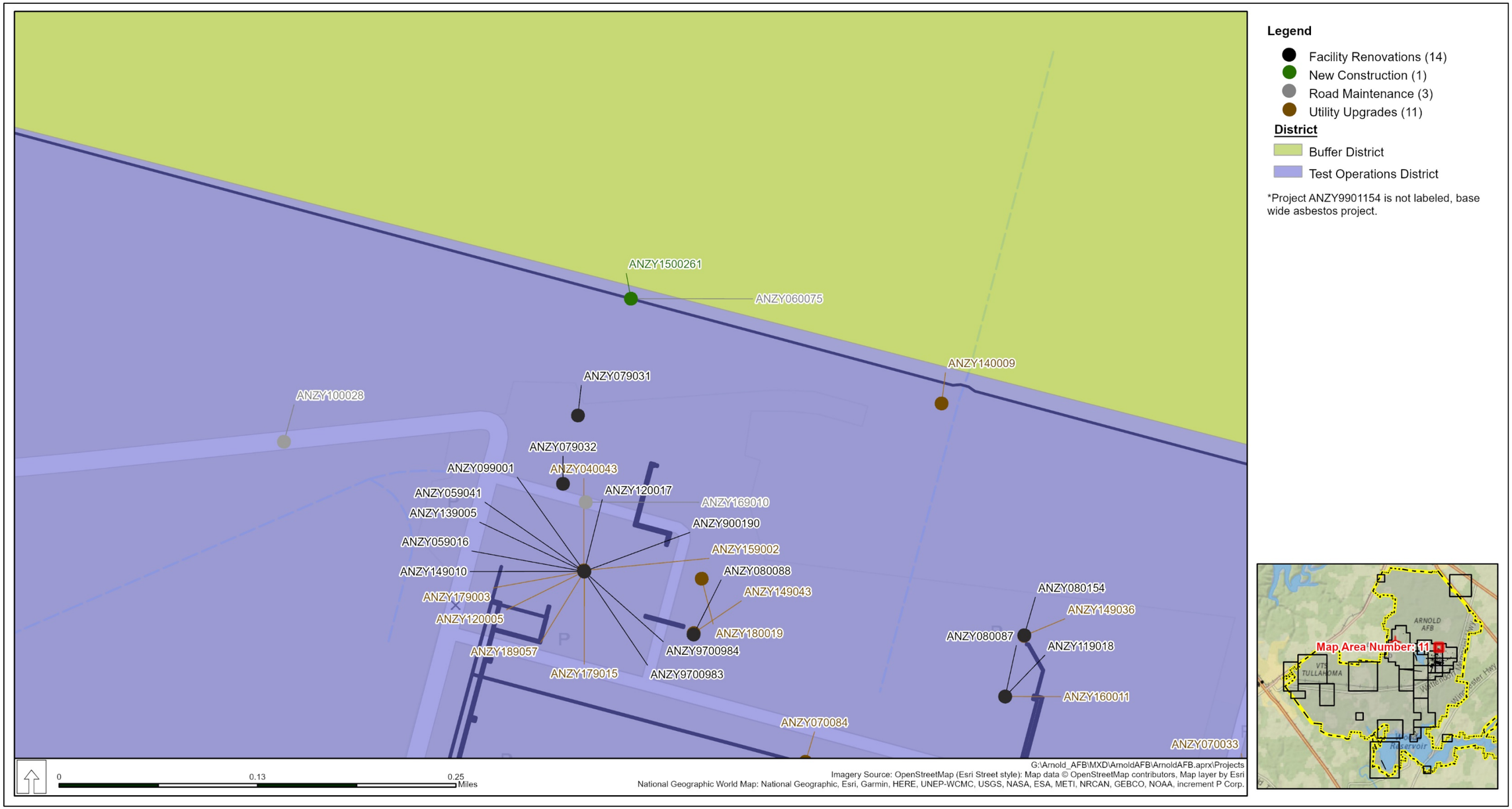

Figure B-12. Proposed Installation Development Projects on Arnold Air Force Base—Map Area 11

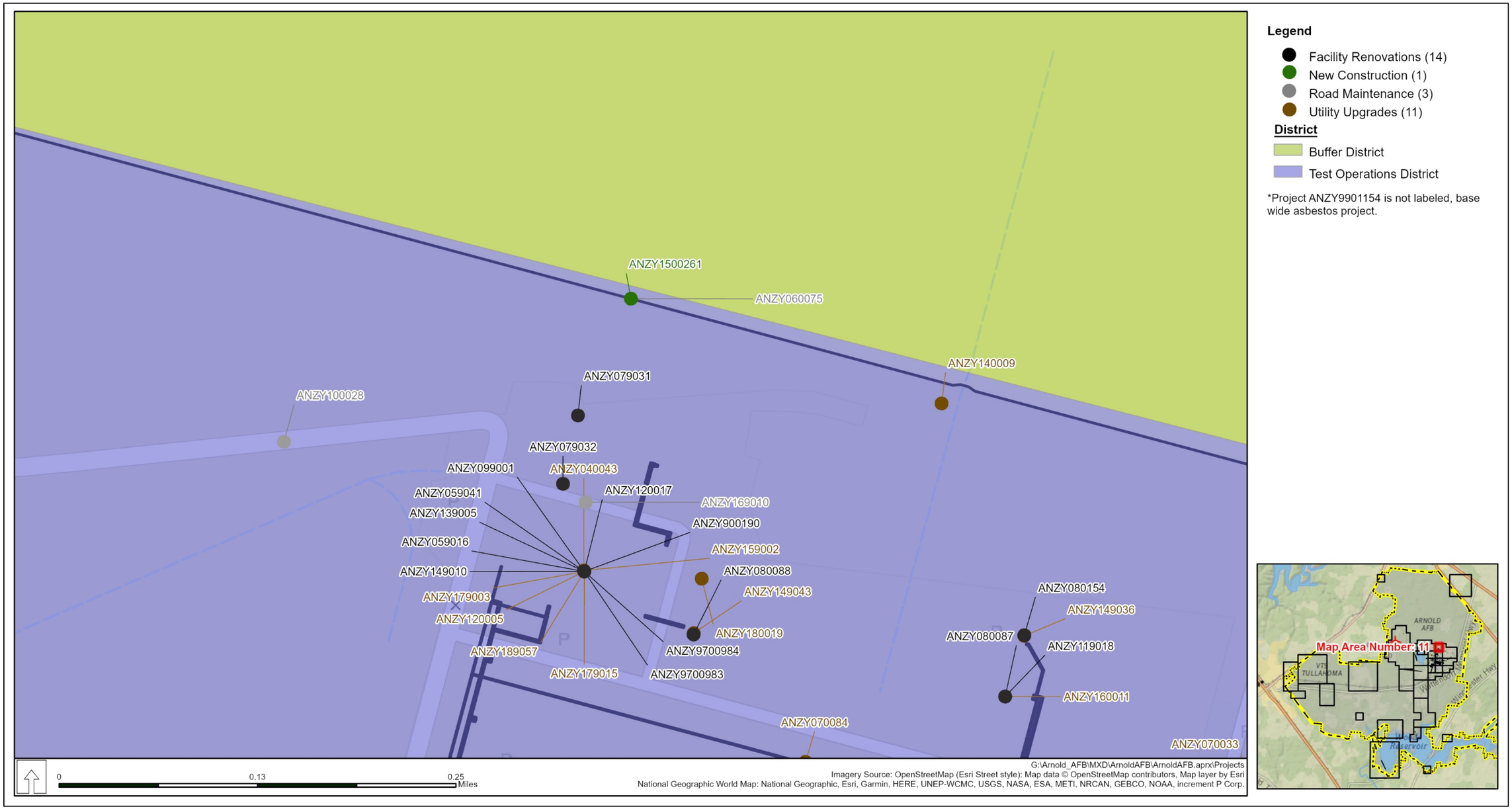

Figure B-13. Proposed Installation Development Projects on Arnold Air Force Base—Map Area 12

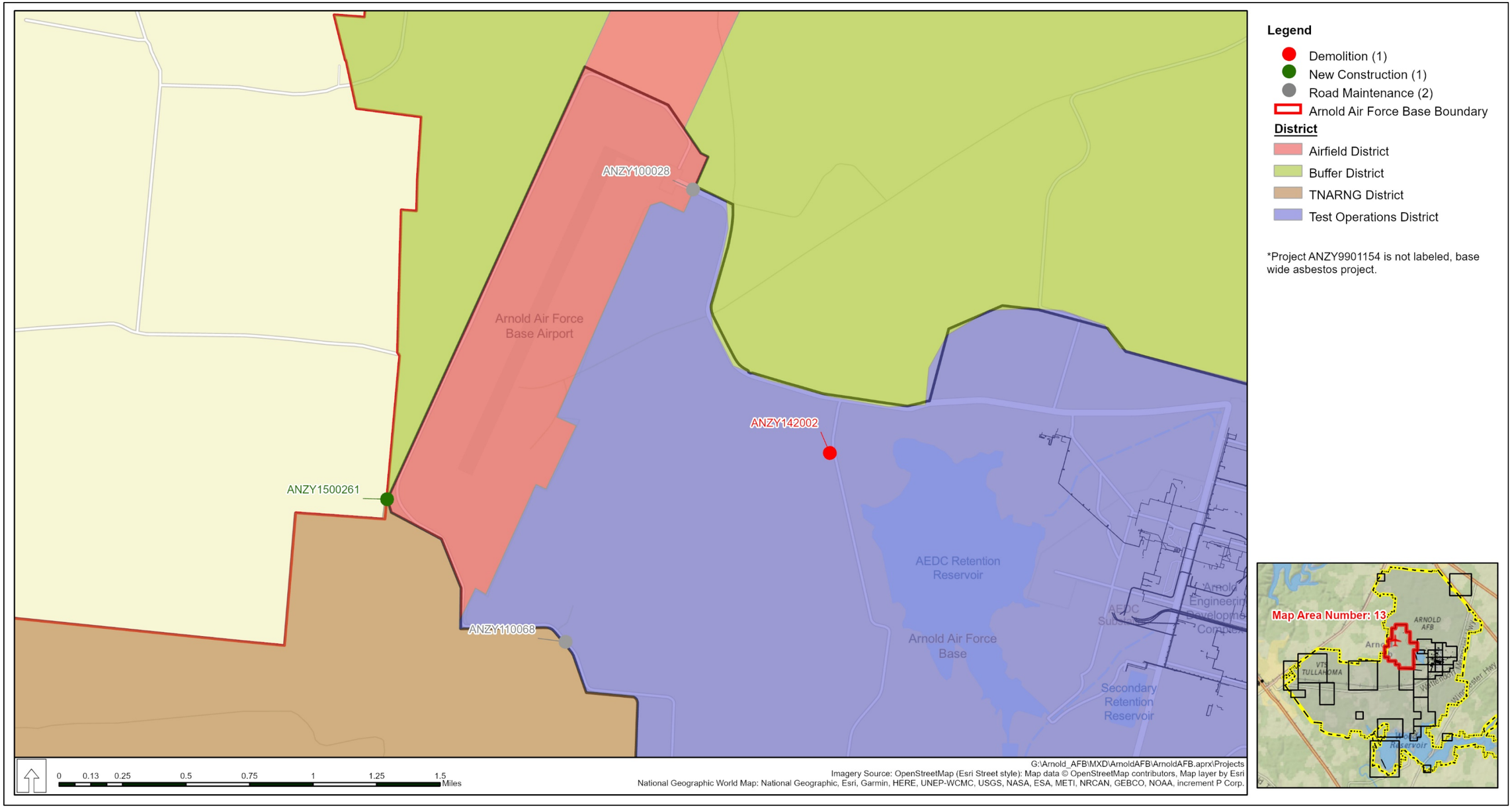

Figure B-14. Proposed Installation Development Projects on Arnold Air Force Base—Map Area 13

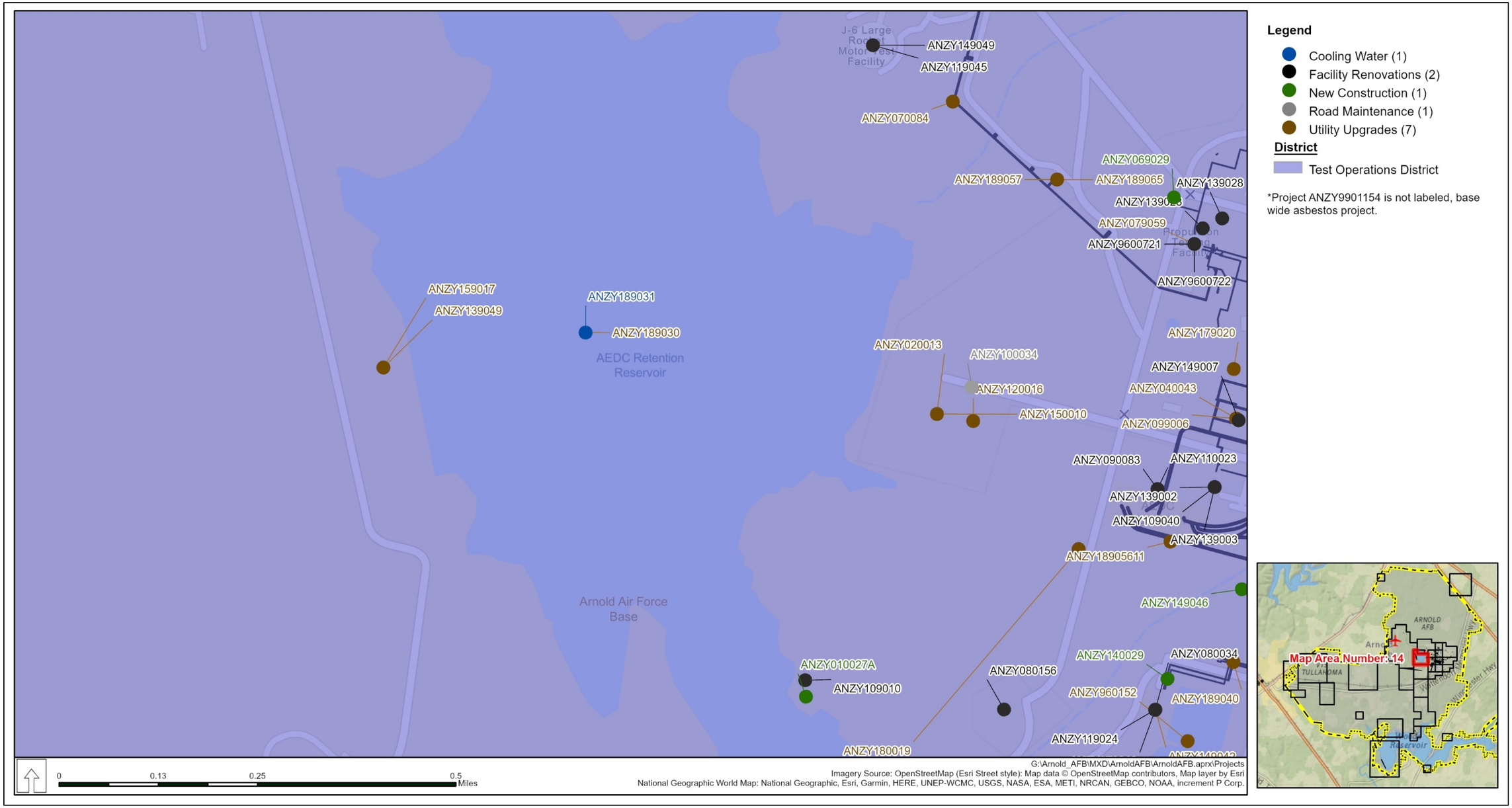

Figure B-15. Proposed Installation Development Projects on Arnold Air Force Base—Map Area 14

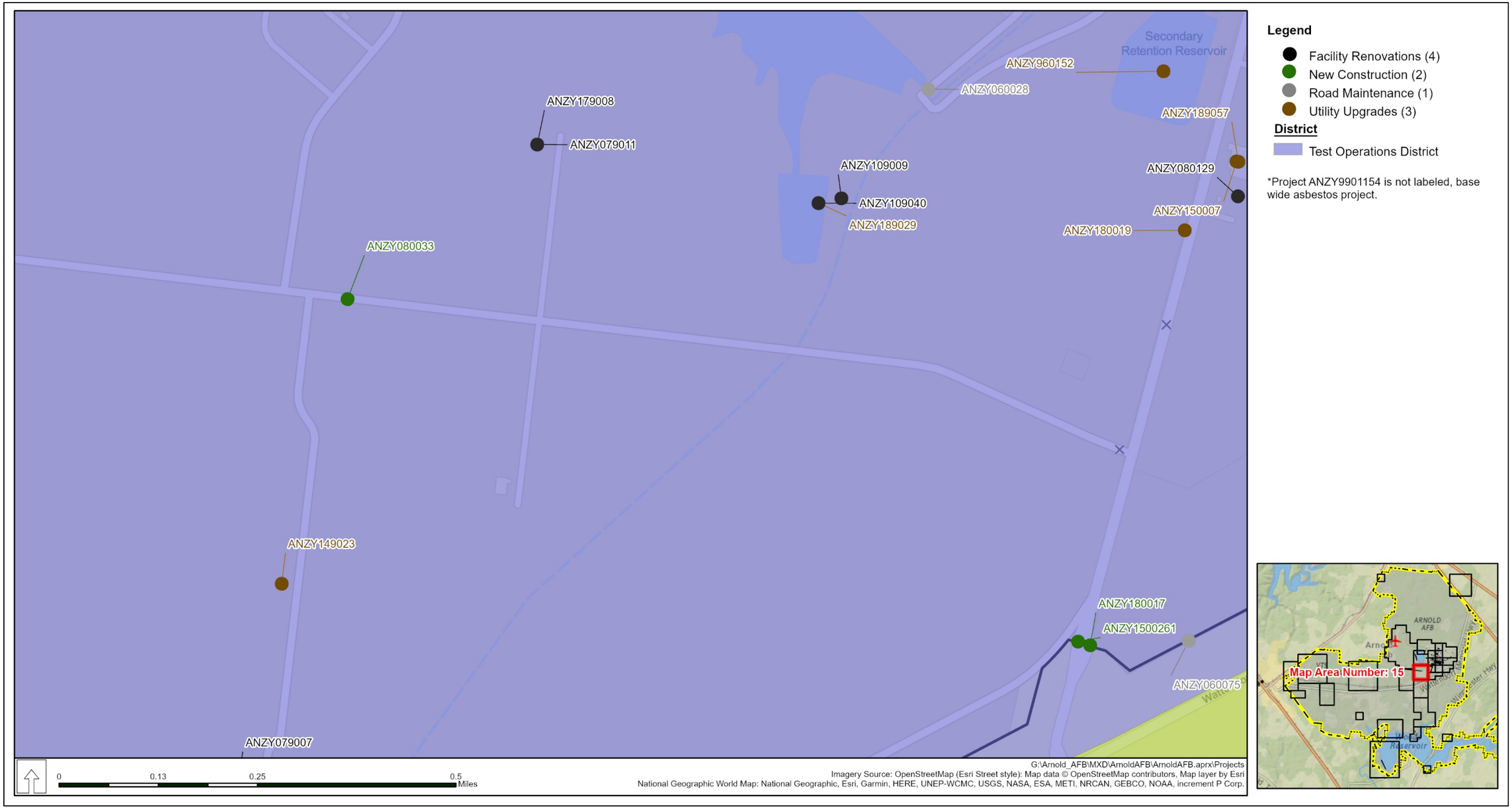

Figure B-16. Proposed Installation Development Projects on Arnold Air Force Base—Map Area 15

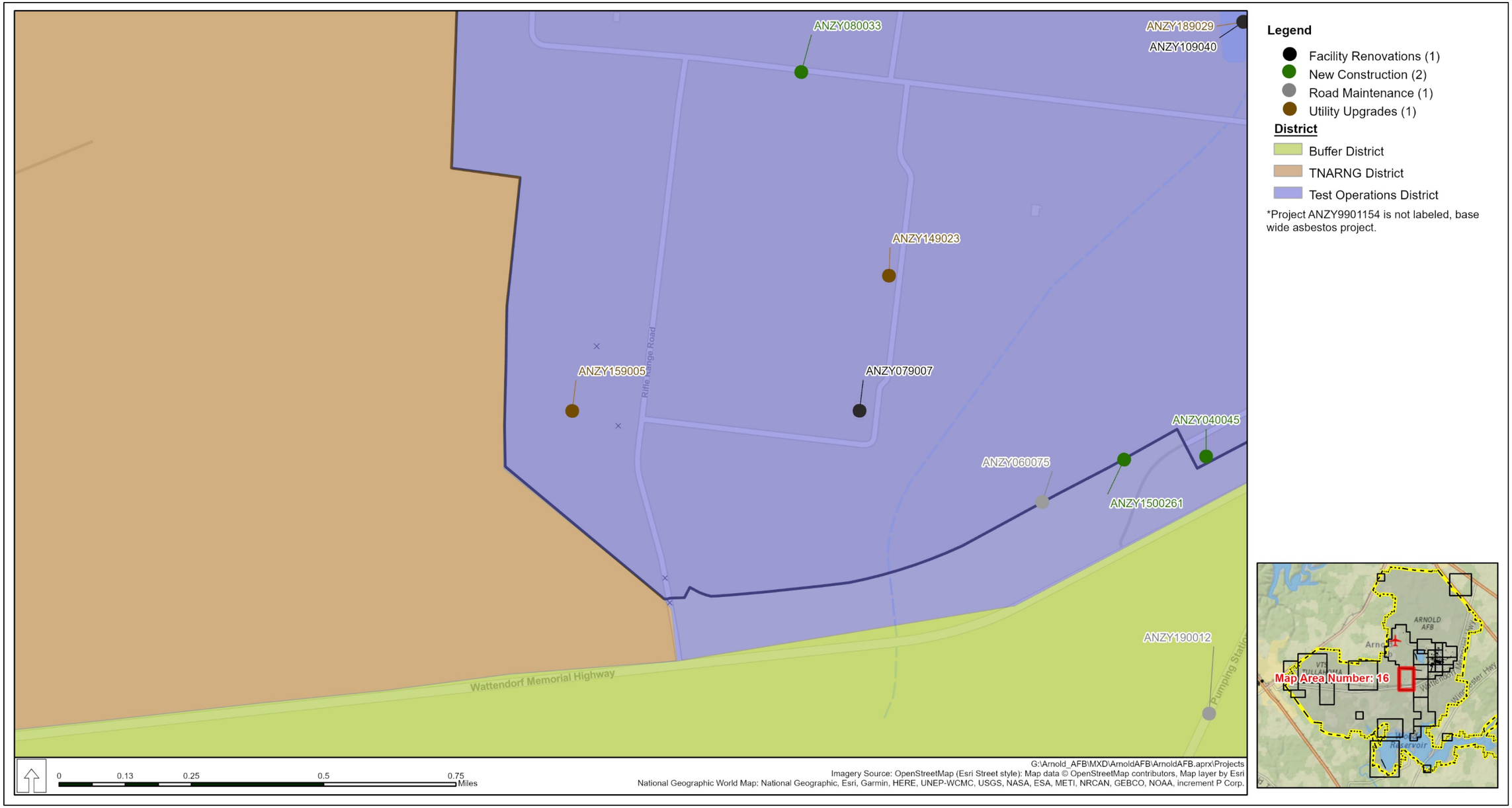

Figure B-17. Proposed Installation Development Projects on Arnold Air Force Base—Map Area 16

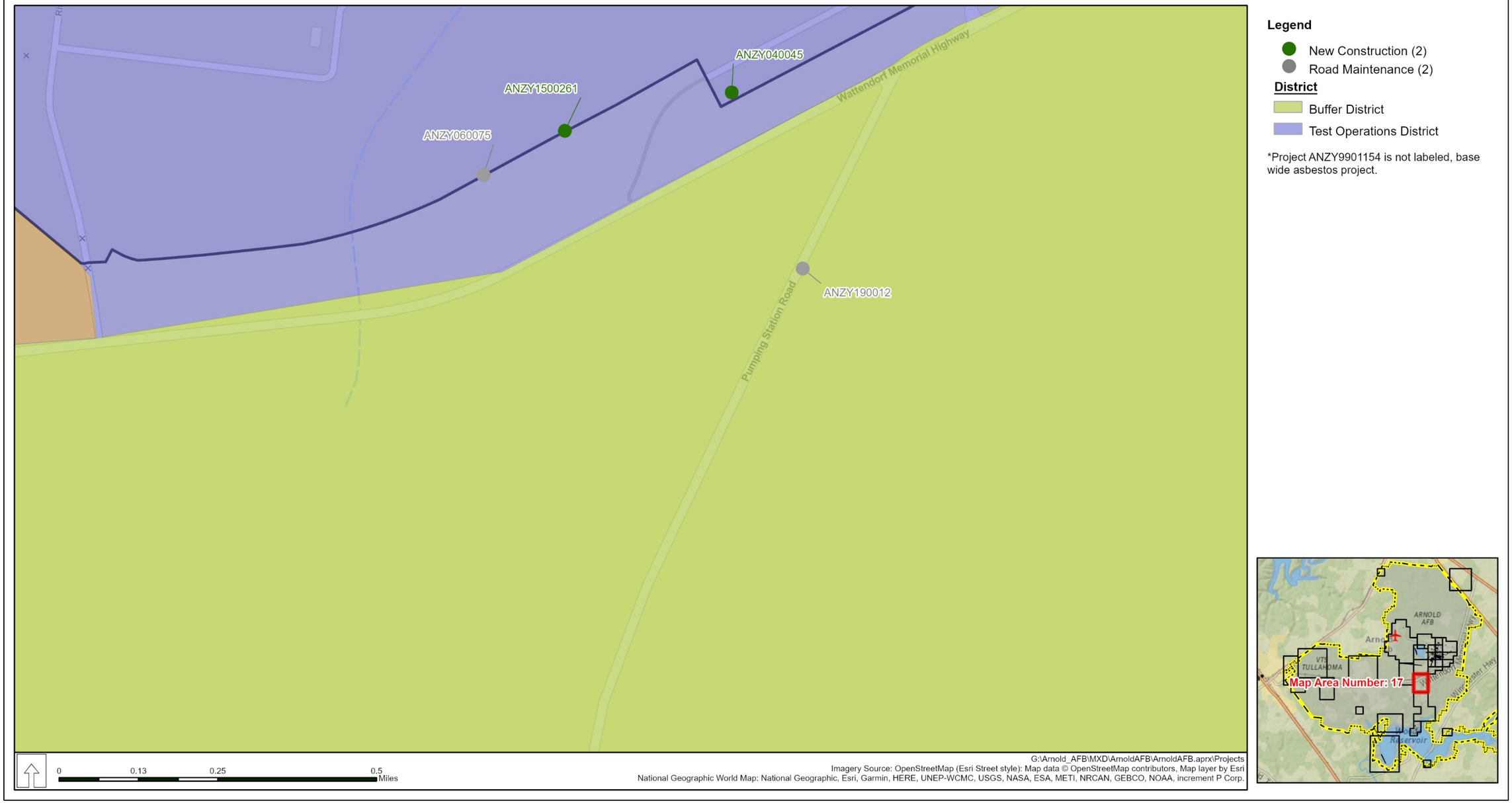

Figure B-18. Proposed Installation Development Projects on Arnold Air Force Base—Map Area 17

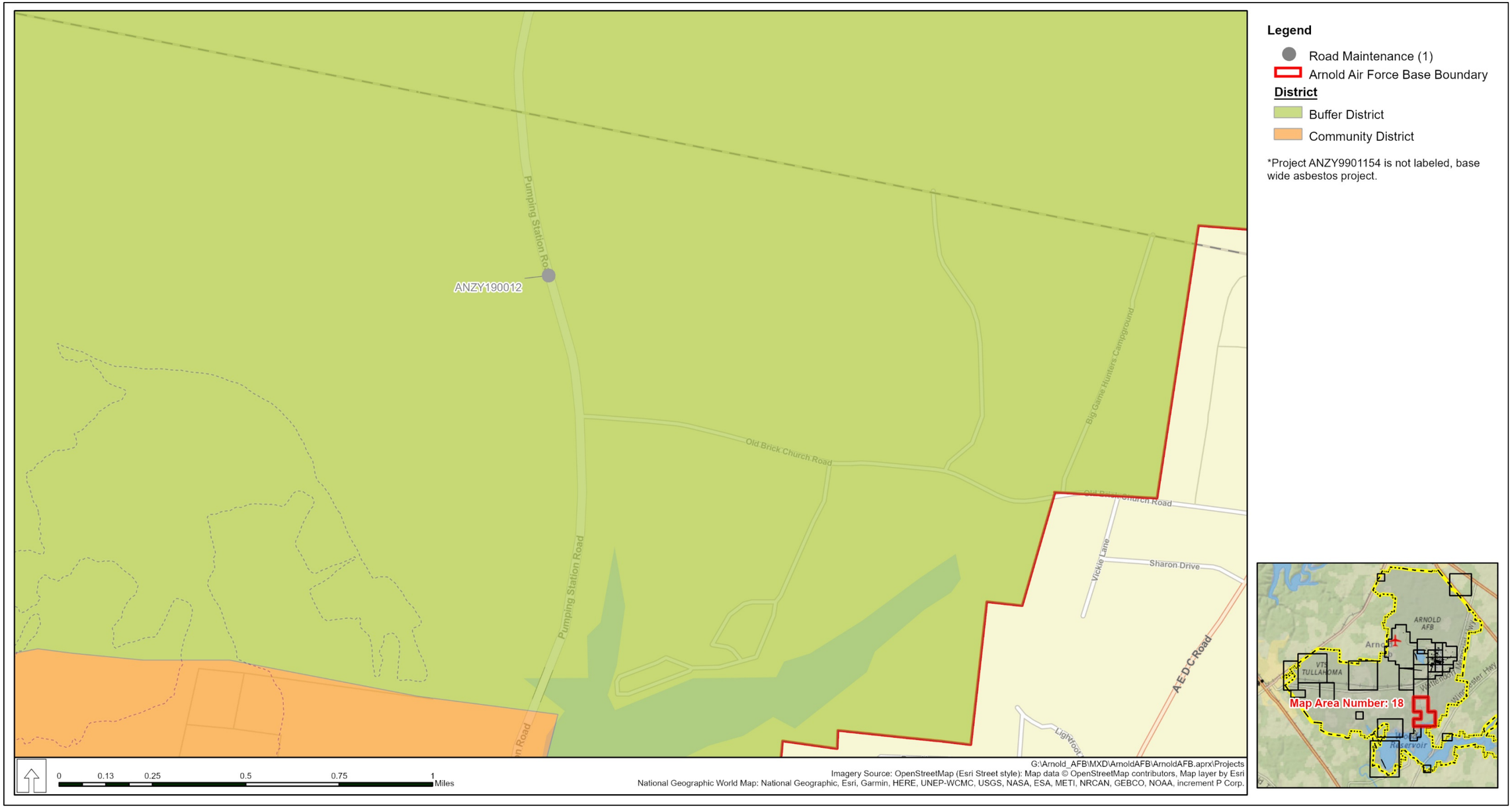

Figure B-19. Proposed Installation Development Projects on Arnold Air Force Base—Map Area 18

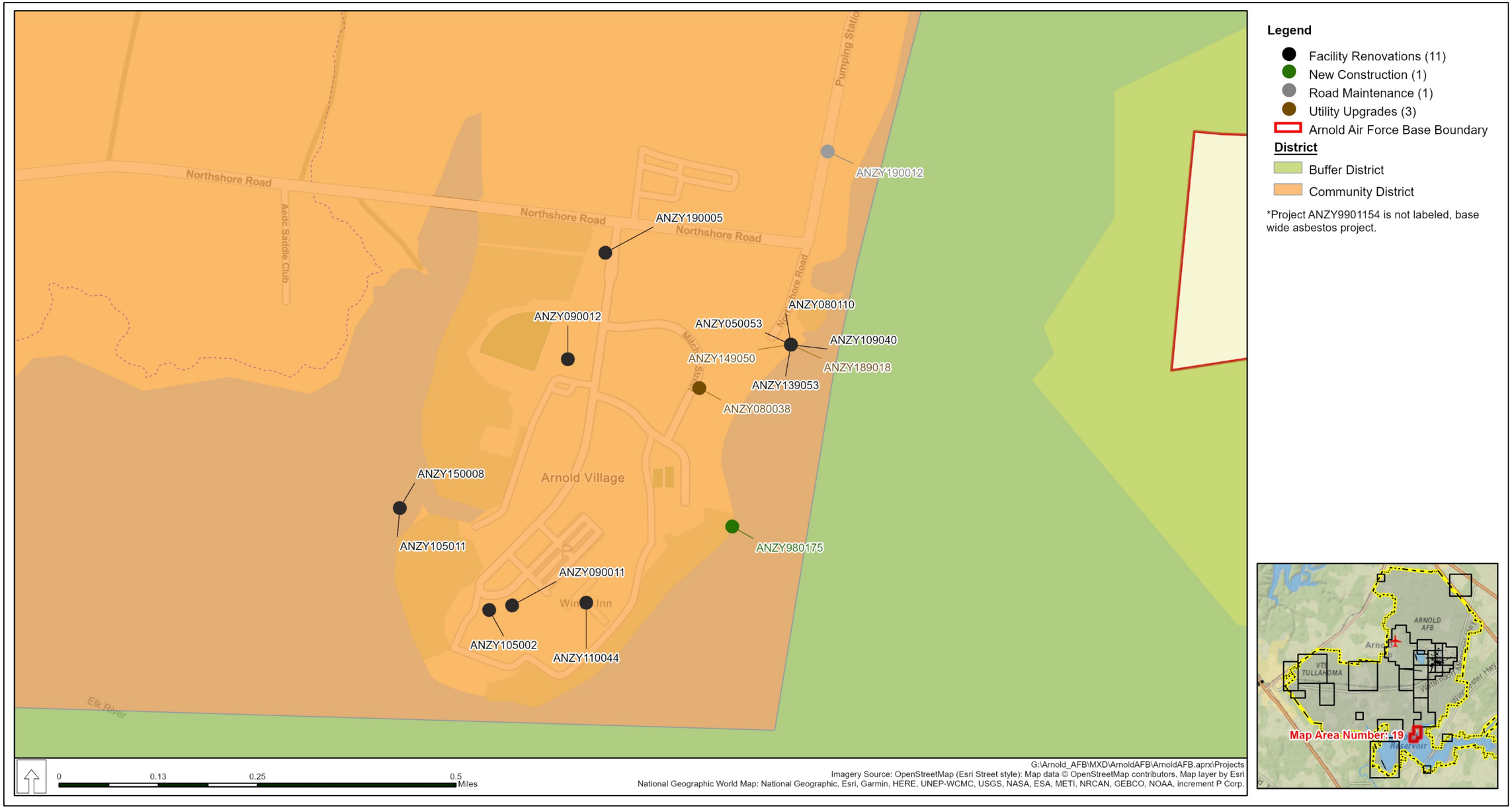

Figure B-20. Proposed Installation Development Projects on Arnold Air Force Base—Map Area 19

Figure B-21. Proposed Installation Development Projects on Arnold Air Force Base—Map Area 20

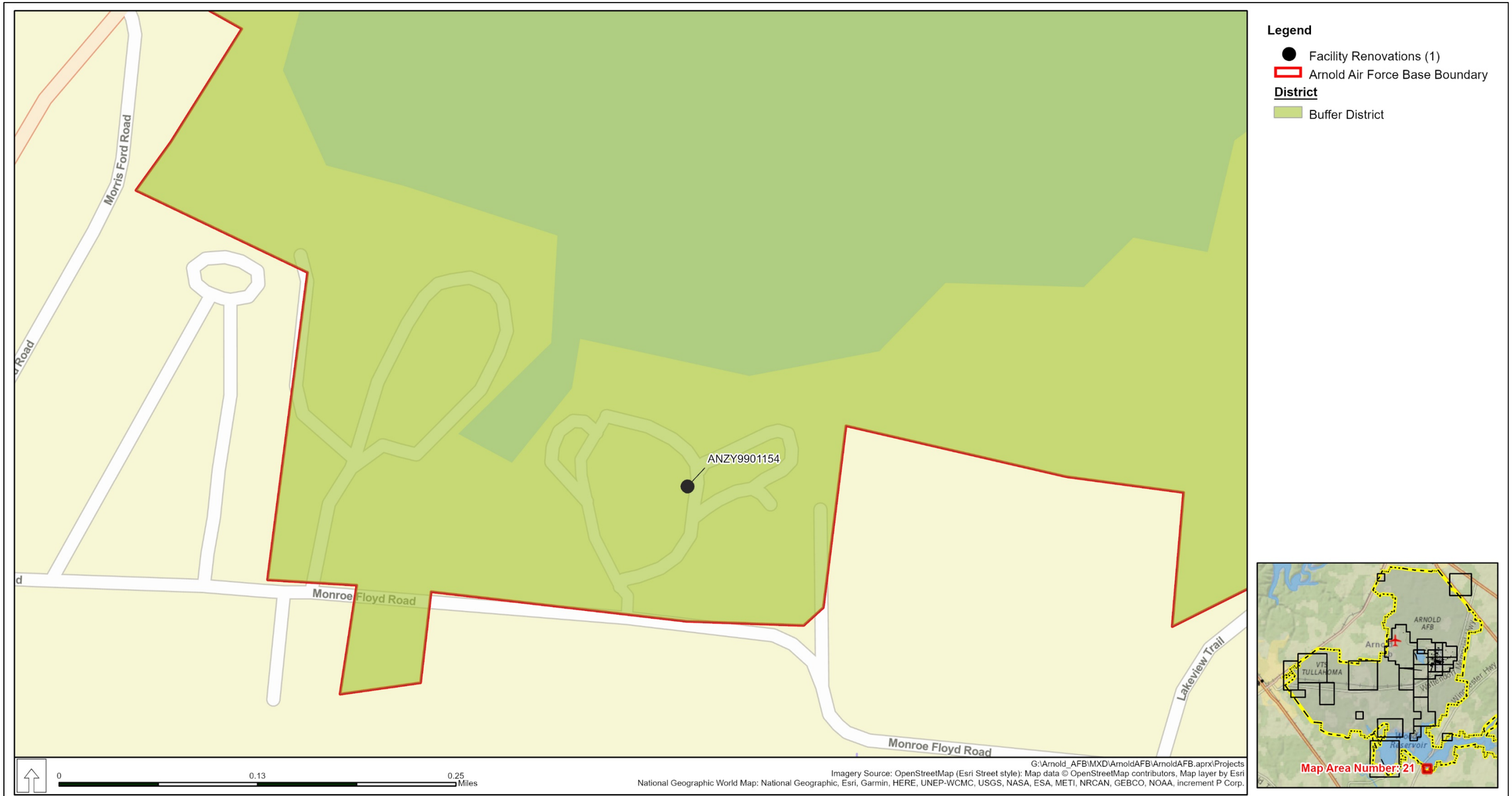

Figure B-22. Proposed Installation Development Projects on Arnold Air Force Base—Map Area 21

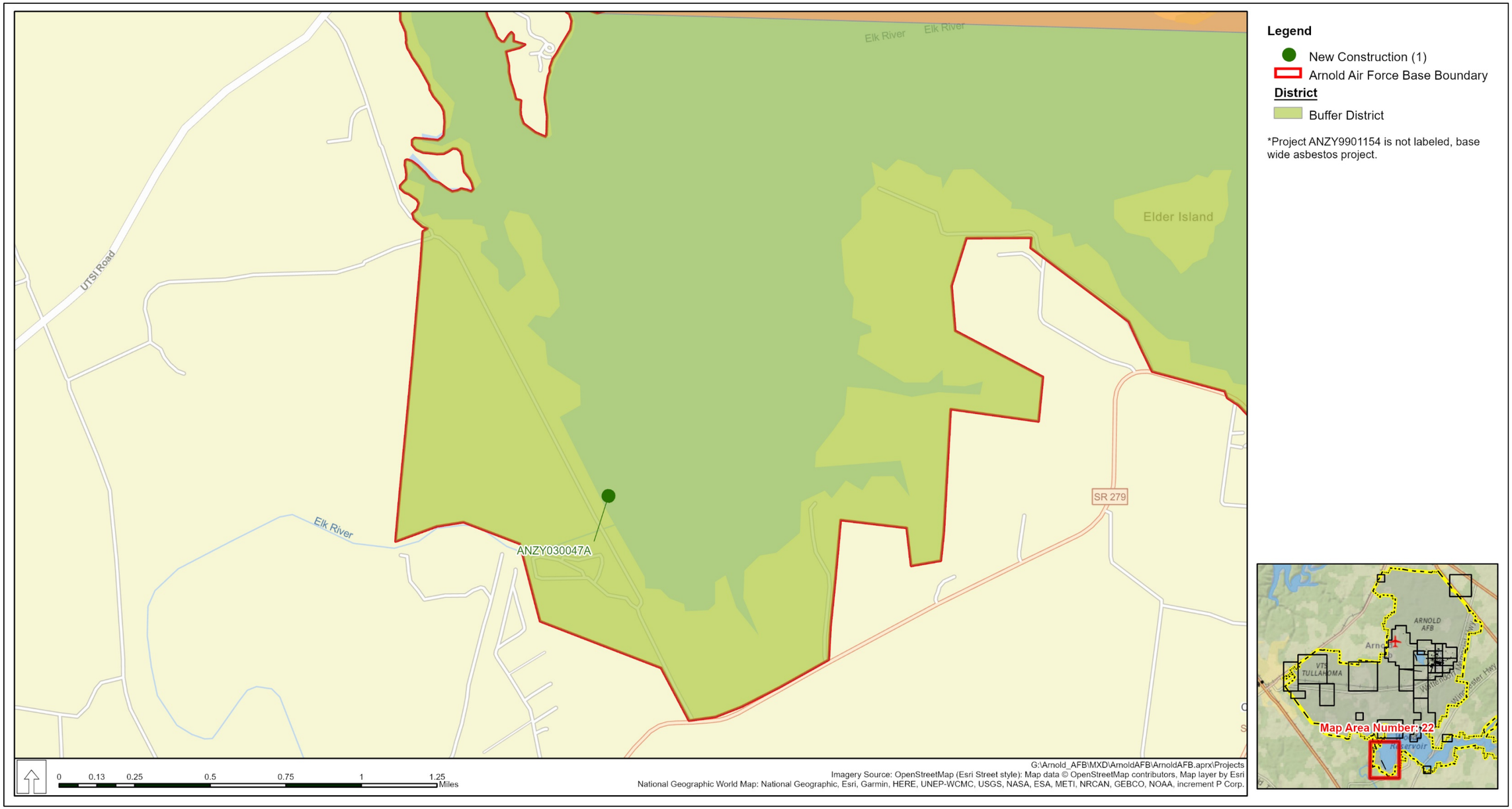

Figure B-23. Proposed Installation Development Projects on Arnold Air Force Base—Map Area 22

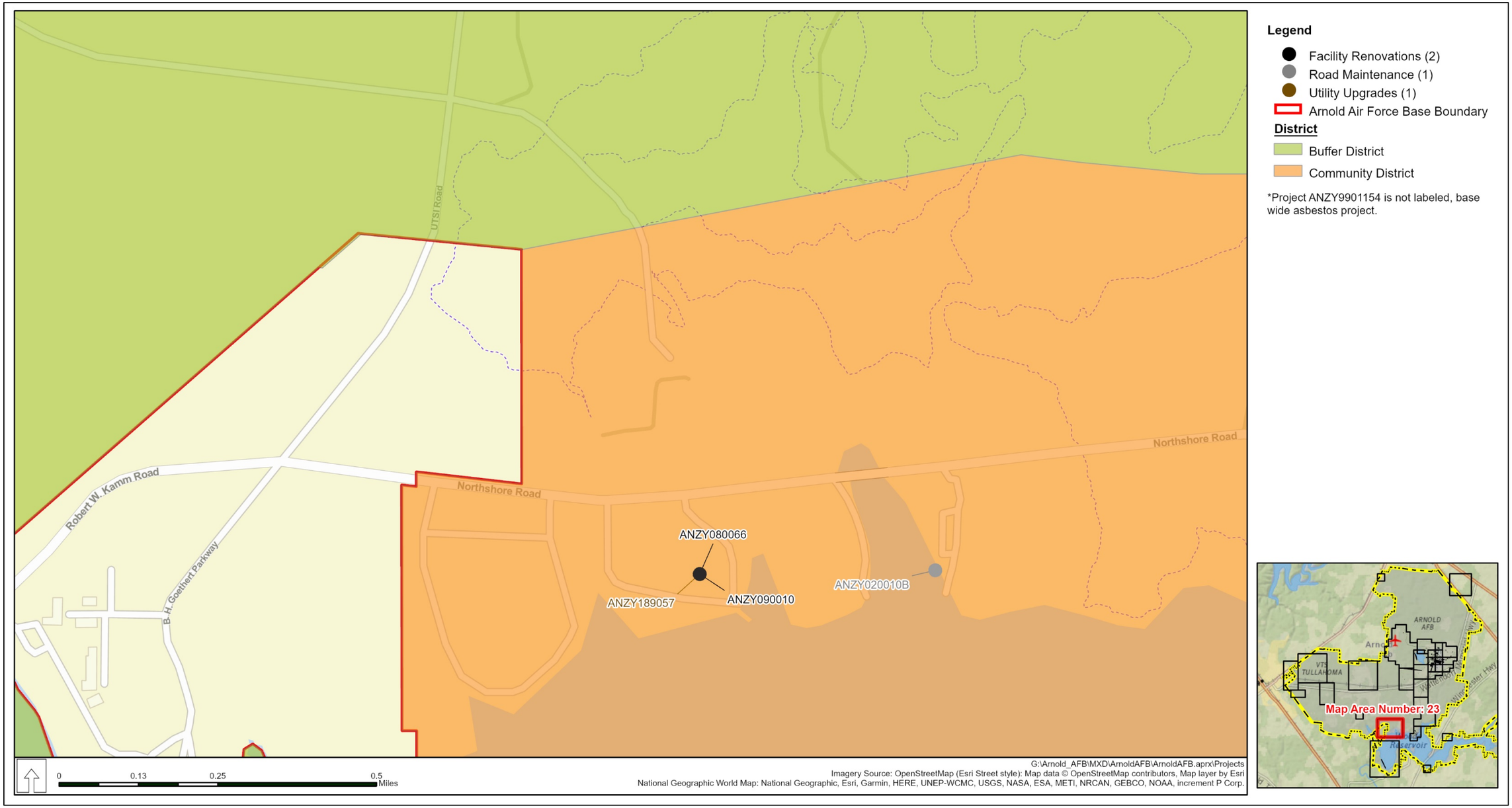

Figure B-24. Proposed Installation Development Projects on Arnold Air Force Base—Map Area 23

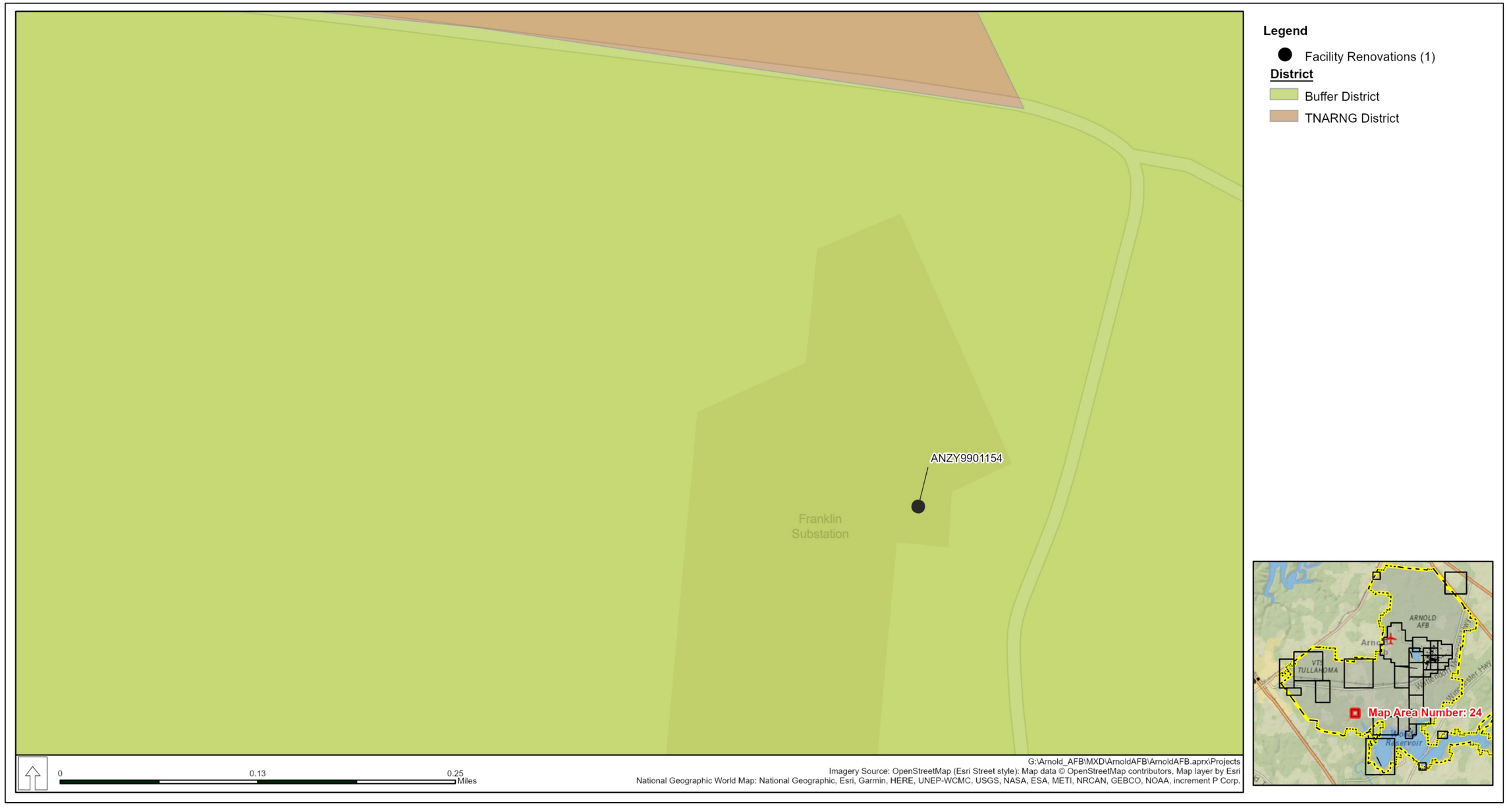

Figure B-25. Proposed Installation Development Projects on Arnold Air Force Base—Map Area 24

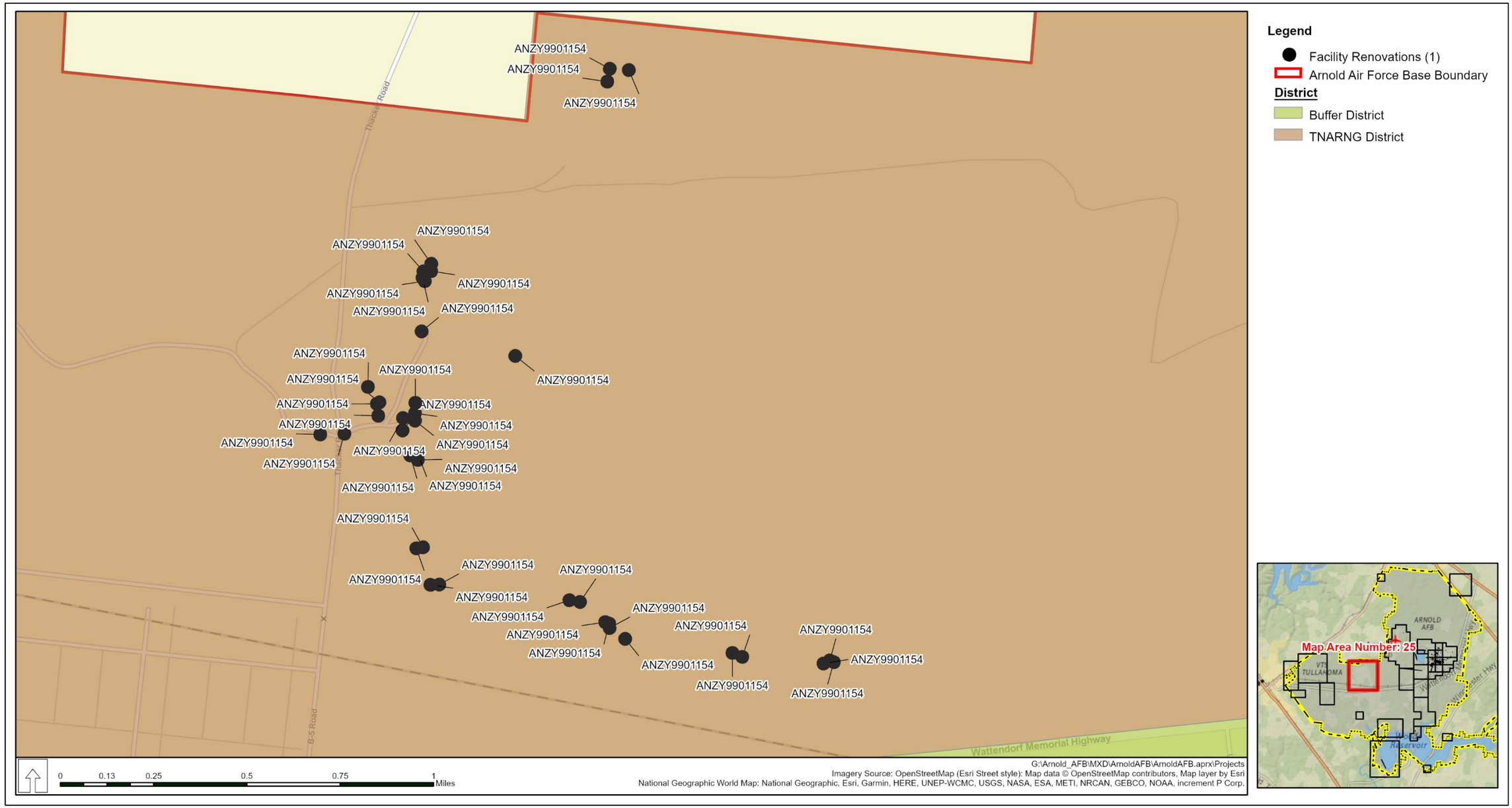

Figure B-26. Proposed Installation Development Projects on Arnold Air Force Base—Map Area 25

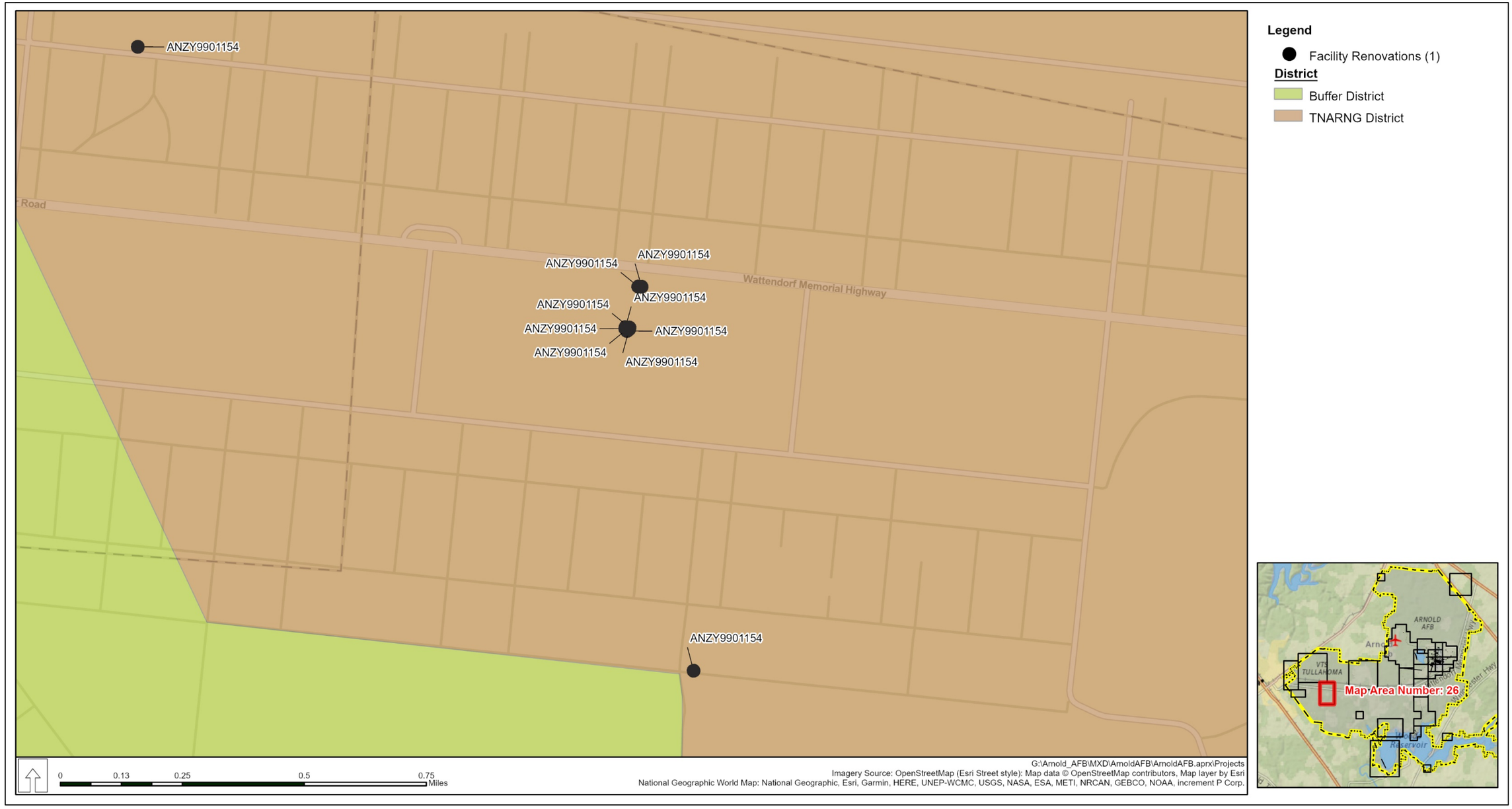

Figure B-27. Proposed Installation Development Projects on Arnold Air Force Base—Map Area 26

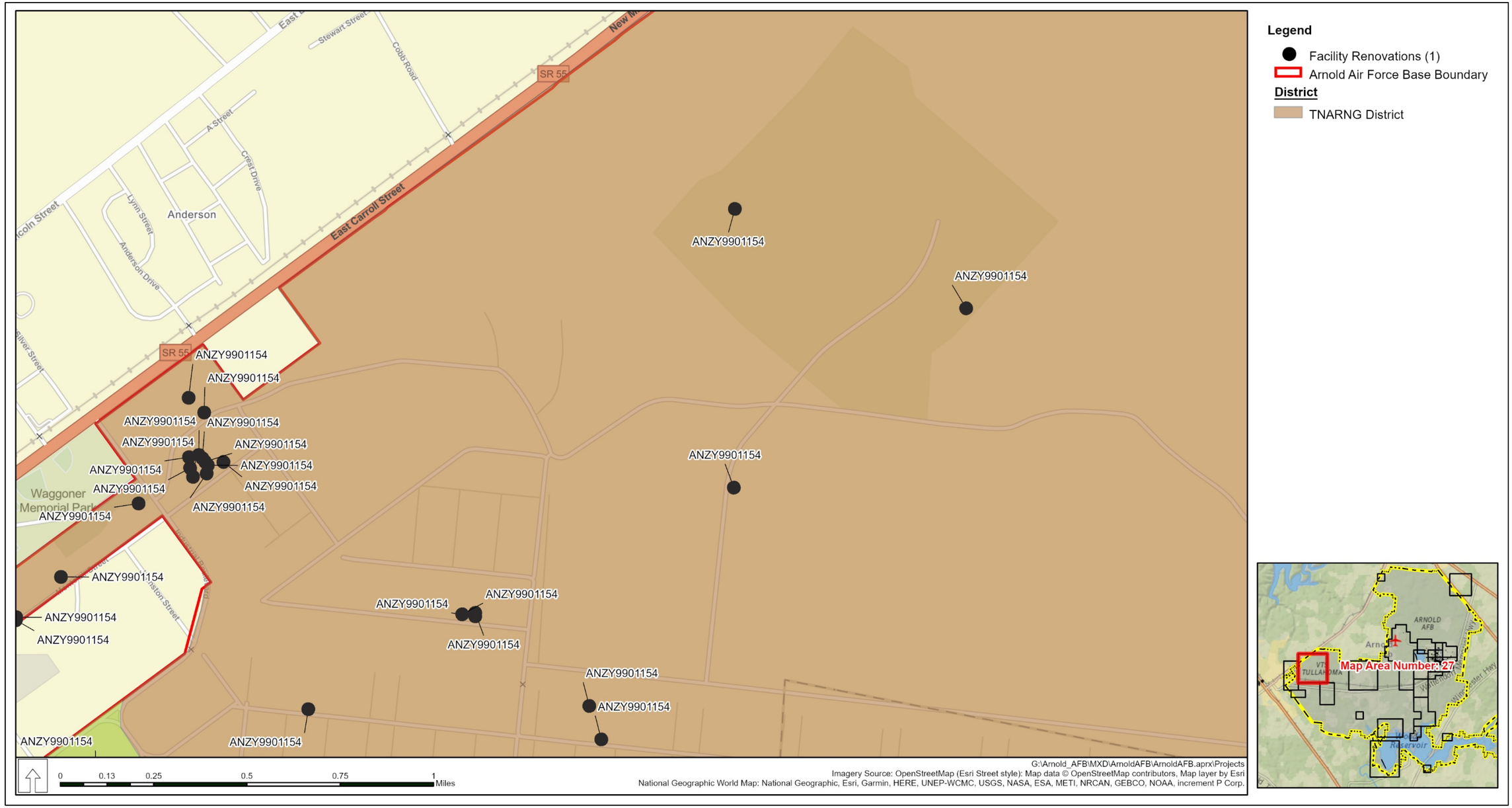

Figure B-28. Proposed Installation Development Projects on Arnold Air Force Base—Map Area 27

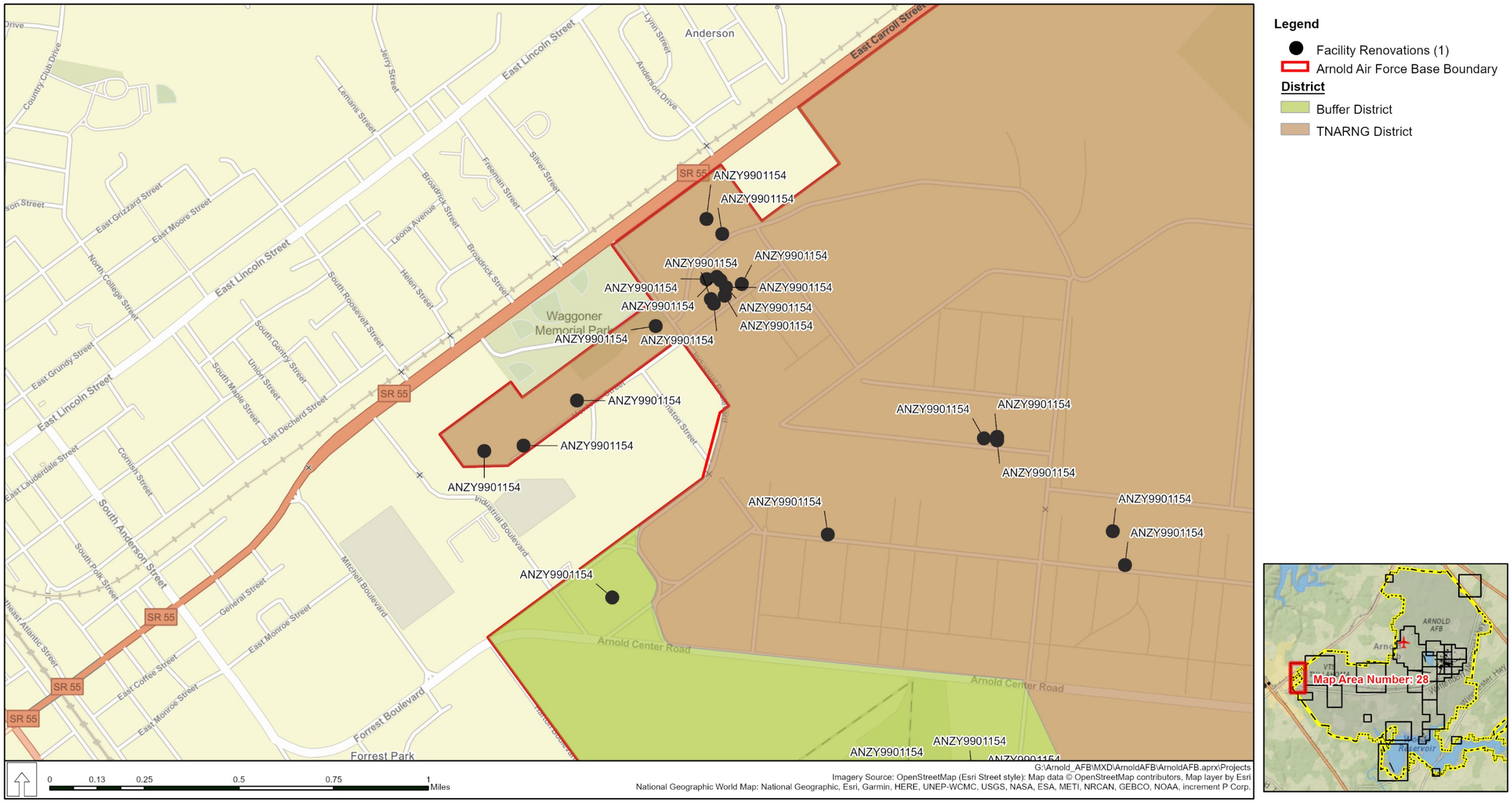

Figure B-29. Proposed Installation Development Projects on Arnold Air Force Base—Map Area 28

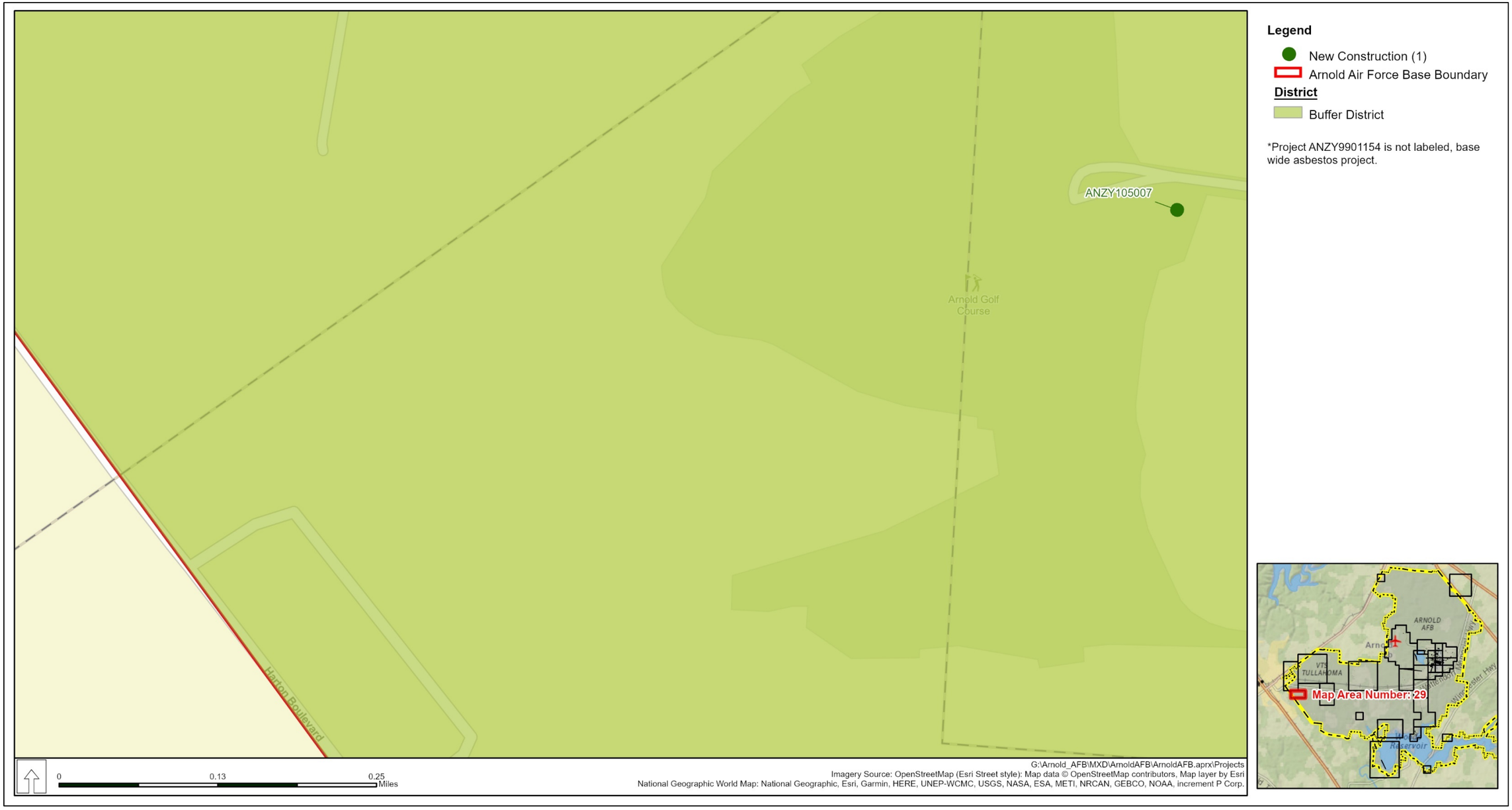

Figure B-30. Proposed Installation Development Projects on Arnold Air Force Base—Map Area 29

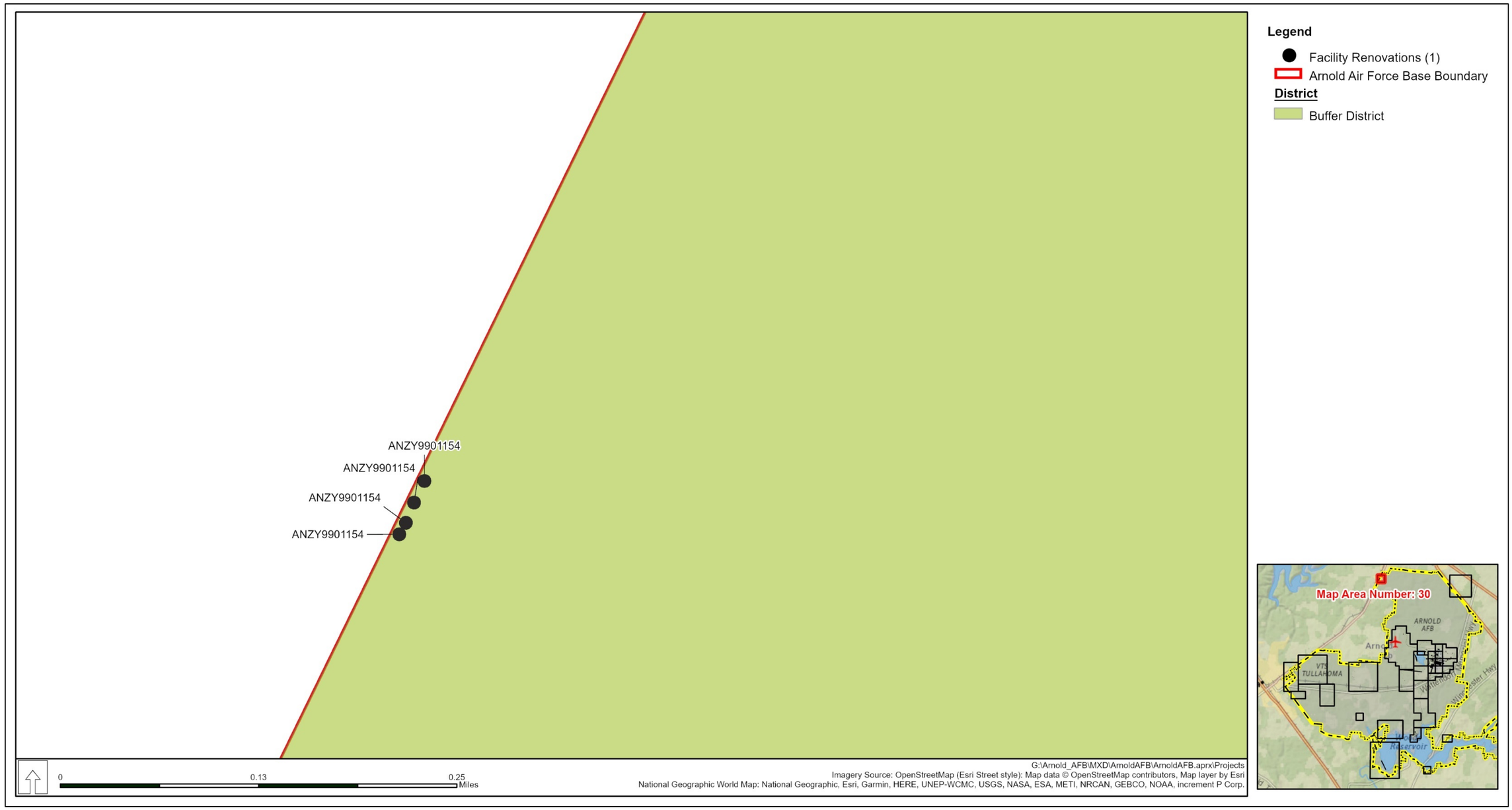

Figure B-31. Proposed Installation Development Projects on Arnold Air Force Base—Map Area 30

Figure B-32. Proposed Installation Development Projects on Arnold Air Force Base—Map Area 31

Table B-1. Description of the Proposed Action and Need for Each Proposed Installation Development Project

Project ID	Project Name	Project Type	Figure Reference	Description of the Proposed Action	Project Need
Infrastructure Projects (New Construction, Facility Renovations, Road Maintenance, and Utility Upgrades)					
ANZY069029	Construct Sun Covers for GN2 Conversion Plant, J4	New Construction	B-11	This project would construct self-supported sun covers for five dewars at the east and west GN2 Conversion Plants at J4. This project would comply with current regulations in AFI 23-201 2.6.12 and 6.17.1.2.	This project is needed to provide shade to the dewars from the sun and to provide corrosion control. By providing shade, the dewars would maintain a cooler temperature resulting in less LN2 lost to boil. Protection from corrosion would result in a longer life for the dewars and reduced maintenance costs.
ANZY139006	Add Stairway and Roof Railing to PWT Atmospheric Air Dryer 1	New Construction	B-9	This project would construct a new stairway, access doors to the different floor levels, and a new safety railing on the roof of the PWT Atmospheric Air Dryer 1. This project would comply with current USAF guidance and safety requirements.	This project is needed because the safety of personnel working at PWT Atmospheric Air Dryer 1 is in jeopardy.
ANZY099024	Construct HTL High-Pressure Air Valve Awning	New Construction	B-9	This project would construct a small awning/roof/cover over the existing HTL high-pressure air valve area at the northwest corner of Building 722. This project would provide cover over an approximately 700 SF area.	HTL personnel must frequent this area during testing preop and postop year-round during all types of weather conditions. Frequently icy/wet conditions create hazardous footing and potential fall injury in this area. The project is needed to alleviate the hazardous working conditions.
ANZY199007	Construct DC Rectifiers, Facility. 579	New construction	B-11	This project would provide adequate coverage for existing twelve DC rectifiers at APTU by constructing a removable roof to cover area where DC rectifiers are located and adding lighting to the coverage to support night operations.	This project is needed to reduce the water ingress into the rectifier cabinets, shield them from the sun to reduce hot-day cabinet temperatures, and stop UV damage to the power cables.
ANZY040060N	Add AT/FP Upgrades, Fitness Center, Facility 1358	New Construction	B-4	The purpose of this project to meet UFC 4-10-01 for AT/FP compliance.	The project is needed to upgrade the roof and HVAC system of the existing fitness center.
ANZY140029	Repair Steam Facility-Reduction, Multi	New Construction	B-8	This project would replace the current steam-using equipment in Facilities 2124, 2123, 2132, and 563 with natural gas and hot-water equipment.	The project is needed to comply with the Energy Policy Act of 2005 (Public Law 109-58) and Energy Independence and Security Act 2007 (Public Law 110-140), which requires continued energy reduction in the federal sector. This project would result in a reduction in the potable water usage at the steam plant and provide an approximately 20% efficiency gain in the use of the natural gas for these facilities.
ANZY105007	Construct Privacy Fence by Arnold Golf Course Clubhouse	New Construction	B-30	This project would construct an 8 ft high vinyl-coated chain-link fence from the back of kitchen by patio and across the driveway at the Arnold Golf Course clubhouse. This project would prevent unauthorized parking behind the clubhouse.	This project is needed control unauthorized parking and to shield from view the storage area and walk-in freezer/cooler (eyesores).
ANZY029454	Install Catwalk for C1 Cable Trays, Facility 912	New Construction	B-9	This project would install a catwalk that will provide safe and efficient access to C1 elevated cable trays.	This project is needed because current operation requires a makeshift, portable scaffold and several more electricians than would be required if a catwalk were installed to provide a safe access.
ANZY199005	Repair/Modify Platforms to Access ETF Plant Eqpt, Facility 911	New Construction	B-9	This project would add a number of new platforms and permanent scaffolding to access currently inaccessible areas and to provide grating to elevate the walking surfaces above discharge and runoff water.	Various work platforms and access points throughout the Engine Test Facility need to be either added or modified to improve maintenance and safe operational access.

Project ID	Project Name	Project Type	Figure Reference	Description of the Proposed Action	Project Need
ANZY189043	Construct Manholes and Repair Valve/Actuator, Facility 20009	New Construction	B-9	The purpose of this project to modernize the current manholes, valves, and actuator, which were originally constructed in the early 1980s.	This project is needed because the old valves have various issues from seat damage to bearing seizing that makes them difficult (if not impossible) to operate, and once closed, they still leak through in excess of what will allow work to be done downstream.
ANZY100028	Repave Gossick Road	Road Maintenance	B-12	The purpose of this project to increase vehicle safety along Gossick Road (Airfield Road) by repaving it from the model shop to the airfield gate.	This project is needed because the road is badly deteriorated with cracks, raveling, and rutting.
ANZY020010B	Pave FAMCAMP Roads	Road Maintenance	B-24	The purpose of this project to improve the appearance and desirability of using the campground by paving the existing dirt road.	This project is needed because existing gravel roads create dusty conditions in the FAMCAMP area require recurring maintenance.
ANZY100006	Repave Sections of Avenue B from 3rd Street	Road Maintenance	B-3	The purpose of this project is to increase vehicle safety and the stability of the road by repaving the asphalt section of Avenue B from 3rd Street to the end of the Building 1103 parking lot near the walking trail entrance and the section of 3rd Street from Avenue B, around Building 1103 to parking lot.	This project is needed because the existing asphalt is between 15 to 20 years old and is showing signs of wear.
ANZY139051	Renovate ETF Office Building, Facility 877	Facility Renovations	B-8 and B-9	This project would bring the existing facility components up to code.	This project is needed because the building HVAC has frequent maintenance issues; control valves currently used to regulate flow to the hot-water reheat coils require chemically treated, filtered water (via a side-stream filtration system) to operate as designed; the chiller that serves this system has required extensive repairs and is not currently functioning at full capacity; windows are not energy efficient and are deteriorated allowing rainwater to seep in; and current lighting does not meet current requirements.
ANZY129017	Repair G-Range Tunnel Structure, Facility 678	Facility Renovations	B-10	This project would ensure adequate load-bearing capacity for heavy equipment using the G Range tunnel structure at 1st Street.	This project is needed because the existing tunnel structure is starting to show signs of being overstressed at road crossings; concrete is cracking; and concrete is pulling away from rebar, which is exposing it in several areas.
ANZY149049	Repair J6 Dehumidification Chamber Elevation, Building 2127	Facility Renovations	B-13	This project would modernize the six-stop traction freight elevator for the J6 Dehumidification Chamber Elevator at Building 2127 in accordance with current codes and standards.	This project is needed because the elevator is currently not code compliant per ANSI A.17-1. Further, the elevator control system is obsolete and no longer supported by the manufacturer. Without implementation of this project, there is an increased likelihood of personnel becoming trapped with the old control system in service.
ANZY179023	Replace Overhead Crane 20-220 in Building 760	Facility Renovations	B-9	This project would modernize the existing overhead crane and associated components.	This project is needed because the current crane was assembled in 1982, and the control systems for this crane are antiquated. Part availability issues could result in long down-time periods if this project is not implemented.
ANZY120017	Replace Office Bay Roof of Building 451	Facility Renovations	B-12	This project would provide a reliable roof over the older office area on the south side of building.	This project is needed because the existing roof was installed in 1989, is in very bad condition (i.e., blisters and flashing failure), and is beyond its economic lifespan.
ANZY109040	Upgrade Utilities Area Buildings for Battery Code Compliance	Facility Renovations	B-3, B-8, B-9, B-16, and B-20	This project would bring the existing battery areas up to code.	This project is needed to because the current battery storage areas do not meet current NFPA and OSHA codes and standards based on a recently conducted study.

Project ID	Project Name	Project Type	Figure Reference	Description of the Proposed Action	Project Need
ANZY079076	Replace Roof, rc-3 Cooler, Building 916	Facility Renovations	B-9	This project would provide a reliable roof over the older office area on the south side of building.	This project is needed because the existing roof was installed in 1984, is in very bad condition (i.e., blisters and flashing failure), and is beyond its economic lifespan.
ANZY079028	Renovate Interior, PWT Rotor Erection, Building 768	Facility Renovations	B-10	This project would modernize the interior of Facility 786 and bring the facility up to current USAF standards.	This project is needed because the building has not been renovated since it was originally constructed in 1955.
ANZY900190	Paint Exterior, Model Shop, Building 451	Facility Renovations	B-12	This project would paint all metal and nonbrick areas of the facility and clean and seal the brick exterior of the administrative addition. This project would ensure the highly visible facility, which is located at the intersection of the Installation's two major traffic arteries, reflects the AFMC's and AEDC's continuing efforts to upgrade base appearance and to ensure continuity in the appearance of the facilities along First Street.	The project is needed because this facility is highly visible and the present paint system is more than 20 years old. Based on the facility's location, it is an excellent candidate to reflect the newly developed base appearance color code and to continue exterior upgrade of facilities along First Street.
ANZY119017	Replace Roof of Building 921, ETF-c Heater Control Building	Facility Renovations	B-9	This project would provide a reliable roof at the ETF-C Heater Control Building 921.	This project is needed because the existing roof was installed in 1983 and is past its economic lifespan.
ANZY090009	Reseal Containment Area, Operational Fuel Room	Facility Renovations	B-9	This project would coat the floor and walls of the Operational Fuel Room with an impermeable coating to prevent fuel from being absorbed into the concrete.	This project is needed because the previous sealant has deteriorated and is no longer performs its intended purpose.
ANZY069012	Replace Mark J Dewatering System, Building 1075	Facility Renovations	B-3	This project would modernize the dewatering system at Building 1075 and bring the facility up to current USAF standards.	This project is needed because the current dewatering sump has failed and is allowing backfill to get into the sump, which has buried the existing pumps. Further, the existing pumps are no longer operational, and a temporary pump has been suspended from the grade level to attempt to keep the water level under control until replacement pumps can be installed.
ANZY080023	Replace Windows, Ops Building 1099	Facility Renovations	B-9	This project would modernize the windows at Building 1099 and bring the facility up to current USAF standards.	This project is needed because the existing windows are original to the facility (1981), are not energy efficient, and are in need of repair.
ANZY109053	Life-Cycle Upgrade, Restrooms, Building 912	Facility Renovations	B-9	This project would modernize the restrooms at Building 912 and bring the facility up to current USAF standards. This building is inhabited by customers who come to Arnold AFB and is not currently representative of the AFMC's and AEDC's continuing efforts to upgrade base appearance.	This project is needed because the walls and wallpaper show signs of damage, and the ceiling tiles are stained and damaged beyond repair from condensate leaks.
ANZY079014	Maintain/Upgrade Interior, ETF-a Airside	Facility Renovations	B-10	This project would modernize the interior of Building 881 to provide cover for the exterior staircase to prevent slipping during bad weather and to bring the facility up to current USAF standards.	This project is needed because interior has had no major upgrade since original construction approximately 30 years ago, and the renovations would improve the safety and quality of life for the building's occupants.
ANZY099001	Upgrade Model Shop Passenger Elevator Building 451	Facility Renovations	B-12	This project would modernize the passenger elevator at Model Shop Building 451 in the west addition on the west wall and would bring the facility up to current USAF standards.	In the last 5 years, a high percentage of maintenance on this elevator has been corrective. This project is needed to bring the components, equipment, and machine room of the elevator system to current codes and standards.

Project ID	Project Name	Project Type	Figure Reference	Description of the Proposed Action	Project Need
ANZY139005	Repair Overhead Doors, Model Shop Building 451	Facility Renovations	B-12	This project would modernize 10 overhead doors at the Model Shop Building 451 and would bring the facility up to current USAF standards.	This project is needed because the door mechanisms and support rails are worn and damaged, which makes them unreliable and a safety hazard.
ANZY009106	Paint Exterior VFK, Facility 676	Facility Renovations	B-10	This project would perform general life-cycle maintenance at Facility 676.	The building is starting to rust and needs to be painted to prevent further deterioration.
ANZY180014	Repair by Replace Built-Up Roof of Photo Lab, Facility. 430	Facility Renovations	B-10	This project would modernize the high bay and east mid-bay roofs on Building 430 and would bring the facility up to current USAF standards.	This project is needed because the existing roof is well past its economical lifespan and has several leaks.
ANZY089002	Replace Raised Floor, Building 912 DCR	Facility Renovations	B-9	This project would modernize the raised floor and associated components at the DCR to prevent injury and to bring the facility up to current USAF standards.	This project is needed because the current floor is in very poor shape; the tiles do not fit properly and are worn from constantly pulling up; tiles are loose and the rubber trim has worn off around the sides of each tile; and support pedestals have shifted due to the large amount of cables running underneath. One injury has already occurred due to the condition of the floor.
ANZY049236	Maintain Interior, J4/J5 Control Rooms	Facility Renovations	B-11	This project would modernize the interior of Building 520, J4, J5, and J6 Control rooms, restrooms, offices, showers, and locker areas and would bring the facility up to current USAF standards.	This project is needed because the facility was constructed in 1963, and existing finishes have deteriorated due to water damage and wear. This facility has had no major upgrade in more than 15 years. Without upgrades, it will continue to deteriorate and present a poor image to test customers.
ANZY099092	Repair/Upgrade Mark 1 Test Building 1075	Facility Renovations	B-3	This project would modernize various interior components and interior/exterior lighting at Building 1075 and would bring the facility up to current USAF standards.	This project is needed to bring the building's components up to current codes and standards.
ANZY080034	Repair Lighting, Secondary Pump Station, Facility 1507	Facility Renovations	B-8	This project would modernize the interior/exterior/lighting throughout the facility with energy-efficient lighting and lighting control to meet requirements of the National Defense Authorization Act (NDAA 2008 according to Section 2863), and ASHRAE 90.1-2010.	This project is needed because the current lighting has reached the end of its service life, is original, inefficient, and inadequate by current codes and standards.
ANZY119005	Paint PWT Desiccant Drier Building 784	Facility Renovations	B-9 and B-10	This project would perform general life-cycle maintenance at Facility 784.	This project is needed because paint is starting to peel and flake, and the exterior needs to be painted before rusting begins.
ANZY110023	Replace Roof of Building 1526, Oil Pump House-Main Substation	Facility Renovations	B-8	This project would modernize the existing built-up roof at the Oil Pump House Building 1526 in the Power Control Building switchyard and would bring the facility up to current USAF standards.	This project is needed because existing built-up roof was last replaced in 1988 and is well past its economical lifespan.
ANZY149003	Repair Raised Floor, Room 113, PWT Control Facility 745	Facility Renovations	B-9	This project would modernize the raised floor and rubber base in Room 113, Building 745, to prevent injury and to bring the facility up to current USAF standards.	This project is needed because the existing floor is misaligned and does not meet the Unified Facilities Guide Specifications 09 69 19 for raised floors. Further, if the raised floor is not replaced, the safety of individual workers and equipment racks in the room could be jeopardized by failure of the floor due to the current misalignment.

Project ID	Project Name	Project Type	Figure Reference	Description of the Proposed Action	Project Need
ANZY119018	Replace the Northwest Metal Roof of Building 350, PMEL	Facility Renovations	B-2 and B-12	This project would modernize the existing roof to a standing seam roof on the northwest corner of Building 350 and would bring the facility up to current USAF standards.	This project is needed because the corrugated metal roof is past its economical lifespan and it starting to leak.
ANZY080156	Repair Sewage Treatment Plant, B 1552	Facility Renovations	B-8 and B-15	This project would modernize various components of the sewage treatment plant, Building 1552, including windows, interior and exterior seal and paint, restrooms, interior/exterior lighting, generators and associated switches and panels, transformers, pumps, piping, valves, and plant controls, and would bring the facility up to USAF standards.	This project is needed because the plant was constructed in 1952, and components have exceeded their economic life and are showing signs of wear. Further, some existing components do not meet current codes.
ANZY179009	Replace Roof Building 1088	Facility Renovations	B-3	This project would modernize the high bay, south bay, and east bay roof on Building 1088 and would bring the facility up to current USAF standards.	This project is needed because the current roof is past its economical lifespan, and it is starting to show signs of leaks.
ANZY089006	Replace Roof, APTU Test Cell Valve Building 576	Facility Renovations	B-11	This project would modernize the existing built-up roof at the APTU Test Valve Building 57 and would bring the facility up to current USAF standards	This project is needed because the current roof is was installed in 1984, is in poor condition, and is well past its economical life span.
ANZY090070	Replace Security Gate AE Loading Dock	Facility Renovations	B-2	This project would replace the existing antiterrorism gate with a more modern gate designed for high-volume use that allows for both automatic and manual operation.	This project is needed because the current gate is too heavy for the application, and it is not proper for high use. It fails regularly, restricting deliveries and requiring heavy maintenance. When the gate fails, a vehicle must be parked across the opening and someone must go move it whenever a delivery is scheduled.
ANZY059041	Renovate Interior Model Shop Building 451	Facility Renovations	B-12	This project would modernize various interior areas currently occupied at the model shop, including carpet additions and removal to various rooms, interior paint, new permanent walls to screen shop restroom entrances, new walls and ceilings to provide an air-conditioned main breakroom/timecard area, floor cleaning and sealing, and door replacement, as needed, and would bring the facility up to USAF standards.	This project is needed because the Model Shop is in extremely poor condition. It has not had any interior sustainment work done in 28 years; consequently, working conditions suffer due to dirt, chipping paint, rust, sprayed-on asbestos ceiling insulation, and a generally poor working environment. Existing doors and lighting are not up to current code.
ANZY100032	Life-Cycle Upgrades, Building 1402	Facility Renovations	B-6	This project would modernize various interior components, including walls, floors, ceilings, doors and trim, electrical system, and painting at Building 1402 and would bring the facility up to USAF standards.	This project is needed because numerous building components are not up to current code.
ANZY119004	Paint Exterior of Building 868, I&C Staging Lab	Facility Renovations	B-10	This project would repaint the exterior of Building 868 to include the corrugated metal roof, canopies, and the stucco walls. This project would ensure Building 868 reflects the AFMC's and AEDC's continuing efforts to upgrade base appearance.	This project is needed because the roof is starting to rust, and the stucco walls are becoming stained due to the rust running down from the roof.
ANZY149005	Repair Raised Floor, Third Floor w. Computer Room Facility 651	Facility Renovations	B-10	This project would modernize the existing raised floor and base in the third-floor west computer room in Building 651 and would bring the facility up to USAF standards.	This project is needed because the existing floor is delaminating, is misaligned, warped, and creates a tripping hazard. Failure of the floor could cause personal hazards to workers or equipment to turn over or become unstable. Further, the existing floor does not meet the UFC specifications 09 69 19 for raised floors.

Project ID	Project Name	Project Type	Figure Reference	Description of the Proposed Action	Project Need
ANZY129002	Repair by Replace Windows and Doors ETF Shop Facility 876	Facility Renovations	B-9	This project would modernize all windows and doors at Facility 876 and would bring the facility up to USAF standards.	This project is needed because the existing windows are more than 60 years old and are single-pane windows. Several windows are broken, and many windows are cracked. The windows are energy inefficient and leak. The tint that was applied to reduce UV damage to equipment and to reduce glare is degraded.
ANZY129001	Repair/Maintain Men's Restroom 102, Building 722	Facility Renovations	B-9	This project would modernize the interior of the Men's Restroom 102 at Building 722 and would bring the restrooms up to USAF standards and in accordance with ADA handicapped requirements.	This project is needed because the existing restroom has never been upgraded and was identified as one of the worst on the base by the systems engineer.
ANZY999132A	Repair Interior Lighting, ETF a Test	Facility Renovations	B-10	This project would modernize the interior lighting throughout the ETF-A Test Building, Facility 880, and would bring the lighting up to USAF standards.	This project is needed because the current lighting is poor and outdated. Proper interior lighting will reduce the risk of personal injury and improve conditions to perform daily tasks and equipment preventive maintenance.
ANZY179017	Maintain/Paint Exterior Facility 607	Facility Renovations	B-10	This project would perform general life-cycle maintenance at Facility 607 by painting the exterior.	This project is needed because the exterior paint is starting to peel, and metal is starting to corrode.
ANZY149008	Repair Raised Floor Room 108, Facility 740	Facility Renovations	B-9	This project would modernize the raised floor in Room 108, Computer Room, Building 740, and bring the facility up to USAF standards.	This project is needed because the existing floor is delaminating, is misaligned, warped, and creates a tripping hazard. Further, the existing floor does not meet the UFC specifications 09 69 19 for raised floors.
ANZY079017	Upgrade Restrooms, AMSC Building 939	Facility Renovations	B-9	This project would modernize the restrooms at Building 939 and bring the facility up to USAF standards.	This project is needed because the building has had no major upgrade since its original construction in 1992. Improvements to the restrooms would enhance the quality of life for the building occupants, reduce maintenance cost, and maintain USAF standards.
ANZY009109	Renovate Restrooms/Repair Interior, J-6 Field Office, Facility 591	Facility Renovations	B-13	This project would modernize the restrooms and to implement life-cycle sustainment repairs to interior components at Facility 591 and bring the facility up to USAF standards.	This project is needed because of current, ongoing toilet repairs; the area is frequently used by AEDC test customers and creates a poor impression of AEDC; and the facility is no longer fully fire protected.
ANZY119045	Repair Lighting, J6 DC Cooler Facility 2127	Facility Renovations	B-13	This project would modernize the J6 DC Cooler Facility lighting at Building 2127 and bring the facility up to USAF standards. Proper, modern lighting will reduce risk of personal injury and improve conditions to perform daily tasks and equipment preventive maintenance.	This project is needed because numerous lights throughout the J6 DC cooler, including the roof, continue to burn out or need repair/replacement. Employees routinely work in this facility and are exposed to trip, slip, fall, and bump hazards. The current exterior lights on the roof are difficult to reach, creating ongoing maintenance issues.
ANZY079005	Renovate Interior, s-1/s-3 Impact Range Building 320	Facility Renovations	B-10	This project would modernize the restrooms and implement life-cycle sustainment repairs to interior components at Facility 320 and bring the facility up to USAF standards.	This project is needed because the existing toilet partitions are wooden and homemade; asbestos floor tiles are missing; floor finishes are torn and worn; and the facility has not been painted in many years. Renovations would improve quality of life for occupants and upgrade the facility to USAF standards.
ANZY080110	Sustainment Upgrades, Primary Pumping Station	Facility Renovations	B-20	This project would modernize the primary pumping station and implement life-cycle sustainment repairs to interior and exterior components of the facility and bring the facility up to USAF standards.	This building was constructed in 1953 and has not had a major renovation since it was built. This project is needed to bring the building up to present-day codes and standards.

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ANZY980061	Construct Personnel/Freight Elevator, PWT Supersonic Control Building	Facility Renovations	B-9	This project would provide personnel and freight elevator access to multiple floors at the PWT Supersonic Control Building and bring the facility into compliance with current codes and standards for freight and ADA personnel access.	This project is needed to facilitate the movement of equipment to and from the model room, instrumentation areas, and basement to the exterior of the building. Currently, a hatch in floor of the model room and an overhead 2-ton hoist are used to bring equipment and hardware up from the ground floor to the model room. An opening in the ground floor, offset from the overhead hatch, provides access to the basement, through use of a 2-ton hoist. Hoisting this equipment presents both a risk to the safety of personnel and a risk of damaging sensitive hardware.
ANZY089061	Life-Cycle Upgrade Lighting, Building 876, ETF Shop	Facility Renovations	B-9	This project would modernize the lighting at Facility 876 and would bring the facility up to USAF standards.	This life-cycle maintenance project is needed to upgrade the lighting and bring the building up to present-day codes and standards.
ANZY080154	Repair Exterior, Force, Flow and Dynamics Building 390	Facility Renovations	B-2	This project would seal and paint all holes, openings, and cracks in the exterior shell (stucco) of Building 390. This project would control the humidity level inside the building.	This project is needed to control inside humidity, due to the nature of the work that occurs in the building. Currently, humidity control is almost impossible with the amount of hot outside air being allowed to enter the building. The exterior material on the building is cracked and falling off, and the stucco contains several holes due to equipment being abandoned or removed.
ANZY109057	Replace Building Insulation for AMSC Building 939	Facility Renovations	B-9	This project would replace the insulation for the entire Building 939 to include the addition of insulated ceiling tiles where needed. This project would control condensation inside the building.	This project is needed because the existing insulation is beginning to fall, causing a condensation problem in several areas.
ANZY059021	Renovate the Photo Lab at G-Range	Facility Renovations	B-10	This project would modernize the photography lab at the G-Range and bring the facility up to USAF standards.	This project is needed because piping is damaged or degraded to the point of nonusability; paint is peeling; the current photo developer is not properly interfaced with the potable water and sewer systems, and the current backflow preventers do not adequately protect the potable water system within the building.
ANZY990053	Construct Freight Elevator, PWT Transonic Control Building 785	Facility Renovations	B-9	This project would provide freight elevator access and transport at the PWT Transonic Control Building and would bring the facility into compliance with current codes and standards for freight movement/transport.	This project is needed to facilitate the movement of equipment to and from the 16t model room and instrumentation area to the exterior of the building. Currently, a hatch in floor of model room and an overhead 2-ton hoist are used to bring equipment and hardware up from the ground floor. Using the existing personnel elevator is not a viable option as it is not adequately sized for large freight cartons or padded to protect the elevator itself. Any equipment brought up through that elevator must be transported through the control room across raised computer flooring to access the model room, potentially damaging the floor. The existing overhead hatch has been found to be undersized for some equipment. Hoisting this equipment presents both a risk to the safety of personnel and a risk of damaging sensitive, critical test-support hardware.

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ANZY139020	Paint Exterior of VKF Compressor Building 651	Facility Renovations	B-10	This project would perform general life-cycle maintenance and to prevent further deterioration at Building 651.	This life-cycle maintenance project is needed because the building is starting to rust and deteriorate.
ANZY099072	Replace Windows, HTL Building 718	Facility Renovations	B-9	This project would modernize all windows in Facility 718 and would bring the facility up to USAF standards.	This project is needed because several windows on the second floor are fogged and prevent occupants from seeing out.
ANZY109045	Repair ETF Shop Building 876 for Break Area	Facility Renovations	B-9	This project would furnish a breakroom to accommodate FA64E and FA64M personnel by utilizing space in the area currently being used as storage.	This project is needed so that FA64E and FA64M personnel can meet at one time in one space. There is no place currently for meetings or retirements. Improvements would enhance the quality of life as a centralized break area for craft personnel and provide better working conditions for many other systems engineers, test customers, and office personnel who work in the building.
ANZY089050	Life-Cycle Upgrades, VKF G-range	Facility Renovations	B-10	This project would modernize the facility, including the replacement of eight personnel doors; two equipment room doors; one overhead door; transformers, panels and associated conduit, wire, etc. as well as installation of a sprinkler system; cleaning and sealing exterior walls; and installing new insulation to bring the facility up to USAF standards.	This life-cycle maintenance project is needed as part of routine maintenance at this aging building, which was constructed in 1963.
ANZY029105	Interior Upgrades, ETF Shop Building 876	Facility Renovations	B-9	This project would modernize numerous interior components of the facility, and would bring the facility up to USAF standards.	This project is needed because finishes are worn, damaged, and dated. Prior roof leaks have resulted in water damage.
ANZY089060	Life-Cycle Upgrades, Building 780, PWT Motor Drive	Facility Renovations	B-10	This project would perform general life-cycle maintenance to the building's interior components and would bring the facility up to USAF standards.	This life-cycle maintenance project is needed to upgrade the building and bring the building up to present-day codes and standards.
ANZY089059	Construct Elevator for Building 676	Facility Renovations	B-10	This project would modernize and streamline the movement of equipment of test hardware between flows at Building 676 in accordance with ANSI A17.1 and ANSI A117.1 codes and standards for freight and for personnel access.	This project is needed to facilitate the movement of equipment and test hardware between floors of Building 676. Hoisting this equipment presents a risk to the safety of personnel. This facility currently has only a single elevator for the entire building; that elevator was originally installed for handicapped access, not for use as a freight elevator, for which it is not sized. Because it receives far greater use than it was designed for, it is subject to frequent breakdowns. The current elevator is a safety hazard.
ANZY139018	Replace Roof of ETF-a Refrigeration Building 884	Facility Renovations	B-10	This project would modernize the roof on Building 884 and bring the facility up to current USAF standards.	This project is needed because the existing roof is well past its economical lifespan and has several leaks.
ANZY139002	Life-Cycle Upgrade Windows Power Control Building 1525	Facility Renovations	B-8	This project would modernize the windows in Building 1525 with new energy-efficient and blast-resistant windows and bring the facility up to current USAF standards.	This project is needed because the current windows are single-pane windows that are broken and drafty, with most of the tint peeling off; therefore, they are not energy efficient.

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ANZY129027	Upgrade Office/Breakroom, ETF shop 876	Facility Renovations	B-9	This project would consulate and improve the office breakroom areas and working conditions at Building 876.	This project is needed because the existing coffee/breakroom in Room 110 was not professionally installed. Further, using a portion of Room 110 as a makeshift breakroom divides up the entire office space, making it inefficient as well as unprofessional in appearance. The breakroom sink is currently located in Room 112 and is similarly set in the office portion of the room.
ANZY089067	Life-Cycle Upgrades, Building 939, Plume Data Diagnostics Lab	Facility Renovations	B-9	This project would perform general life-cycle maintenance to the building's interior components and would bring the facility up to USAF standards.	This life-cycle maintenance project is needed to upgrade the building and bring the building up to present-day codes and standards.
ANZY110044	Construct Elevator System, Wingo Inn, Facility 3027	Facility Renovations	B-20	This project would update the Wingo Inn (Facility 3027) through installation of an elevator system.	This project is needed because there is not currently an elevator at the facility. Many guests will not request an upstairs room because of difficulties in climbing stairs and transporting their items. Many times, if a downstairs room is not available, potential guests will stay at another hotel facility. The project is needed to facilitate use of luggage carts to the second floor. Currently, guests are unloading luggage and accessories at the stairwell to carry to their upstairs room. An elevator is needed to move heavy furniture and supplies between floors safely. Housekeeping personnel could work more efficiently between floors by accessing the elevator when using housekeeping carts. Implementation of this project would create a safer environment (with use of the elevator) for guests and personnel.
ANZY179008	Repair by Replacement High Bay Roof of Building 2108	Facility Renovations	B-16	This project would modernize the roof on Building 2108 and would bring the facility up to current USAF standards.	This project is needed because the existing roof is well past its economical lifespan and is showing sign of degradation.
ANZY050042	Repair Raised Flooring, Building 1103, Base NCC	Facility Renovations	B-3	This project would improve the reliability and maintainability of the raised flooring in Building 11-3 and to ensure the flooring meets current codes and requirements.	This project is needed because the existing raised floor is a tripping hazard and does not meet the current UFGS-09 69 13 standards for rigid grid access flooring.
ANZY119008	Replace Windows at Building 1411, Steam Plant a	Facility Renovations	B-6 and B-9	This project would replace all single-pane windows and wall louvers at steam plant with more energy-efficient windows.	This project is needed because the existing windows are more than 50 years old and are not energy efficient. The windows are old, worn, and past their economical life expectancy.
ANZY100051	Life-cycle Upgrade, Restroom, Building 1525	Facility Renovations	B-8	This project would modernize the restrooms in Building 1525 and bring the facility up to current USAF standards.	This project is needed because the existing fixtures are original to the facility constructed in 1952, partitions are rusted, some lockers have black paint on them, and all restrooms area is need of maintenance upgrades. None of these restrooms meet the Architectural Barriers Act for Handicapped Accessibility. This facility is manned 24 hours a day to support facilities and testing operations. The existing toilet fixtures do not meet the Energy Policy Act of 2005.

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ANZY089062	Life-Cycle Upgrades, Building 903, ETF-c Exhauster	Facility Renovations	B-9	This project would perform general life-cycle maintenance to the building's interior components and would bring the facility up to USAF standards.	This life-cycle maintenance project is needed to upgrade the building and bring the building up to present-day codes and standards.
ANZY139053	Repair by Replace Interior Lighting Primary Pump Station Facility 3038	Facility Renovations	B-20	This project would install proper lighting that would reduce risk of personal injury and eliminate an existing personnel safety hazard, meet energy requirements, and improve conditions to perform daily tasks and equipment preventive maintenance.	This project is needed because the current lighting has reached the end of its service life, is original, inefficient, and inadequate by current codes and standards (UFC 3-530-01 Design: Interior and Exterior Lighting and Controls 8/22/2006, and the IESNA Lighting Handbook 10th edition). Proper lighting will reduce risk of personal injury and eliminate an existing personnel safety hazard, meet energy requirements, and improve conditions to perform daily tasks and equipment preventive maintenance.
ANZY179007	Repair by Replacement Roof of Facility 2123	Facility Renovations	B-13	This project would modernize the roof on Building 2123 and bring the facility up to current USAF standards.	This project is needed because the existing built-up roof was installed in 1992 and is starting to show signs of deterioration.
ANZY079010	Repair Interior, ETF Special Projects Building 899	Facility Renovations	B-9	This project would renovate the interior of Building 899, first and second floors; replace water-damaged red/brown carpet in all rooms; repair water-damaged ceiling tile and replace missing panels; and paint all interior walls, doors, and frames as needed.	This project is needed because existing finishes have been flooded at least three times. The carpet smells terrible. Ceiling tiles are missing, molded, or water damaged. The entire facility projects a poor image to testing customers and will continue to deteriorate without improvements.
ANZY9700983	Renovate Model Shop/1st Floor	Facility Renovations	B-12	This project would renovate the interior administration area on the first floor of the model shop to bring the facility up to current standards.	This project is needed because the existing lighting and air conditioning are not sufficient to support the requirements of current-day office equipment systems such as computers and printers. Without this project, overcrowding will continue with corresponding loss of productivity. Old, unsuitable laboratory areas will continue to be used for office space. Air-conditioning systems have outlived their useful life, and maintenance and repair cost are escalating. The floor covering is deteriorating and contains asbestos; replacement is the only option for repair.
ANZY139055	Repair/Replace Interior Lighting PWT Supersonic Compressor Facility 702	Facility Renovations	B-9 and B-10	This project would replace the interior lighting throughout the PWT Supersonic Compressor Equipment Building, Facility 702, including foot-candle levels, preventive maintenance, emergency lighting, and lighting controls.	This project is needed because the current lighting has reached the end of its service life, is original, inefficient, and inadequate by current codes and standards (UFC 3-350-01 Design: Interior and Exterior Lighting and Controls 8/22/2006, and the IESNA Lighting Handbook 10th edition). Proper lighting will reduce risk of personal injury and eliminate an existing personnel safety hazard, meet energy requirements, and improve conditions to perform daily tasks and equipment preventive maintenance.
ANZY139019	Paint Exterior of PWT Rotor Building 786	Facility Renovations	B-10	This project would prevent further exterior paint deterioration by performing maintenance painting of the building exterior including walls, doors, frames, rollup doors, louvers, bollards, and trim.	This project is needed because paint is beginning to peel and siding is starting to show signs of corrosion.

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ANZY150008	Repair by Replace Roof Services Marina Storage, Facility 3058	Facility Renovations	B-20	This project would modernize the roof on Building 3058 and would bring the facility up to current USAF standards. This project is in a floodplain.	This project is needed because the current roof was installed in 1997 and is past its economical life span.
ANZY089073	Repair Fire Exit Stairs, Mark 1, Building 1075	Facility Renovations	B-3	This project would widen and reduce the exit stair slope as required to comply with current life safety codes.	This project is needed because the stairs do not comply with fire codes for an occupancy of over 10 people. Further, use of this facility for the STAT offices requires the stairs to be upgraded.
ANZY119036	Life-Cycle Upgrade Building 646	Facility Renovations	B-10	This project would renovate the interior of Building 646, including replacing asbestos floor covering, patching/painting drywall, removing strip heaters hanging from the ceiling, installing gaskets/weatherstripping at all exterior doors, and upgrading restroom walls, floors, ceiling, fixtures, and accessories.	This project is needed because the existing facility is cold due to lack of weather stripping and has had no major upgrades. The current restroom is a small area built between two walls. Improvements would enhance the quality of life of the occupants.
ANZY9700984	Renovate Model Shop/2nd Floor	Facility Renovations	B-12	This project would renovate the interior second floor of the model shop to bring the facility up to current standards.	This project is needed because the existing lighting and air conditioning is not sufficient to support the requirements of current day office equipment systems such as computers and printers. Without this project, overcrowding will continue with corresponding loss of productivity. Old, unsuitable laboratory areas will continue to be used for office space. Air conditioning systems have outlived their useful life, maintenance and repair cost are escalating. The floor covering is deteriorating and contains asbestos, replacement is the only option for repair.
ANZY119002	Repair Work Lights in j6 Test Cell Building 2124	Facility Renovations	B-13	This project would replace work lights with equivalent illumination and distribution or replace existing fluorescent fixture oil-filled ballasts with electronic ballasts and locate electronic ballasts outside the vacuum system.	This project is needed because the antiquated oil-filled ballasts currently being used are no longer manufactured.
ANZY170010	Replace Roof on BCE Building, Facility 1478	Facility Renovations	B-9	This project would replace the existing built-up roof with a new single-ply roof, replace the existing skylights with new watertight panels, and replace the existing roof access fixed ladders.	This project is needed because the existing roof was installed in 1997 and is beginning to show signs of problems. The existing skylights have leaked for many years, and repairs have been attempted to no avail. Also, the existing fixed ladders are not code compliant and have been deemed unsafe by Safety.
ANZY119024	Replace Windows at Secondary Pumping Station, Building 1507	Facility Renovations	B-8	This project would replace existing windows with new energy-efficient windows.	This project is needed because the existing windows are over 50 years old, are deteriorated single-pane windows, and are not energy efficient.

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ANZY129011	Life-Cycle Upgrade PWT Supersonic Control Building 745	Facility Renovations	B-9	This project would maintain the interior of Facility 745, including the following items: repair janitor's closet after steam leak is repaired to include painting, door replacement, shelving, and concrete block repair as needed; replace ceiling tile and paint office near men's first-floor restroom; paint men's first-floor restroom, replace partitions, fixtures, and accessories as needed; upgrade to ADA standards as feasible; paint interior of 113 Plant Computer room and repair wall/paint adjacent hallway drywall east wall; repair moisture problems on east wall and paint wall in the 16S Nozzle Room; paint interior, replace ceiling tile, and replace carpet in 115, 4T User Office; paint and replace damaged asbestos floor tile in 117 and 117A; replace ceiling tile in 117A; replace high bay west double doors with roll-up door and personnel door; and repair same interior exit by removing unused electrical cabinets and painting interior.	This project is needed because the existing facility has had no interior maintenance painting or carpet replacement in over 20 years except for the control room. The facility needs to be updated to give test customers and employees a cleaner and safer environment in which to work.
ANZY109009	Life-Cycle Upgrade - Rowland Creek PS Building 1547	Facility Renovations	B-16	This project would paint walls damaged by a steam leak in the high bay.	This project is needed to bring the building up to present-day codes and standards.
ANZY110021	Renovate Exterior of Building 1422	Facility Renovations	B-6	This project would renovate Building 1422, which includes replacing the exterior metal roof and siding, along with new insulation, new roll-up doors, and new personnel doors.	This project is needed because the existing roof is starting to rust and needs to be replaced before the situation worsens. The building exterior has been hit several times, denting the building, and there are holes in the exterior metal that are not allowing the building to be weather tight. The existing overhead and personnel doors are old and do not function well.
ANZY079037	Repair Interior, ETF-C Heater Control Building. 921	Facility Renovations	B-9	This project would maintain Facility 921, ETF-C Heater Control Building, by completing interior repair of peeling paint; interior painting of walls, doors, and trim; exterior painting of doors and frames; installation of new trash can in restroom; repair of water-damaged 12x12 vinyl floor tile; cleaning and relamping of existing light fixtures; repair of ballast in restroom light fixture; and replacement of vestibule ceiling tile.	This project is needed to maintain the facility to Air Force standards and improve the quality of life for occupants. Relamping light fixtures will improve safety of occupants. Without repairs the facility will continue to deteriorate and require more costly repairs.
ANZY109010	Life-Cycle Upgrade - Flammable Storage Building 1543	Facility Renovations	B-15	This project would maintain the flammable storage area at Building 1542 by painting exterior walls, installing new envelope insulation, replacing an overhead door on the south side of building, replacing exterior lights and installing weatherproof receptacles with associated conduit/wiring, and replacing all lighting fixtures with more energy-efficient light and lighting controls such as motion sensor.	This project is needed to bring the building up to present-day codes and standards.
ANZY169006	Repair Lighting in Control Room Facility, Facility 878	Facility Renovations	B-9 and B-10	This project would replace the interior lighting in the control room and bathroom area of Facility 878. This project requires replacing the ceiling tiles and feeder wires; the existing interior lighting fixtures with new induction, or LED lighting fixtures; and the existing lighting panel with a new lighting control panel.	The existing lighting fixtures have already reached the end of its service life, and the control room is lacking acceptable lighting levels. The interior lighting does not meet current codes and standards (UFC 3-530-01 Design: Interior and Exterior Lighting and Controls 8/22/2006, and the IESNA Lighting Handbook 10th edition).

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ANZY139030	Paint PWT 4T Building 707	Facility Renovations	B-9	This project would perform maintenance painting of the H Building exterior to include walls, doors, frames, roll-up doors, louvers, ladders, bollards, and trim.	This life-cycle maintenance project is needed to prevent further deterioration of the building.
ANZY050024	Construct/Repair Elevator System, A&E Building, Facility 100	Facility Renovations	B-2	This project would construct the passenger elevator on northwest side of the A&E Building (B-Wing) and would bring the facility up to current USAF standards.	This project is needed because there is currently a single elevator for the entire Building; that elevator is a freight elevator not designed for passengers. It is slow, and because it receives far greater use than it was designed for, it is subject to frequent breakdowns. The lack of a functional passenger elevator does not meet the intention of ADA requirements.
ANZY189005	Repair Metal Pump Room Roof, Facility 579	Facility Renovations	B-11	This project would replace the metal roof with a new metal roof, install a new roof hatch so that the pumps and other equipment can be easily moved in and out of the building, replace the insulation inside the building that is located on the underside of the roof decking, and provide safe access to the roof hatch and valves on the roof.	This project is needed because the existing roof, which was installed in 1972, leaks and is past its economical life span. Because of those roof leaks, the insulation is falling and no longer protects the equipment inside from temperature issues. Also, there currently is no roof hatch, which makes moving pumps and equipment in and out very difficult.
ANZY119019	Replace Metal Roof of Building 712, PWT 16s Nozzle Pump House	Facility Renovations	B-9	This project would modernize the existing corrugated metal roof to a standing seam roof on Building 712 and bring the facility up to current USAF standards.	This project is needed because the existing roof is past its economical lifespan.
ANZY079016	Maintain Interior, ETF Exhauster, Building 882	Facility Renovations	B-10	This project would upgrade the Interior of Building 882, including control room floors and walls, the toilet and janitor's closet, and interior doors and hardware as needed, and paint.	This project is needed because of some areas has not been upgraded since original construction. Finishes are dirty and worn making it difficult to properly maintain. Renovation will improve the quality of life for the occupants and visitors and will maintain the facility to USAF standards.
ANZY080129	Repair/Maintain HAZMAT Pharmacy Building 1459	Facility Renovations	B-7	This project would maintain Building 1459 by replacing the current low-voltage power distribution, transformers, power panels, and associated wiring; replacing two personnel doors; painting walls, doors and trim; replacing floor tile and base; sealing any water penetrations in walls; and installing an exhaust fan at east end of to ensure it is explosion proof.	This project is needed because the existing floor tile is broken and scratched; interior finishes need painting; lighting is obsolete and inadequate.
ANZY090080	Upgrade Lighting, Commissary/ BX Building 125	Facility Renovations	B-2	This project would modernize the existing lighting system at Building 125 and bring the facility up to current USAF standards.	This project is needed because the current lighting was installed in 1982 and is no longer adequate for the facility. Replacement lighting on sensors or controls would also help the base comply with the Energy Policy Act.
ANZY139037	Paint Exterior of PWT Pes Control Building 710	Facility Renovations	B-9	This project would maintain Building 710 by painting exterior walls, doors, frames, roll-up doors, louvers, ladders, bollards, and trim and cleaning and sealing concrete and brick walls.	This life-cycle maintenance is needed to prevent rust and further deterioration.
ANZY076008	Repair H1 Bank 1 Roof, Facility 921	Facility Renovations	B-9	This project would modernize the existing flat roof to a standing seam roof on the C Plant H1 Bank 1a Facility 921 and bring the facility up to current USAF standards.	This project is needed because the existing roof is beginning to leak, allowing water to enter the combustion chamber.

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ANZY089042	Repair/Maintain PWT Model Installation Building 760	Facility Renovations	B-9	This project would maintain Building 760 by replacing any discolored, missing, or water-damaged ceiling tile and grid; painting walls damaged by a steam leak in the high bay and all of the interior walls and ceilings except offices on the first floor; and replacing low-voltage power panels.	This project is needed because walls and ceiling tiles have been damaged by leaks and have yellowed in some areas due to age. The existing low-voltage power panels are 50 years old, worn out, and parts are no longer available, and satisfactory operation is questionable.
ANZY090010	Modernize Gossick Leadership Center, Facility 2912	Facility Renovations	B-24	This project would modernize Facility 2912 and bring it up to USAF standards.	This project is needed to bring the building up to present-day codes and standards.
ANZY099079	Install Lighting Controls, Customer Service Building 1306	Facility Renovations	B-6	This project would modernize the lighting system at Building 1306 and bring it up to USAF standards.	This project is needed to bring the building up to present-day codes and standards.
ANZY139052	Modify Roof or Replace PWT HTL Reactor Facility 721	Facility Renovations	B-9	This project would raise the existing roof of Building 721 or replace Building 721 altogether to allow for the use of the top coils of the C reactors.	This projected is needed to improve heater operations in the H1, H2, and H3 facilities.
ANZY190005	AD/AL Installation Gate Access Control Point, Arnold Village	Facility Renovations	B-20	This project would modernize the access control point at Arnold Village and bring it up to USAF standards.	This project is needed because the current security booth is too small and lacks sufficient space for required equipment to include a computer and the Defense Biometric Identification System (DBIDS). Further, the existing booth does not contain a restroom.
ANZY129012	Life-Cycle Upgrade PWT Transonic Control Building 785	Facility Renovations	B-9	This project would upgrade the interior of Building 785 to include the following: paint interior of the second floor as needed, replace east double door with new roll-up door and canopy, repair the forklift-damaged north drywall wall inside the double doors and cover wall with metal to prevent further damage in the tight space, paint interior and replace lighting to energy-efficient lights in the basement work areas, replace lighting in the equipment room, replace the damaged men's restroom door in the first-floor lobby area to match existing door style and color, and reinsulate any damaged piping in the basement work areas.	This project is needed because the current lights have exceeded their economic life and are not energy efficient. The paint is the old original green color. The double door has exceeded its life and is coming apart at the bottom plus is hard to keep open to get a forklift inside. Years of wear have taken their toll on the facility and upgrades are needed.
ANZY139038	Paint Exterior of ETF-A Exhauster Building 882	Facility Renovations	B-10	This project would maintain Building 882 by painting exterior walls, doors, frames, roll-up doors, louvers, ladders, bollards, and trim and cleaning and sealing concrete and brick walls.	This life-cycle maintenance project is needed because the building is starting to rust and measures are needed to prevent further deterioration.
ANZY070012	Maintain/Upgrade Restroom, Secondary Pump Station	Facility Renovations	B-8	This project would modernize the restroom at Facility 1507, Secondary Pumping Station, and bring it up to USAF standards.	This life-cycle maintenance project is needed because the interior of the restroom has had no major upgrade since it was originally constructed. Upgrades would improve the quality of life for round-the-clock occupants and maintain the facility to USAF standards.
ANZY099018	Repair Mark I High Bay Lighting	Facility Renovations	B-3	The purpose of the is project is to relamp Mark I (1075) High Bay and Mark I Refrigeration Shop with sufficient high bay lighting.	This life-cycle maintenance project is needed because the lighting in both areas is very poor and has become a safety concern due to lack of available lighting. The lamps that do function are very noisy and distracting. Both areas support not only the Space Environments Test Facilities but also the Sensor Test Facilities of 7V and 10V.

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ANZY139029	Paint ETF-C Air Supply Building 929	Facility Renovations	B-8 and B-9	This project would maintain Building 929 by painting exterior walls, doors, frames, roll-up doors, louvers, ladders, bollards, and trim and cleaning and sealing concrete and brick walls.	This life-cycle maintenance project is needed because the building is starting to rust and measures are needed to prevent further deterioration.
ANZY079030	Repair Interior, PWT Blade Repair Building 794	Facility Renovations	B-10	This project would improve the workplace for users and bring the facility up to USAF standards by renovating the interior of Facility 794.	This project is needed because no improvements have been made to the facility since the original construction in 1965. Renovation improve the workplace for users and bring the facility up to USAF standards.
ANZY099019	Repair Mark I Test Control Areas Lighting	Facility Renovations	B-3	This project would improve the workplace for users and bring the facility up to USAF standards by relamping the test control areas of the Mark I Facility (1075).	This project is needed because the lighting in these areas is insufficient and noisy for the prolonged work that is inherent in conducting a Mark I test. Personnel are subjected to poor, very noisy lighting for 8 hours per day, up to 40 days in a row during a Mark I test.
ANZY139022	Paint Exterior of t-3 Test Cell Building 898	Facility Renovations	B-10	This project would maintain Building 898 by painting exterior walls, doors, frames, roll-up doors, louvers, ladders, bollards, and trim and cleaning and sealing concrete and brick walls.	This life-cycle maintenance project is needed because the building is starting to rust, and measures are needed to prevent further deterioration.
ANZY080048	Renovate Auto Repair Shop, Facility 1400	Facility Renovations	B-6 and B-9	This project would improve the quality of life for the occupants, provide modern workspaces for occupants, and bring the facility up to USAF standards by renovating the interior of Facility 1400.	This project is needed because the existing building is over 60 years old.
ANZY079011	Renovate Interior, X-Ray Building	Facility Renovations	B-16	This project would improve the workplace for users and bring the facility up to USAF standards by renovating the interior of Facility 2108.	This project is needed because the floor tile is currently a mixture of green, white, and black tiles. Walls are multiple colors. Floors are discolored due to water and roof leaks.
ANZY090012	Modernize Arnold Community Center	Facility Renovations	B-20	This project would modernize the Arnold Community Center and bring the facility up to USAF standards.	This project is needed to bring the building up to present codes and standards.
ANZY189037	Maintain/Paint Exterior of VKF G-Range, Facility. 678	Facility Renovations	B-10	This project would maintain Facility 678 as a weathertight building.	This project is needed because the existing exterior protective coating is significantly degraded.
ANZY090006	Repair Heavy Equipment Repair Shop Facility 1401	Facility Renovations	B-6	This project would modernize Facility 1401 and bring the facility up to USAF standards.	This project is needed because the facility was constructed in 1953 and requires life-cycle upgrades to maintain its economical life.
ANZY079007	Repair Restroom, Explosive/Rocket Motor Storage Building 2228	Facility Renovations	B-17	This project would improve the workplace for users and bring the facility up to USAF standards by renovating the restroom Facility 2228.	This project is needed because the existing concrete floor in restroom cannot be maintained, and the restroom needs more permanent floor. Upgrades will improve the quality of life for the occupants and upgrade the area to Air Force standards.
ANZY199021	Renovate VKF HTL Shop, Facility 718	Facility Renovations	B-9	This project would improve the workplace for users and bring the facility up to USAF standards by modifying the existing 718 Facility, including adding new office spaces, a new conference room, new supervisor offices, and a breakroom; increasing restroom capacity; installing a new fire detection and suppression system; and replacing exterior doors and windows.	This project is needed because the facility is currently at capacity, and a temporary trailer is currently being used to house the MPAH project team and area supervisor. Additional personnel are being hired to support increased testing and would be housed in the same trailer. The current shop area doubles as a break area and the facility does not have adequate space for a true customer area.
ANZY070074	Replace Task Lights, Carroll Building	Facility Renovations	B-3	This project would create a more energy-efficient building and bring the facility up to USAF standards.	This project is needed because the current task lights are not energy efficient.

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ANZY139003	Seal Exterior of Power Control Building 1525	Facility Renovations	B-8	This project would seal the brick and repair the mortar, clean and seal concrete steps and landings, and paint metal handrails and guardrails at Building 1525.	This project is needed because the brick exterior is starting to show signs of degradation and needs to be sealed to prevent water intrusion into the building.
ANZY0491133	SSTF Renovations Phase 3	Facility Renovations	B-2 and B-3	This project would modernize the facility and bring it up to USAF standards.	This project is needed because the building has had no major upgrades since it was constructed in 1964, and finishes and lighting are dated and worn.
ANZY099078	Install Lighting Controls, Customer Service Building 1307	Facility Renovations	B-6	This project would modernize the lighting system at Building 21213 and bring it up to USAF standards.	This project is needed to bring the building up to present-day codes and standards.
ANZY139025	Paint J6 Local Electronics Building 2123	Facility Renovations	B-13	This project would maintain Building 2123 by painting exterior walls, doors, frames, roll-up doors, louvers, ladders, bollards, and trim and cleaning and sealing concrete and brick walls.	This life-cycle maintenance project is needed because the building is starting to rust and measures are needed to prevent further deterioration.
ANZY140025	Repair/Renovate Shop Areas BCE Facility 1478	Facility Renovations	B-9	This project would modernize Facility 1478 and bring it up to USAF standards.	This project is needed because the existing BCE shop facility has had no major upgrades since the original construction. Lighting and skylights need to be updated to meet the energy codes. Restrooms are the original 1950s construction with no upgrades. The facility does not currently have a fire sprinkler system, and no mass notification system is in place. Heaters are old and in need of replacement.
ANZY139033	Paint ETF AC&T Building 878	Facility Renovations	B-9 and B-10	This project would maintain Building 878 by painting exterior walls, doors, frames, roll-up doors, louvers, ladders, bollards, and trim and cleaning and sealing concrete and brick walls.	This life-cycle maintenance project is needed because the building is starting to rust and measures are needed to prevent further deterioration.
ANZY139034	Paint ETF B-Side Exhauster Building 879	Facility Renovations	B-9 and B-10	This project would maintain Building 879 by painting exterior walls, doors, frames, roll-up doors, louvers, ladders, bollards, and trim and cleaning and sealing concrete and brick walls.	This life-cycle maintenance project is needed because the building is starting to rust and measures are needed to prevent further deterioration.
ANZY130008	Paint Exterior of PWT Office Building 740	Facility Renovations	B-9	This project would maintain Building 740 by painting exterior walls, doors, frames, roll-up doors, louvers, ladders, bollards, and trim and cleaning and sealing concrete and brick walls.	This life-cycle maintenance project is needed because the building is starting to rust and measures are needed to prevent further deterioration.
ANZY099087	Life-Cycle Upgrades, Cooling Tower Control Building 1092	Facility Renovations	B-3 and B-9	This project would improve the workplace for users and bring the facility up to USAF standards by renovating the restroom in Building 1092.	This project is needed to bring the building up to present-day codes and standards.
ANZY100042	Repair Waste Oil Minimization Facility-Building 1461	Facility Renovations	B-6	This project would modernize the lighting system at Building 1461 and bring it up to USAF standards.	This project is needed to bring the building up to present-day codes and standards.
ANZY139024	Paint PWT Transonic Control Building 785	Facility Renovations	B-9	This project would maintain Building 785 by painting exterior walls, doors, frames, roll-up doors, louvers, ladders, bollards, and trim and cleaning and sealing concrete and brick walls.	This life-cycle maintenance project is needed because the building is starting to rust and measures are needed to prevent further deterioration.

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ANZY089003	Repair Raised Floor, ETF-a Test, Building 880	Facility Renovations	B-10	This project would modernize the flooring at Building 880 and bring it up to USAF standards.	This project is needed because the current floor is carpeted and does not fit back properly when removed, causing a tripping hazard all over. Tiles are old and this particular system is no longer made, making it impossible to order spare tiles to replace the defective ones.
ANZY149007	Repair Raised Floors sl2/sl3, Facility 541	Facility Renovations	B-8 and B-11	This project would modernize the flooring at Facility 541 and bring it up to USAF standards.	This project is needed because the existing floor is worn, discolored carpet covered and is impossible to maintain, a laminate surface would give a cleaner appearance. The existing floor has missing trim in some locations, is not square, and carpet covering can cause tripping hazards as the carpet delaminated from age. Without replacement the floor would continue to be a tripping hazard.
ANZY139023	Paint Exterior of the j-4 Data Conditioning Building 534	Facility Renovations	B-11	This project would maintain Building 534 by painting exterior walls, doors, frames, roll-up doors, louvers, ladders, bollards, and trim and cleaning and sealing concrete and brick walls.	This life-cycle maintenance project is needed because the building is starting to rust and measures are needed to prevent further deterioration.
ANZY100061	Replace Floor Covering Building 922	Facility Renovations	B-9	This project would modernize the flooring at Building 922 and bring it up to USAF standards.	This project is needed because the existing carpet in Room 202 is worn from constant use and is stained due to roof leaks. Tile is missing in some parts of the hallways. Floorcovering replacement is required to maintain the facility and prevent tripping hazards from missing tile in the second-floor hallway. This area is frequently visited by personnel obtaining work permits to work in this test area.
ANZY050053	Maintain Interior, Primary Pumping Station	Facility Renovations	B-20	This project would maintain the interior of Building 3038 and bring it up to USAF standards by painting interior walls, window frames, and ceiling and by upgrading the restrooms.	This project is needed to restore damaged building components. The existing restroom is in deplorable condition, walls in the office are damaged due to roof leaks, and the interior of the high bay area has never been painted.
ANZY080087	Sustain Precision Measurement Lab	Facility Renovations	B-2 and B-12	This project would modernize the laboratory and bring it up to USAF standards by replacing two personnel doors, replacing the exterior lighting system, installing new installation, and replacing a crane.	This project is needed to bring the building up to present-day codes and standards.
ANZY139028	Paint J4 Power Distribution Building 569	Facility Renovations	B-11	This project would maintain Building 569 by painting exterior walls, doors, frames, roll-up doors, louvers, ladders, bollards, and trim and cleaning and sealing concrete and brick walls.	This life-cycle maintenance project is needed because the building is starting to rust, and measures are needed to prevent further deterioration.
ANZY149009	Repair Raised Floor and Paint PWT Facility 722	Facility Renovations	B-9	This project would modernize the flooring at Facility 722 and bring it up to USAF standards.	This project is needed because the existing raised floor is old and has had numerous repairs to attach loose panels, trying to maintain stability.
ANZY079069	Repair Interior, Post Office/ICC, Building 685	Facility Renovations	B-10	This project would modernize the interior of Building 685 and bring it up to USAF standards by replacing damaged ceiling tiles; painting all walls, doors, and trim; replacing the restroom floor; cleaning interior and exterior windows; and adding a lock to Vestibule 106 for fire department access.	This project is needed to repair damaged building components and to bring the building up to present-day codes and standards.

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ANZY080088	Sustain Chem Lab, Facility 445	Facility Renovations	B-12	This project would modernize the laboratory and bring it up to USAF standards by replacing two personnel doors, replacing exterior lighting system, and installing a new fire sprinkler system.	This project is needed to bring the building up to present-day codes and standards.
ANZY169002	Replace Raised Floor, Third-Floor Corridor, Facility 912	Facility Renovations	B-9	This project would modernize the flooring at Facility 912 and bring it up to USAF standards.	This project is needed because the existing raised floor is old and has had numerous repairs to attach loose panels, trying to maintain stability.
ANZY079031	Interior Repairs, Riggers, Maintenance Building 441	Facility Renovations	B-12	This project would improve the workplace for users and bring Building 441 up to USAF standards.	This project is needed to bring the building up to present-day codes and standards.
ANZY080099	Repair/Maintain Warehouse 1, Facility 1476	Facility Renovations	B-7 and B-8	This project would modernize Facility 1476 and bring it up to USAF standards by replacing existing partial divider walls, carpet, and ceiling system; upgrading electrical and communications wiring to current code; installing new lighting; installing new HVAC ducting; replacing the low-voltage power system and associated components; replacing exterior doors and hardware; and painting the building's interior.	This project is needed because the facility was constructed in 1952 and has had no upgrades. Walls are uninsulated. Dated finishes give the Building a 1950s appearance. The building layout is not conducive to current operations for employees and contractors or suppliers. Currently, the potable water lines supplying the fire sprinkler systems are old and leaking.
ANZY099005	Paint High Bay, VKF	Facility Renovations	B-10	This project would maintain high bay area by cleaning and painting it.	This life-cycle maintenance project is needed because the building is starting to rust, and measures are needed to prevent further deterioration.
ANZY149010	Repair Shop Office Flooring Model Shop Facility 451	Facility Renovations	B-12	This project would modernize the flooring at Facility 451 and bring it up to USAF standards.	This project is needed because the existing raised floor is old and has had numerous repairs to attach loose panels, trying to maintain stability.
ANZY100059	Replace Floor Covering on the Fifth Floor of Building 1075	Facility Renovations	B-3	This project would modernize the flooring on the fifth floor of Building 1075 and bring it up to USAF standards.	This project is needed because the existing carpet is stained from water and glycol leaks over the years.
ANZY090075	Upgrade ID Conference Area, Building 1103	Facility Renovations	B-3	This project would improve the workplace for users and bring the facility up to USAF standards by upgrading the ID Conference Room in Building 1103 through removal of one workstation and the construction of new floor to ceiling walled conference room with a door.	This project is needed because the current ID Conference room is used by more than 150 employees, and any meeting over one hour long is hard to schedule in the current conference rooms. ID meetings can be noisy, especially if the speaker phone is being used, and this disrupts ID employees in surrounding workstations.
ANZY079032	Paint Shear Machine Shed (Corrosion Control), Building 443	Facility Renovations	B-12	This project would maintain Building 443 by cleaning and painting the structural steel and underside of the roof.	This life-cycle maintenance project is needed because the building is starting to rust, and measures are needed to prevent further deterioration.
ANZY105011	Upgrade Building 3058 – NAF Boat Storage/Repair	Facility Renovations	B-20	This project would modernize the lighting system at Building 3058 and bring it up to USAF standards.	This project is needed to bring the building up to present-day codes and standards.

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ANZY059016	Maintain Paint Interior Shop Area, Model Shop 451	Facility Renovations	B-12	This project would maintain the shop area at Building 451 by cleaning and painting it.	This life-cycle maintenance project is needed because the building was constructed in 1953, and the shop paint has exceeded its useful life. The shop area is dark and hard to clean because of the deteriorated and dingy paint.
ANZY199026	Renovate Room 157, AMSC Building, Facility 939	Facility Renovations	B-9	This project would improve the workplace for users and bring the facility up to USAF standards by renovating Room 157 in Facility 939, including removal of existing office cubicles and installation of new cubicles, removal of an interior half wall, painting and patching of interior walls, replacement of carpet and ceiling panels, installation of electrical and communications as required, and adjustment of the current HVAC system as required.	This project is needed because AMSC requires additional cubicle space to hire personnel to meet RBA workload requirements forecasted through FY23.
ANZY009123	Paint ETF EXH Process Air Ducting Building 879	Facility Renovations	B-9 and B-10	This project would maintain the Building 879 by cleaning and painting the duct.	This life-cycle maintenance project is needed to prevent further deterioration of the duct system.
ANZY160005	Life-Cycle Repair Restrooms Facility 100	Facility Renovations	B-2	This project would modernize the restrooms at Facility 100 and bring the restrooms up to USAF standards.	This project is needed because the existing restrooms have had only minor modifications with new partitions and new vanities in some restrooms in 1991 but still have all the interior finishes from the original 1952 construction. The restrooms no longer meet the Architectural Barriers Act toilet compartment layouts.
ANZY089065	Life-Cycle Upgrades, Building 922, ETF-c Refrigeration Control	Facility Renovations	B-9	This project would modernize Building 922 and bring it up to USAF standards by installing new insulation, repairing or replacing ceilings in Stairs 2 and 7, replacing personnel doors, and replacing lighting.	This project is needed to bring the building up to present-day codes and standards.
ANZY099071	Life-Cycle Upgrades, APTU Test Cell Building 579	Facility Renovations	B-11	This project would modernize Building 579 and bring it up to USAF standards by upgrading offices, installing new lighting, and replacing low-voltage electrical components.	This project is needed to bring the building up to present-day codes and standards.
ANZY089064	Life-Cycle Upgrades, Building 913, ETF-c Compressor Building	Facility Renovations	B-9	This project would modernize Building 913 and bring it up to USAF standards by installing new insulation, replacing three personnel doors, and replacing lighting.	This project is needed to bring the building up to present-day codes and standards.
ANZY100036	Life-Cycle Upgrades-Pesticides Storage Building 1414	Facility Renovations	B-9	This project would modernize Building 1414 and bring it up to USAF standards by installing new insulation, updating restrooms, replacing low-voltage electrical components, and replacing lighting.	This project is needed to bring the building up to present-day codes and standards.
ANZY090033	Facility Upgrades, Fire Department, Building 251	Facility Renovations	B-2	This project would modernize Building 251 and bring it up to USAF standards by replacing windows and doors on the northeast-side security area and replacing the two current emergency generators with two newer, larger generators.	This project is needed to bring the building up to present-day codes and standards.

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ANZY090083	Energy Upgrades, Oil Pump House, Main Substation	Facility Renovations	B-8	This project would modernize the pump-house main substation and bring it up to USAF standards by replacing exterior windows, installing insulation, replacing an interior door, replacing a personnel double door, and replacing all fixtures with more energy-efficient lighting and lighting controls.	This project is needed to bring the building up to present-day codes and standards.
ANZY090008	Modernize Warehouse VI	Facility Renovations	B-6	This project would modernize Warehouse VI and bring it up to USAF standards by replacing an overhead door, replacing lighting, installing a fire sprinkler system, replacing windows, and cleaning and sealing exterior walls.	This project is needed to bring the building up to present-day codes and standards.
ANZY100020	Sustain Fire Department Compressor Building 261	Facility Renovations	B-2	This project would modernize Building 261 and bring it up to USAF standards by installing new insulation, replacing exterior doors, and replacing all fixtures with more energy-efficient lighting and lighting controls.	This project is needed to bring the building up to present-day codes and standards.
ANZY089040	Sustain VKF Compressor Building, Facility 651	Facility Renovations	B-10	This project would modernize Building 651 and bring it up to USAF standards by installing new insulation, replacing all exterior windows, replacing power panels, replacing 11 personnel doors and 4 overhead doors with safety gates, and cleaning and sealing exterior walls.	This project is needed to bring the building up to present-day codes and standards.
ANZY089063	Life-Cycle Upgrades, Building 912, ETF-C Test Building	Facility Renovations	B-9	This project would modernize Building 912 and bring it up to USAF standards by installing new insulation, replacing 12 doors, replacing lighting, and installing a permanent heater in the mechanical room to protect the fire protection system riser.	This project is needed to bring the building up to present-day codes and standards. Further, the fire sprinkler system riser is located in an unheated room subject to freezing. If the riser freezes and cracks, the riser body fire protection will be lost, and it will be very expensive to repair.
ANZY189052	Renovate Dot Lab Facility. 934 for the JSIS FOC Effort	Facility Renovations	B-9	This project would renovate Building 934 to accommodate the needs of the Joint Standard Instrumentation Suite (JSIS) Full Operational Capability (FOC) effort. This project includes making modifications to the interior finishes; raising the ceiling; upgrading lighting, fire protection, and HVAC; relocating interior electrical power for external access; and modifying the parking lot and driveway for increased building access.	This project is needed to provide the AEDC infrastructure that would support future JSIS work. The JSIS FOC effort will be under development at AEDC from FY19-FY23.
ANZY099070	Life-Cycle Upgrades - APTU Test Cell Control Building 578	Facility Renovations	B-11	This project would modernize Building 578 and bring it up to USAF standards by cleaning and sealing exterior walls, replacing vinyl flooring, replacing door hardware on a personnel door, and installing more energy-efficient lighting and lighting controls.	This project is needed to bring the building up to present-day codes and standards.
ANZY109004	Renovate APTU Control Room 578	Facility Renovations	B-11	This project would renovate APTU Control Room 578 and bring it up to USAF standards by removing an existing wall between the data conditioning room and the primary control area to provide an expanded area and allow for more efficient operations.	This project is needed because the existing control room in Building 578 does not provide adequate room for test operations personnel and test customers. As facility improvements are implemented such as the Facility Control System upgrade, the area available to conduct test operations will continue to decrease. Overcrowded conditions in the control room would continue to exist without renovation or expansion. Test engineers would be forced to limit the number of observers and other nonessential personnel allowed in the control room during test periods.

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ANZY080131	Life-Cycle Upgrades, Building 1433	Facility Renovations	B-6	This project would modernize Building 1433 and bring it up to USAF standards by installing cleaning and sealing exterior walls, replacing windows, replacing four personnel doors and one equipment room door, and installing a new fire sprinkler system and fire alarm.	This project is needed to bring the building up to present-day codes and standards.
ANZY179026	Repair HVAC, Interior Exterior J6 Facilities 2123, 2124, 2132	Facility Renovations	B-13	This project would maintain J6 Facilities 2123, 2124, and 2132 and bring them up to USAF standards by repairing or replacing interior finishes in Space 112, replacing HVAC, painting and repairing the ceiling in Space 109, replacing the main entry exterior doors and frame, replacing any other rusting personnel exit doors, installing canopies over exit doors, painting the interior, and replacing the entry floor tile and base.	This project is needed because current facilities are starting to age and need maintenance repairs to maintain function and appearance for future testing at AEDC.
ANZY090011	Sustainment Repairs, Arnold Lakeside Center	Facility Renovations	B-20	This project would maintain the Arnold Lakeside Center and bring it up to USAF standards by replacing one personnel door and one equipment room double door, completing facility lighting replacement, installing new power panels, and installing a new fire protection system that is up to code.	This project is needed to bring the building up to present-day codes and standards.
ANZY109005	Renovate, Trenton Equipment Warehouse Building 1471	Facility Renovations	B-7 and B-8	This project would renovate Trenton Equipment Warehouse Building 1471 and bring it up to USAF standards by repairing exterior walls, roof covering, HVAC and exhaust system, and fire detection and sprinkler systems; installing new insulation; installing separate men's and women's restrooms; renovating restrooms; replacing low-voltage electrical components; and installing more energy-efficient lighting and lighting controls.	This project is needed to bring the building up to present-day codes and standards. Further, the current facility has no running water or restrooms. Men and women who work in the facility share an outdoor portable toilet with no running water, just hand sanitizer. Adjacent facilities have restrooms across the street on the opposite ends of the buildings away from this facility
ANZY100040	Repair/Maintain Recycling Building 1426	Facility Renovations	B-6	This project would maintain Recycling Building 1426 and bring it up to USAF standards by painting exterior walls, installing new insulation, installing new exterior doors, replacing low-voltage electrical components, and installing more energy-efficient lighting and lighting controls.	This project is needed to bring the building up to present-day codes and standards.
ANZY189063	Renovate VKF Tunnel B High Bay Area VKF MTL Facility 676	Facility Renovations	B-10	This project would renovate the Tunnel B High Bay area and bring it up to USAF standards by cleaning; patching/repairing holes in walls and floors; painting walls, doors, and floors; removing obsolete components; and installing new LED lighting.	This project is needed because the Tunnel B High Bay area has not been updated in the past 25+ years. This is the test area for Tunnel B and the image of AEDC work environments for test customers. The walls and floors are marred and damaged and contain holes. The paint is filthy, detaching, and eroding. The area in general is extremely dirty from years of abuse and maintenance of Tunnel B components.
ANZY080036	Renovate Power Control Building 1525	Facility Renovations	B-8	This project would modernize Power Control Building 1525 and bring it up to USAF standards by relacing overhead doors, lighting, office furniture, and tile flooring; improving the energy efficiency of the building; and providing a more modern workspace for the building users.	This project is needed to modernize and improve the facility. Overhead doors were installed approximately 50 years ago and no longer operate properly and also allow the ingress of water. Ceilings are not insulated, and lighting is 50 years old and reduces the energy efficiency of the building. Existing tile flooring contains asbestos and must be sealed every quarter to prevent the release of asbestos dust.

Project ID	Project Name	Project Type	Figure Reference	Description of the Proposed Action	Project Need
ANZY9600721	Paint J4 Crane Structure, Phase 1	Facility Renovations	B-11	This project would abate corrosion by painting the J-4 overhead bridge crane superstructure.	This project is needed because AEDC facilities have not been maintained in a manner that complies with Air Force or industry standards because of low-priority funding levels. Failure to paint the structure would accelerate corrosion and degradation of the crane.
ANZY9600722	Paint J4 Crane Structure, Phase 2	Facility Renovations	B-11	This project would abate corrosion by painting the J-4 overhead bridge crane superstructure.	This project is needed because AEDC facilities have not been maintained in a manner that complies with Air Force or industry standards because of low-priority funding levels. Failure to paint the structure would accelerate corrosion and degradation of the crane.
ANZY109054	Life-Cycle Upgrade, Control & Breakroom, Stairwells Building 912	Facility Renovations	B-9	This project would remove existing wallpaper and paint the walls, replace carpeting, paint stair handrails, and install a fire protection system. This project would ensure Building 912 reflects the AFMC's and AEDC's continuing efforts to upgrade base appearance.	This project is needed to replace damaged components of the building that are in areas highly visible to customers who utilize this facility. Further, this facility has not undergone any improvements in the last 20 years.
ANZY089049	Life-Cycle Upgrades, ETF Exhauster Building 879, b side	Facility Renovations	B-10	This project would improve the workplace for users and bring the facility up to USAF standards.	This project is needed to bring the building up to present-day codes and standards.
ANZY199023	Renovation Back Hallway Restrooms to Improve Capacity, Facility 1088	Facility Renovations	B-3	This project would improve the workplace for users and bring the facility up to USAF standard by replacing systems furniture in Modular Operator Booths 100 and 200, replacing windows, and cleaning and sealing exterior walls.	This project is needed to bring the building up to present-day codes and standards.
ANZY080090	Repair Facility Components Warehouse 8, Building 1428	Facility Renovations	B-6	This project would improve the workplace for users and bring the facility up to USAF standards by increasing current restroom capacity and creating a female-only restroom.	This project is needed to bring the building up to present-day codes and standards. The number of employees using this building has increased, and this is expected to continue to increase in the future. This also includes an increase in the number of female employees, which drives the need for a dedicated restroom.
ANZY080132	Life-Cycle Upgrades, A&E Building 100	Facility Renovations	B-2	This project would modernize Building 100 and \bring it up to USAF standards by replacing windows, replacing one personnel door, replacing two power panels, and installing new insulation.	This project is needed to bring the building up to present-day codes and standards.
ANZY105002	Upgrade ALC Storage Building 3060	Facility Renovations	B-20	This project would modernize Building 3060 and bring it up to USAF standards by installing carpet, tile, base, new ceiling tile, and grid in the library; performing associated asbestos/lead removal required to install new ceiling tile and diffusers; and replacing doors and windows in other areas of the building.	This project is needed because the existing finishes and furniture have never been upgraded since the facility was constructed in 1952. The entire area is past due for improvements. Shelves are old and attached to the ceiling tile to prevent them from turning over. Improvements to the library would portray a better image to users to match the technology of the base.
ANZY080066	Renovate GLC Kitchen	Facility Renovations	B-24	This project would modernize the GLC kitchen and bring it up to USAF standards by replacing a door and installing more energy-efficient lighting and lighting controls.	This project is needed to bring the building up to present-day codes and standards.

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ANZY100021	Sustain Incinerator Building 265	Facility Renovations	B-2	This project would modernize Building 265 and bring it up to USAF standards by painting exterior doors, installing new insulation, installing two new exterior doors, replacing low-voltage electrical components, and installing more energy-efficient lighting and lighting controls.	This project is needed to bring the building up to present-day codes and standards.
ANZY9901154	Replace Asbestos Insulation, Basewide	Facility Renovations	B-2 through B-32	This project would modernize Arnold AFB and bring it up to USAF standards by removing asbestos throughout the base. Portions of this project are in a floodplain.	This project is needed to bring the building up to present-day codes and standards.
ANZY080103	Renovate 3rd Floor, HQ Building, Facility 100	Facility Renovations	B-2	This project would modernize the HVAC and lighting system at Facility 100 and bring it up to USAF standards.	This project is needed because the existing ductwork and air distribution system is 55 years old, and the system is deteriorating, causing particulates to infiltrate the airstream. The system also must be manually adjusted, requiring a service call from an HVAC technician, as this area is not connected to the existing DDC control system. The sprinkler systems are approximately 58 years old and need upgrade and inspection for integrity. There are many leaks due to deteriorated drains and pipes that are over 50 years old. Attempts to repair the piping have been unsuccessful. More leaks occur during every rain, and it has come to a point where patching is no longer feasible.
ANZY0400362	Renovate OPS Facility 1099, 1st Floor	Facility Renovations	B-9	This project would modernize OPS Facility 1099 and bring it up to USAF standards by renovating first-floor walls, ceilings, carpet, paint, doors, insulation, and associated electrical and mechanical components.	This project is needed because the first floor of the facility has had no interior sustainment since construction in 1981. Existing ceiling tile is falling, and matching replacements cannot be ordered. Ceiling tile has been removed from the closets in the conference rooms to patch other areas where ceiling tile has fallen. Some rooms have missing ceiling tile, which does not meet fire code. Carpet and wall coverings are worn and deteriorated in the conference rooms, offices, and corridors. The existing HVAC is inefficient, has obsolete controls, and requires frequent maintenance. Parking pavement is in poor condition, and it will continue to degrade and require additional maintenance and a higher funding level.
ANZY139043	Mothball ETF ACT&T Building 878 (Test Side)	Facility Renovations	B-9 and B-10	The purpose of this project is secure the AC&T Building 878 (Test Side) so that maintenance tasks can be terminated without risk to personnel, environment, or equipment.	This project is needed to eliminate the recurring and accumulating maintenance costs associated with keeping Building 878 (Test Side) in active status.
ANZY0000501	Remove Asbestos Insulation-J2A	Facility Renovations	B-10	This project would modernize this facility and bring it up to USAF standards by removing asbestos insulation from piping and equipment in the J2A Test Cell Area and complex/support buildings.	This project is needed to bring the building up to present-day codes and standards. Further, a hazardous condition exists in the J2A Test Cell Area based on the deteriorated condition of the asbestos insulation and its nonasbestos covers.
ANZY099012	Repair G-Range Computer Room HVAC, Facility 678	Utility Upgrades	B-10	This project would modernize the HVAC unit for the Range G computer room (Room 210, approx. 25 feet by 50 feet) so the computer area can be cooled separately from the rest of the building.	This project is needed because the computer room requires its own HVAC unit due to heat load requirements generated by computer hardware. The existing chilled-water unit that provides central air conditioning for the north end of Building 678 currently also cools the computer areas. In order to meet computer room temperature requirements, the unit has to overcool the other areas in the north end of the building, wasting energy.

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ANZY150010	Replace Product Recovery Tanks at Fuel Farms, Facility 870,1575	Utility Upgrades	B-9 and B-15	This project would modernize the product recovery tanks at the bulk and test fuel farms.	This project is needed because the current product recovery tanks have hand driven pumps that are beginning to and have failed. Replacement product recovery tanks have been purchased and are ready to be installed. More manpower would be wasted using the time-consuming hand-driven pumps and more time would be wasted trying to keep this working.
ANZY079059	Corrosion Control Painting – LN2 Dewars, Facility 530	Utility Upgrades	B-11	This project would extend the life of the J4 GN2 bottles and LN2 dewars and provide energy savings by keeping the vessels cooler.	This project is needed because the paint on the J4 LN2 dewars is severely degraded. The white paint on the dewars serves two functions: it protects carbon steel vessels from corroding and keeps the vessels cooler by reflecting sunlight. In its current state, the paint is doing neither of these.
ANZY160009	Repair/Install 2 Valve Protection-Steam Distribution System	Utility Upgrades	B-6, B-8, and B-9	This project would modernize the valve protection for the steam distribution system.	This project is needed to safely work on equipment downstream of the isolation valves without requiring large outages.
ANZY099091	Upgrade APTU Test Cell Overhead Bridge Crane 20-725, Facility 579	Utility Upgrades	B-11	This project would modernize the overhead bridge crane located at the APTU test facility that is used to perform precision positioning of critical and near-rated-capacity loads, improve the crane's reliability, and avoid performing lifts that approach the crane's rated capacity.	This project is needed because technology has improved since this crane was originally installed in the early 1970s that will allow the distribution of the crane weight to be spread out over a larger area on the runway rails. This is needed to allow the crane capacity to increase without requiring upgrades to be made to the superstructure.
ANZY089023	Replace 24-Ton CO_2 Fire Suppression Tank, Building 912	Utility Upgrades	B-9	This project would replace and install a new tank that is functioning properly and would meet current USAF standards and codes and laws.	This project is needed because the existing tank is undersized for the hazard it is protecting. Therefore, a tank with a larger carbon dioxide capacity is needed.
ANZY179025	Replace HVAC T3/T11/Equipment , Facility 878	Utility Upgrades	B-9 and B-10	This project would replace the old, failing units servicing the T3 and T11 control rooms with new, air-cooled units.	This project is needed because the current units that are servicing the T3 and T11 control rooms are approximately 30 years old. These older units require extensive maintenance and repair to remain operable. These units need replacing due to multiple failing parts inside each unit and the current raw water dependability of the facilities in which they are housed.
ANZY089047	Repair Interior Lighting, ETF-C Air Supply 929	Utility Upgrades	B-8 and B-9	This project would replace existing interior lighting throughout the building with energy-efficient lighting and lighting controls and would meet current USAF standards and codes and laws.	This project is needed because the current lighting has reached the end of its service life, is original, inefficient, and inadequate by current codes and standards. Proper lighting will reduce risk of personal injury, meet energy requirements, and improve conditions to perform daily tasks and equipment preventive maintenance. This project will address foot-candle levels, preventative maintenance, energy efficiency, and emergency lighting.
ANZY090035	Inspect/Repair Bulk Fuel Tank 4A	Utility Upgrades	B-9	This project would modernize Bulk Fuel Tank 4 and meet current USAF standards and codes and laws.	This project is needed to bring the existing tank into compliance with current codes and standards.
ANZY099046	Upgrade Sprinkler System, ETF-C Test Building 912	Utility Upgrades	B-9	This project would modernize the sprinkler system at ETF-C Test Building 912 and would meet current USAF standards and codes and laws.	This project is needed to bring the existing tank into compliance with current codes and standards.

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ANZY149044	Repair by Replace Cooling Towers, Building1088	Utility Upgrades	B-3	This project would modernize the cooling towers at Building 1088 and would meet current USAF standards and codes and laws.	This project is needed because the cooling tower media are beginning to collapse in one of the units and have already collapsed in the other. This renders the cooling towers highly ineffective and is beginning to dump treated water onto the rooftop, wasting the chemical treatment.
ANZY139049	Repair Deficiencies at the Retention Pond Dam, Facility 20008 (Phase 1)	Utility Upgrades	B-15	This project would repair deficiencies at the retention pond dam, Facility 20008, and would meet current USAF standards and codes and laws.	This project is needed to provide good dam safety and prevent deterioration of the dam structure. A failure of this dam structure would release untreated water into the Duck River watershed, as well as causing flood damage to property beyond the AEDC boundary.
ANZY159017	Repair Deficiencies at the Retention Pond Dam Facility 20008 (Phase 2)	Utility Upgrades	B-15	This project would repair deficiencies at the retention pond dam, Facility 20008, and would meet current USAF standards and codes and laws.	This project is needed to provide good dam safety and prevent deterioration of the dam structure. A failure of this dam structure would release untreated water into the Duck River watershed, as well as causing flood damage to property beyond the AEDC boundary.
ANZY020012	Repair Piping Fuel, Facility 870	Utility Upgrades	B-9	This project would repair deficiencies in the fuel piping and related devices associated with the test fuel farm and would meet current USAF standards and codes and laws.	This project is needed because the fuel piping system is aging and inspections indicate an unacceptable level of weld indications.
ANZY0490001	Repair Steam/Condensate Piping and Provide Heat to ETF AC&T	Utility upgrades	B-9	This project would repair deficiencies in the steam/condensate piping in ETF Buildings 878, 879, and 898 to provide heat and steam to support testing and to meet current USAF standards and codes and laws.	This project is needed because the piping was installed in the building during construction in 1950 and requires life-cycle replacement. The piping has deteriorated and has multiple leaks throughout the system and requires frequent repairs. These leaks can cause a loss of heat in the building, which can lead to freezing issues within the building. These leaks can also damage surrounding high-voltage electrical equipment and test equipment and can cause damage to asbestos insulation.
ANZY089038	Repair Controls, Cranes 20-315 & 20-315-1, ETFA T-3, Facility 898	Utility Upgrades	B-10	This project would repair deficiencies in and upgrade the T-3 Test Cell cranes to meet current USAF standards and codes and laws.	This project is needed because the pendant control on crane 20-315 is old and is not the proper type for the crane; further, the electrical control cable is installed in such a way that it can become tangled and caught on items in the immediate area when crane is in use. Additionally, the pendant hose line on crane 20-315-1 is not installed properly and could also become tangled and caught on items in the immediate area when crane is in use.
ANZY140018	Repair by Replacement HVAC Components East/West Rooms, Facility 1103	Utility Upgrades	B-3	This project would modernize the HVAC components and associated cooling towers for the penthouse (east and west) rooms on the roof of Building 1103, which serve the office areas on all three floors (approximately 360 people), and would meet current USAF standards and codes and laws.	This project is needed because the current condensate pans are leaking onto the floor, which then leaks out of the penthouse and down into the third floor below. This system is still utilizing pneumatic controls and needs to be switched over to electronic controls. The cooling towers on top of Building 1103 are nearing the end of their expected life.

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ANZY0300312	Repair u/g Raw Water Line, PWT/PES Area	Utility Upgrades	B-3 and B-9	This project would repair deficiencies in the cooling water supply line in the PWT/PES area and would meet current USAF standards and codes and laws.	This project is needed because the buried section of this pipeline has the second-highest frequency of leaks in the AEDC cooling water supply line. From 1995 through 2012, there were 24 underground leaks. Also, a significant amount of pipeline from these lines is breaking off and being caught in the heat exchangers in the area, which degrades cooling performance.
ANZY080052	Replace Unit Sub 4, ETF-b Airside, Building 878	Utility Upgrades	B-9 and B-10	This project would modernize Unit Substation 4 and associated components in Building 878 and would meet current USAF standards and codes and laws.	This project is needed because the equipment was installed in the 1950s and has exceeded its life expectancy.
ANZY079027	Repair Plumbing, ETF Shop, Building 876	Utility Upgrades	B-9	This project would modernize plumbing and associated components in the ETF shop building and would meet current USAF standards and codes and laws.	This project is needed because the piping was installed in the building during construction in 1953 and requires life-cycle replacement. The piping is decaying, causing large amounts of rust in the water. High levels of iron are in the water.
ANZY199006	Repair by Replace ASTF Cooling Tower Discharge Supply Header	Utility Upgrades	B-3	This project would modernize the ASTF cooling tower discharge supply header and associated piping components and would meet current USAF standards and codes and laws.	This project is needed because the current piping leaks and pipe failures continue to occur at an increasing frequency, which results in more downtime to test facilities.
ANZY189041	Replace the Control/Power Wiring to PWT01 through PWT07 Valves	Utility Upgrades	B-8 and B-9	This project would modernize the control/power wiring that runs from various buildings to seven main water control valves in the PW ASTF area (PWT01 through PWT07 valves).	This project is needed because deteriorating wiring insulation is causing grounds to the conduits the wires are pulled in. This damages other wires nearby and has resulted in interrupted service to some valves.
ANZY9801822	Replace 6.9 kV Switchgear-VKF (Phase 2)	Utility Upgrades	B-9	This project would replace aging equipment to maintain the life of the utility system.	This project is needed because the existing system is obsolete and replacement parts increasingly difficult to obtain. The stationary contacts are worn and are damaged; insulating compound is routinely found on the breakers where it has leaked from the contact bottles. The switchgear is in danger of catastrophic failure.
ANZY020013	Repair Piping, Fuel, Facility 1575	Utility Upgrades	B-15	This project would replace aging equipment to maintain the life of the utility system.	This project is needed because the current system is aging and evaluations indicate an unacceptable level of weld indications.
ANZY179012	Repair/maintain HVAC 7V Control Room, Facility 1077	Utility Upgrades	B-2 and B-3	This project would modernize the HVAC system and would meet current USAF standards and codes and laws.	This project is needed because the existing units are more than 15 years old, becoming more and more unreliable each year. The units are starting to fail one at time, and the current placement of these units makes working on them almost impossible due to having to erect scaffolding. A new unit sitting on the raised floor would provide the serviceability needed to maintain the unit correctly.
ANZY159002	Replace Overhead Crane 20-034 Model Shop, Facility 451	Utility Upgrades	B-12	This project would modernize the building by replacing the 5-ton overhead crane, 20-034, located in Building 451 on the west side of the new machine shop, and would meet current USAF standards and codes and laws.	This project is needed because the existing crane is starting to have trouble, and the crane manufacturer is no longer in business. Replacement parts are becoming hard to find.

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ANZY149018	Repair/Add Fire Protection for PWT PES Control Building, Facility 710	Utility Upgrades	B-9	This project would modernize the fire protection system for PWT PES Control Building, Facility 710. and would bring it up to USAF standards by replacing a door and installing more energy-efficient lighting and lighting controls.	This project is needed to bring the building up to present-day codes and standards.
ANZY189054	Repair by Replace HVAC for 10V Operations, Facility 1077	Utility Upgrades	B-2 and B-3	This project would modernize the HVAC system and to meet current USAF standards and codes and laws.	This project is needed because all units in the current HVAC system have approached 15 years of service and are starting to malfunction and require additional maintenance. There is currently no reliable and redundant system designed for each area. The ductwork for the control room is undersized for the heat load produced by equipment and people in the control room. This force both the primary and redundant unit to run in order to overcome the heat load.
ANZY119003	Replace Piping PWT Instrument Tunnel	Utility upgrades	B-9	This project would modernize the existing piping in the PWT utility tunnel and associated components and reduce the risk of a water leak that could flood the instrument tunnel, and it would meet current USAF standards and codes and laws.	This project is needed because the existing line has significant corrosion and has had several leaks in the past 2 years. Leaks in this line are difficult to access and repair. There is also a risk of the leak being large enough that it would flood the instrument tunnel. Also, the cables, equipment, and asbestos insulation in the tunnel could be damaged by being covered with water.
ANZY119042	Replace Water and Sewer Piping inside ETF-A Building, Building 880	Utility Upgrades	B-10	This project would address deficiencies in the current piping, to modernize the interior sewer piping at Building 880, and to meet current USAF standards and codes and laws.	This project is needed because existing pipes are original to the building and have exceeded their economic life, and water does not flow properly, causing constant plumbing problems and repairs.
ANZY149040	Repair/maintain C1 & C2 Overhead Crane, 20-840 & 20-841, Building 912	Utility Upgrades	B-9	This project would address deficiencies of the existing C1 (50/10 ton) and C2 (70/10 ton) overhead cranes in Building 912 by replacing them with newer, more modern cranes.	This project is needed because existing overhead cranes are over 30 years old and replacement parts are becoming more difficult to obtain.
ANZY099036	Replace Halon with Sprinkler System, J6 Local Electronics, Facility 2123	Utility Upgrades	B-13	This project would modernize the fire protection system at Facility 2123 and bring it up to USAF standards.	This project is needed to bring the building up to present-day codes and standards.
ANZY140020	Repair/Maintain AHU and Condensers 7V Clean Room, Facility 1077	Utility Upgrades	B-2 and B-3	This project would modernize the system of condensers and AHUs and associated HVAC system at Facility 1077 and bring it up to USAF standards by replacing a door and installing more energy-efficient components.	This project is needed because the existing condensers and AHUs are more than 12 years old and becoming more and more unreliable each year. The condensers are currently placed far away from the AHUs, which puts unneeded stress on the system.
ANZY129003	Life-Cycle Upgrade Drains in Steam Plant A, Building 1411	Utility Upgrades	B-6 and B-9	This project would upgrade the existing drains and drain lines at Building 1411 and bring it up to USAF standards.	This project is needed because drain lines have exceeded their economic life and are in poor condition. The drains are allowing water to stay on the floor, causing a slipping hazard. The roof drains are in poor condition. At one location, the drain line under the floor has separated and has stopped flowing.

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ANZY180019	Repair Water Distribution Facility 20005, North Hap Arnold Drive Branch	Utility Upgrades	B-2, B-3, B-7, B-8, B-11, B-12, and B-15	This project would repair approximately 18,000 linear feet of piping of numerous main branches that come off of North Hap Arnold Drive. This project would provide potable water to the AEDC Golf Course. The new line would provide potable water that meets or exceeds drinking water standards and has adequate capacity to meet current and future fire suppression requirements.	This project is needed to restore the base's potable water distribution system to proper operation, to eliminate leaks, to ensure a safe and sanitary water supply, and increase operational efficiency.
ANZY189044	Repair by Replace Three Overhead Doors, Power Control, Facility1525	Utility Upgrades	B-8	This project would reduce human safety hazards at Facility 1525 by replacing three antiquated overhead doors with modern doors and bringing the building up to USAF standards.	This projected is needed because the current doors are a safety hazard to personnel and equipment. There are no fall prevention safety devices on any of these doors.
ANZY120016	Repair/Inspect/Modify, Tank 21, Bulk Fuel Farm 1585	Utility Upgrades	B-15	This project would perform API-653 out-of-service internal and external inspection of Bulk Fuel Tank 21 (Waste Fuel Tank) and repair it as needed to ensure the tank meets all USAF and regulatory standards, codes, and requirements.	This project is needed to bring the tank up to present-day codes and standards.
ANZY159011	Repair 2nd-Floor HVAC Units, ETF Shop Building. 876	Utility Upgrades	B-9	This project would install an HVAC system with the current heat load for the four areas on the second floor of Building 876 and would meet current USAF standards.	This project is needed because the four units that condition the areas on the second floor have become less reliable over the years. Parts of the split units have been changed out over time, so they no longer match. Three of the four units contain R-22 refrigerant, which is an environmental hazard and is being phased out by USEPA.
ANZY980007	Repair by Replace VKF Raw Water Lines	Utility Upgrades	B-10	The purpose of this multiyear/multiphase effort is to replace and repair the raw-water supply and return headers and the supply and return lines to coolers located throughout the V-PLT Main Compressor Plant.	This project is needed because the buried section of this pipeline has the second-highest frequency of leaks in the AEDC cooling water system. Pressure loss in these lines would continue to increase without this project.
ANZY089013	Install Fire Alarm/Detection & Emergency Lighting, PWT MB	Utility Upgrades	B-9	This project would provide a modern fire protection system and associated components and would bring the system up to USAF standards.	This project is needed because the existing detection and notification system is outdated and does not cover the entire facility. This lack of protection would allow fire to start and spread within the facility undetected for extended periods of time. This project is also needed to bring the fire protection system up to present-day codes and standards.
ANZY159006	Replace ETF-c AFFF Fire Suppression Systems, Facility 903 & 929	Utility Upgrades	B-9	This project would demolish existing aqueous-film-forming foam (AFFF) fire suppression systems located in the ETF-C Exhaust Building, Building 903 (protecting lube oil LOCs 1.1, 1.2, 1.3, 1.4, 2.1, 2.2, 2.3 and 3.1), ETF-C Air Supply Building, and Building 929 (protecting lube oil LOCs 1.1, 1.2 and 2.1) and install new AFFF fire suppression systems to protect the lube oil systems located in the ETF-C Test Area.	This project is needed because all existing AFFF systems were installed in the early 1980s and are beyond their useful life. All system components and piping have deteriorated due to the corrosive properties of the foam concentrate. The systems are known to continuously leak on the floor due to system component degradation.
ANZY179005	Repair by Replace Fire Alarm System PWT 4t Test Facility 707	Utility Upgrades	B-9	This project would provide a modern fire protection system and associated components and would bring the system up to USAF standards.	This project is needed because the existing fire alarm system is antiquated and beyond its life expectancy. Materials are no longer available for repair of the system. This project is also needed to bring the fire protection system up to present-day codes and standards.

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ANZY160010	Repair Steam Plant A Fuel Storage Tank Facility 1413	Utility Upgrades	B-6	This project would repair current deficiencies in the fuel storage tank, containment, and oil water separator and bring the tank into compliance with USAF and regulatory standards, codes, and regulations.	This project is needed to bring the tank up to present-day codes and standards.
ANZY189061	Repair by Replace AC&T Potable Water Line Facility 878	Utility Upgrades	B-9 and B-10	This project would restore potable water to Facility 878 by replacing the existing potable water system of pipes and valves inside Building 878, the AC&T Building.	This project is needed because the water line is currently out of service due to numerous leaks occurring on electrical panels. Many repairs have been performed on the line in the past, resulting in numerous repair clamps on the line that may leak if the line is repressurized.
ANZY160021	Repair Fuel Systems Steam Plant A, Facility 1411	Utility Upgrades	B-6 and B-9	This project would provide a modern, safe, and reliable steam system at Facility 1411 by replacing the antiquated natural-gas, liquid fuel, and propane system for Steam Plant A.	This project is needed because the fuel systems originally were installed in 1972 and are reaching the end of their useful life. Replacement parts are difficult to find, and it is difficult to determine which parts are the identical replacement for an item.
ANZY070033	Repair Plumbing, FP&C Facility 251	Utility Upgrades	B-2	This project would modernize the plumbing at Facility 251 and would bring the system up to USAF standards.	This project is needed because the plumbing was installed during building construction in 1952 and requires life-cycle replacement. The sewer line between the building and the manhole is failing and causing sewage to back up into the building. The steam water heater has failed and needs replacing.
ANZY109025	Replace Unit Sub #11, ETF-a Exhaust n. Of Building 882	Utility Upgrades	B-10	This project would provide better personnel safety and equipment protection at Building 882 by replacing the antiquated Sub Unit 11 currently at the building and would bring the building up to USAF standards.	This project is needed because the existing equipment was installed in the 1950s, has far exceeded its life expectancy, and does not provide personnel safety or equipment protection.
ANZY080053	Replace Unit Sub 10, ETF-a Exhaust	Utility Upgrades	B-10	This project would provide better personnel safety and equipment protection at Building 882 by replacing the antiquated Sub Unit 10 currently at the building and bringing the building up to USAF standards.	This project is needed because the existing equipment was installed in the 1950s, has far exceeded its life expectancy, and does not provide personnel safety or equipment protection.
ANZY179020	Repair by Replacement J5 Unit Substation Facility. 527	Utility Upgrades	B-11	This project would address deficiencies of the current J5 Unit Substation by replacing it with a modern and energy-efficient unit substation that meets current USAF standards.	This project is needed because the current Unit Substation has shown evidence of moisture and rodent intrusion. Multiple insulating components have been replaced due to electrical tracking caused by contamination and moisture. The concrete pad has shifted under the low-voltage section, and the low-voltage cables are now exposed. This has also allowed rodents to enter the gear and cause contamination. Oil analysis of the transformer shows an elevated level of CO, which is an indicator of overheating of the insulating paper that is internal to the transformer.

Project ID	Project Name	Project Type	Figure Reference	Description of the Proposed Action	Project Need
ANZY040043	Repair Steam Condensate Pumps	Utility Upgrades	B-3, B-6, B-7, B-8, B-9, B-10, B-11, B-12, and B-13	The purpose of this project to reduce maintenance requirements and increase energy efficiency by replacing the antiquated condensate pumps in the steam distribution system at Buildings 445, 451, 522, 535, 537, 541, 542, 563, 640, 645, 651, 678, 707, 722, 728, 740, 750, 760, 775, 780, 786, 790, 792, 794, 796, 830, 878, 879, 890, 897, 898, 914, 1088, 1093, 1103, 1400, 1401, 1461, 1476, 1484, 1507, 2123, 2124, 2132; Manholes MH1E4, MHD13, MHA13, MH56, MN100, MH105; and field locations (ASTF Reboiler, APTU area, J4 Accumulators, J1-J2 Fuel Area, J6 Accumulators).	This life-cycle replacement of equipment project is needed because the existing steam pumps are redundant and have reached the end of their useful life. Implementation of this project would result in savings of several thousand dollars per month through reduced maintenance and energy savings.
ANZY189030	Replace Retention Pond Skimming & Dividing Booms, Facility 20008	Utility Upgrades	B-15	This project would replace the dividing boom, two main skimming booms, and associated lagoon booms on the Retention Reservoir that have begun to degrade.	This project is needed because the current floating booms and curtains have signs of deterioration caused by sunlight, weather, and physical damage by animals and wind.
ANZY120005	Replace Potable Water Lines Serving Model Shop Building 451	Utility Upgrades	B-12	This project would modernize the potable water lines inside the model shop, service the connections, and meet current USAF standards.	This project is needed because the piping has reached the end of its useful life and is in poor condition.
ANZY199003	Repair by Replace HVAC System for Secure Area, Facility 760	Utility Upgrades	B-9	This project would install a modern HVAC system with the current heat load at the secure area on the first floor of Building 760 and would meet current USAF standards.	This project is needed because the existing unit is not large enough to condition the secure area and the area outside the secure area to comfortable/workable conditions with the heat load that is there. The temperature of the secure rooms approaches the high 80s (Fahrenheit), and the temperature of the room outside the secure area is always in the 80s.
ANZY199035	Repair by Replace HVAC, j6 LEB Building, Facility 2123	Utility Upgrades	B-13	This project would install a modern HVAC system with the current heat of Building 2123 and would meet current USAF standards.	This project is needed because the existing units are at the end of their economic life and several major repairs have already been completed.
ANZY1330011	Replace ug 161 kV Cables Facility 10004 Phase 1	Utility Upgrades	B-8, B-9, B-10, and B-11	The purpose of the project is to modernize the facility and provide proper cathodic protection by replacing the existing oil-filled 161 kV cable system with solid insulation cables.	This project is needed because the existing cathodic protection system on the 161 kV system has not been functional for several years, over which time the piping that houses the cables has been susceptible to degradation.
ANZY199013	Repair by Replacing HVAC and Heaters, Building 912	Utility Upgrades	B-9	This project would install a modern HVAC system with the current heat load of the entire Building 912 and would meet current USAF standards.	This project is needed because the current units are reaching the end of their useful life. Since the main purpose of Building 912 is testing, the building always needs to be kept conditioned. The current controls are old, and the parts to replace controllers are no longer buyable.
ANZY199020	Repair Exhaust Fans and Louvers, Facility. 913	Utility Upgrades	B-9	The purposed of this project is to create ambient conditions inside the building that allow for proper equipment operation, equipment life, and personnel accessibility by installing a building ventilation system.	This project is needed because the current building ventilation system is currently not functional and is resulting in constant building internal temperatures more than 100 degrees Fahrenheit.
ANZY189065	Construct Backup Steam Using Steam Plant c (j6), Facility 563	Utility Upgrades	B-11	This project would provide a connection to maintain the steam distribution pressure by using the J6 steam plant and accumulators.	This project is needed because there have been several failures in the past several years within Steam Plant A (SPA) that have required SPA downtime to complete the repair.

Project ID	Project Name	Project Type	Figure Reference	Description of the Proposed Action	Project Need
ANZY179003	Repair Fire Alarm and Suppression System for Model Shop Facility 451	Utility Upgrades	B-12	This project would modernize the fire protection system for the model shop at Facility 451 and would meet USAF standards.	This project is needed to bring the current fire protection system up to present-day codes and standards.
ANZY140009	Install Crane/Construct Shelter Bradley Creek Pump Station 436	Utility Upgrades	B-12	This project would upgrade the Bradley Creek Pump Station to protect the pumps, motors, and valves from the weather.	This project is needed because the existing facility has no lifting equipment to aid in the repair/maintenance of the pumps and other equipment. Access by mobile crane is difficult, and repairs often tie up a mobile crane for several days, causing scheduling issues between crane availability and the maintenance machinist. Also, operations personnel are called on to clean out the pump impeller as any time of the night or day. In the past this work was done by personnel lifting parts that are heavier than should be safely lifted, risking injury/strains. Also, no weather protection for the equipment reduces the life of belts and causes freeze protection issues when the heater element and heat tracing fail.
ANZY149032	Repair by Replace Heating System ASTF Exhauster Facility 903	Utility Upgrades	B-9	This project would provide a reliable and efficient source of heat by replacing the existing heating system in Building 903.	This project is needed because the existing HVAC controls systems are very old; many of them run on pneumatic lines that do not seem to have any pressure. Only a few of the hot-air handlers in the building are in operational condition. A large percentage of the piping system is corroded, possibly so extensively corroded that water flow may be halted. Bay and basement heaters were inoperable during that winter months.
ANZY149014	Replace Cooling Water Main Between w4 and PWT04 Facility 20009	Utility Upgrades	B-8 and B-9	This project would replace approximately 1,000 feet of buried steel cooling water line that runs between the W4 and PWT04 valve to reduce future impacts to the base's water supply due to the currently leaking line.	This project is needed because the existing buried pipe was installed in 1951, and it frequently develops holes/leaks due to cathodic corrosion. Outages of the system are required to make repairs from inside the pipe, due to the difficulty of excavating down to the pipe. These outages impact basewide water use, which cause downtime to all test facilities on the base.
ANZY149050	Repair Fire System for Primary Pumping Station, Building 3038	Utility Upgrades	B-20	This project would modernize the fire protection system at the primary pumping station, Building 3038, and would meet USAF standards.	This project is needed to bring the current fire protection system up to present-day codes and standards.
ANZY149031	Repair by Replace the Heating System in Facility 922	Utility Upgrades	B-9	This project would provide a reliable and efficient source of heat by replacing the existing heating system in Building 922.	This project is needed because the existing HVAC controls systems are very old; many of them run on pneumatic lines that do not seem to have any pressure. A large percentage of the piping system is corroded, possibly so extensively corroded, water flow may be halted. Bay and shop heaters were inoperable or not producing enough heat during the winter months.
ANZY149015	Repair by Replace CW Main to PWT K1 Valve Vault Facility 20009	Utility Upgrades	B-9 and B-10	This project would replace approximately 200 feet of buried cooling water line that feeds the PWT K1 valve vault to reduce future impacts to the base water supply due to the currently leaking line.	This project is needed because the existing buried pipe was installed in 1953, and it frequently develops holes/leaks due to cathodic corrosion. Outages of the system are required to make repairs from inside the pipe, due to the difficulty of excavating down to the pipe. These outages impact basewide water use, which cause downtime to all test facilities on the base.

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ANZY080092	Install Fire Protection System Building 253, Special Projects	Utility Upgrades	B-2	This project would modernize the fire protection system at Building 253 and would meet USAF standards.	This project is needed to bring the current fire protection system up to present-day codes and standards.
ANZY159004	Repair Heat Systems, APTU Test Building 579	Utility Upgrades	B-11	This project would provide a reliable and efficient source of heat to personnel and equipment in APTU Test Building 579, including the pump room.	This project is needed because numerous repairs have been required over the last several years to keep the heat operating. A reliable hear source is needed to prevent pipes from freezing.
ANZY189039	Repair Central Lateral Cooling Water Main w5 to pw, Facility 20009	Utility Upgrades	B-10	This project would replace approximately 600 feet of buried supply line that feeds the ETF A/B Plant and T/J cells to reduce future impacts to the base water supply due to the currently leaking line.	This project is need because leaks are becoming more frequent, and it is difficult if not impossible to excavate down to the leaking pipe due to the structures constructed over and around this line.
ANZY159001	Repair HVAC, ETFA Exhauster Facility 882	Utility Upgrades	B-10	This project would install a modern HVAC system with the current heat load of the control room for the control room in Building 882 on the second floor and would meet current USAF standards.	This project is needed because the existing unit is currently nonoperational, and a temporary unit is in place to provide cooling to this area. The existing unit is raw water cooled, so at least twice a year this unit has to be shut down due to the raw-water outage that occurs.
ANZY070086	Repair Fire Suppression System, BX/Commissary	Utility Upgrades	B-2	This project would modernize the fire protection system at the BX/commissary and would meet current USAF standards.	This project is needed because the existing fire protection system is original to the facility, constructed in 1982. This system was responsible for five false fire responses in 2006. The sprinkler valve and controls are obsolete and require life-cycle sustainment.
ANZY059028	Repair HVAC, j J4/J5/J6 LEB Building 520	Utility Upgrades	B-11	This project would install a modern HVAC system with the current heat load to serve the J4/J5/J6 LEB in Building 520 and to meet current USAF standards.	This project is needed because the existing units range in age from 4 to 26 years of age. The area is used to support testing for the J4/J5/J6 area. The computer room units have become high-maintenance items, and the parts have become very expensive. One of the manufacturers is no longer in business.
ANZY080038	Repair Water Distribution Systems, Arnold Village	Utility Upgrades	B-20	This project would replace the potable water distribution system from the Estill Springs water meter on the south side of North Shore Road south to the Arnold Lake Side Club and to loop the raw-water system at base housing and replace the existing pipe. The raw-water system is used to supply the cooling needs and fire suppression needs of base housing.	This project is needed because this segment of piping is approximately 50 years old and requires life-cycle replacement. The current piping is also undersized. The existing piping in the ground also needs to be replaced. The piping is approximately 50 years old and has exceeded its useful life.
ANZY099048	Install Fire Sprinkler System, ETF-C EXH Building 903	Utility Upgrades	B-9	This project would modernize the fire protection system at Building 903 and would meet current USAF standards.	This project is needed to bring the fire protection system up to present-day codes and standards.
ANZY980073	Upgrade Heating System j6 Test Cell Facility 2124	Utility Upgrades	B-13	This project would increase the heating capacity in the high bay area and replace all existing steam heaters in J6 Test Cell, Facility 2124.	This project is needed because the J6 Test Building heating system is not able to maintain the ambient temperature inside the high bay area above freezing when the outside temperature drops below 20 degrees Fahrenheit. Solid propellant rocket motors require a temperature range between 60 to 90 degrees Fahrenheit to prevent propellant damage. The existing steam piping is corroded from years of use and is unable to deliver the steam capacity needed for the heaters to work properly. After new larger heaters are installed, new steam piping and components will also be needed throughout facility.

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ANZY189018	Replace Arnold Village Fire Pump, Facility. 3038	Utility Upgrades	B-20	This project would replace the 1,500-gallon-per-minute fire-water supply pump that serves the MFH/Arnold Village area with a new pump to ensure uninterrupted fire protection.	This project is needed because there is only one fire pump, so maintenance and repairs of the pump result in loss of dedicated fire system protection. The pump was installed in 2005 and will likely need maintenance work by 2020.
ANZY059029	Repair HVAC, FSD Research, Building 648	Utility Upgrades	B-10	This project would provide a modern and energy-efficient HVAC system and associated components for the building and would bring the system up to USAF standards.	This project is needed because the existing water-cooled units were installed in the mid-1980s and are over 30 years old. They are reaching the end of design useful life. The building has experienced some indoor air quality issues with mold and smells from the raw-water system. When there is a raw-water outage, the building has no air conditioning.
ANZY189035	Repair ASTF Cooling Tower Structure and Fans, Facility 1090	Utility Upgrades	B-3 and B-9	This project would replace the existing wooden ASTF cooling tower structure, fans, spray piping, and other supporting systems down to the concrete basin with more modern and durable components in order to extend the life of the structure.	This project is needed because the current pressure-treated wooden structure only has a life of 15 to 20 years before deterioration of the members starts impacting the stability of the structure.
ANZY199012	Repair by Replace HVAC Units, Building 899	Utility Upgrades	B-9	This project would provide a modern and energy-efficient HVAC system and associated components for the building and would bring the system up to USAF standards.	This project is needed because the current units are not dependable and need repair.
ANZY019109A	Repair by Replace 16s Ipco2 System, Facility 745	Utility Upgrades	B-9	This project would provide a modern and appropriately sized storage tank and associated components for Facility 745 and would bring the facility up to USAF standards.	This project is needed because the existing system is antiquated and materials for the existing control system are not available. The system has been out of service since 2002 and has been depleted of CO_2 since 2007, which has allowed water/condensation accumulation in the storage tank. Controls are not working as designed, valves leak or seize due to lack of actuation, and piping/fittings lack structural integrity.
ANZY149043	Repair by Replace AC Units outside of 445	Utility Upgrades	B-12	This project would provide a modern and energy-efficient HVAC system and associated components for the building and would bring the system up to USAF standards.	This project is needed because the current units are becoming more unreliable, which could result in a catastrophic failure.
ANZY099047	Install Fire Sprinkler System, Mark 1 Test Building 1075	Utility Upgrades	B-3	This project would provide a modern fire protection system and associated components for the Mark 1 Test Building 1075 and would bring the system up to USAF standards.	This project is needed because the current fire protection system does not meet present data codes and standards.
ANZY080125E1	Test Area Energy Improvements - ETF Shop HVAC	Utility Upgrades	B-9	This project would provide a modern and energy-efficient HVAC system and associated components for the ETF Shop and would bring the system up to USAF standards.	This project is needed because the current HVAC system is not energy efficient and does not meet present data codes and standards.

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ANZY160011	Repair by Replace Humidifiers, PMEL Building Facility. 350	Utility Upgrades	B-2 and B-12	This project would provide a modern and efficient humidifier system for the entire Building 350 that operates with the current water quality at AEDC (i.e., Armstrong Humidifier).	This project is needed because the current Dristeem humidifiers require RO water, have numerous maintenance issues associated with scaling water, and are inefficient.
ANZY149027	Repair HVAC Equipment, Steam Plant Control Room, Facility. 1411	Utility Upgrades	B-6 and B-9	This project would provide a modern and efficient HVAC system and associated components to serve the control room at Steam Plant A in Building 1411 and would bring the system up to USAF standards.	This project is needed because the existing unit supports the steam plant control room, and the steam plant supplies steam to the entire base and to the test areas.
ANZY059035	Repair HVAC, PWT mib	Utility Upgrades	B-9	This project would provide a modern and efficient HVAC system and associated components to serve the balance laboratory, machine shop, office area, and the pretest area of Building 760 and would bring the system up to USAF standards.	This project is needed because the existing units were installed in the 1986 to 1988 timeframe and are approaching more than 30 years of service. The unit for the pretest area is made by a manufacturer that is no longer in business and getting repair parts is very difficult.
ANZY150007	Repair by Replace HVAC, Hazmat Building 1456	Utility Upgrades	B-7	This project would provide a modern and efficient HVAC system and associated components to serve the office area at Building 1456 and would bring the system up to USAF standards.	This project is needed because the current unit is at the end of its economic life, and several major repairs have already been completed, including the replacement of the compressor twice.
ANZY189031	Replace Return Ditch Gates and Hoist Systems, Facility 2008	Utility Upgrades	B-15	This project would provide reliable operations of the gates and hoist systems at Facility 2008.	This project is needed to ensure gates and hoists are operational so discharge water can be shut off when there are spills that could result in a NPDES violation.
ANZY18905611	Repair by Replacement ASTF and EAF Power Systems, p-11	Utility Upgrades	B-3, B-8, and B-9	In recent years there have been multiple failures of air-insulated switches due to water intrusion. This project would remove the air-insulated switches and replace them with Vista switches, thereby eliminating the failures of air-insulated switches because Vista switches are sealed, gas-insulated units.	This project is needed to reduce switch failures and to reduce maintenance downtime. Currently to perform maintenance on the 13.8kV ASTF Unit Substations with air-insulated switches, all other 13.8kVA ASTF Unit Substations with air-insulated switches must also be deenergized. Vista switches would allow one unit substation to be deenergized without affecting all the others.
ANZY199019	Repair by Replacement HEDI Unit Substation & Switchgear, Facility 583	Utility Upgrades	B-11	This project would replace the antiquated current HEDI Unit Substation and would bring the system up to USAF standards.	This project is needed because the current HEDI Unit Substation experiences significant downtime with older, unreliable contactors for water pump support. The existing switchgear is worn out with numerous operations and is at its equipment life expectancy.
ANZY189046	Rebuild Return Basin Structure and install Vertical Turbine	Utility Upgrades	B-9	This project would modify the basin structure to permit the installation of vertical turbine pumps and install new pumps, motors, discharge valves, and check valves.	This project is needed because the existing pumps were intended for horizontal installation, however, they are currently installed vertically. Correct installation of the pumps would significantly reduce the effort/time required to repair/rebuild pumps. It would eliminate the pump packing issues that come with installing horizontal pumps in the vertical position.

Project ID	Project Name	Project Type	Figure Reference	Description of the Proposed Action	Project Need
ANZY189029	Repair/Dredge Rowland Creek Pumps Inlet, Facility 20008	Utility Upgrades	B-16	This project would avoid future sedimentation and maintenance issues associated with sedimentation that accumulates at the inlet of the Rowland Creek pumps.	This project is needed to remove the sedimentation that accumulates at the inlet of the Rowland Creek pumps. Due to the low water velocity required to permit fuel/oil to rise to the surface and be skimmed off, most sedimentation in the water has time to settle out. This buildup would become a problem after years of accumulation and needs to be removed.
ANZY189009	Repair ASTF Unit Substation #8, Facility 929	Utility Upgrades	B-8 and B-9	This project would replace ASTF Unit Substation 8 located in the ASTF Airside Plant Building 929 with a modern unit that is a more efficient transformer, which would both increase ASTF reliability and reduce unwanted downtime, and would bring the system up to USAF standards.	This project is needed because existing ASTF Unit Substation 8 is more than 30 years old and beyond its expected life cycle. This substation was installed when arc flash standards were not in place.
ANZY070084	FASCAP - Replace Insulation on Steam Lines	Utility Upgrades	B-2, B-3, B-6, B-8, B-9, B-10, B-11, B-12, and B-13	Steam is provided to facilities at Arnold AFB with more than 9 miles of piping. This project would replace damaged or missing insulation at various points in the Arnold AFB steam distribution system and to increase the energy efficiency of the system.	This project is needed because insulation has been removed and not replaced over the years as maintenance and other work has been performed on the system. Existing insulation is deteriorated or missing in many locations, particularly in the mechanical rooms, valve pits, and above ground distribution lines. Bare, high-temperature steam lines and system components are exposed, releasing valuable heat energy to the environment. The current situation reduces the operating efficiency of the system and increases the consumption of fossil fuel to compensate for the lost energy.
ANZY159005	Repair by Replace HVAC System, rpa-4, Building 2201	Utility Upgrades	B-17	This project would provide a modern and efficient HVAC system and associated components for Building 2201 and would bring the system up to USAF standards.	This project is needed because the current system has been out of operation for approximately 9 years, and the two condensing units are not repairable. The area is currently being cooled by portable units that are in the way and very inefficient. Users in the area need the space to be cooled for test equipment and occupancy.
ANZY089036	Renovate PWT Blade Shop Building. #645 Mixing Booth Ventilation	Utility Upgrades	B-10	This project would provide an appropriately sized and efficient ventilation system and associated components in the mixing booth and would bring the system up to USAF standards.	This project is needed because the existing ventilation fan provides inadequate velocity for fume removal.
ANZY080100	Renovate HQ Building, Facility 100	Utility Upgrades	B-2	This project would modernize Facility 100 and would meet current USAF standards and codes and laws.	This project is needed because the existing ductwork and air distribution system is more than 60 years old. Environmental control is difficult, and the system is deteriorating, causing particulates to infiltrate the airstream. Numerous calls regarding indoor air quality issues have been received, but duct cleaning is not possible due to the type of construction and the presence of asbestos. Areas cannot be individually controlled, resulting in numerous calls to the HVAC Shop for adjustments.
ANZY089072	Install Air Conditioning, APTU Support Building 577	Utility Upgrades	B-11	This project would install air conditioning in the APTU Support Building 577 to provide comfort for workers in the facility.	This project is needed because insulation was installed in the exterior walls during renovations in 2006, but no air conditioning was provided for the work area.

Project ID	Project Name	Project Type	Figure Reference	Description of the Proposed Action	Project Need
ANZY970081	Replace High Bay Heaters ETF Shop	Utility Upgrades	B-9	This project would modernize heating, exhaust, and ventilation components in the high bay area of the ETF Shop building and would meet current USAF standards and codes and laws.	This project is needed because the high bay heaters have reached their expected lifespan. The ability of these units to keep the area war room comfortable during the winter has become very unreliable. They need frequent repairs, becoming a costly maintenance problem, and maintenance costs will continue to grow as the units age. The unit ventilators are no longer operable.
ANZY080105	Renovate 1st Floor, HQ Building, Facility 100	Utility Upgrades	B-2	This project would provide a modern and efficient HVAC system and associated components for the first floor at Facility 100 and would bring the system up to USAF standards.	This project is needed because the existing ductwork and air distribution system is 55 years old. Environmental control is difficult, and the system is deteriorating, causing particulates to infiltrate the airstream. Numerous calls regarding indoor air quality issues have been received, but duct cleaning is not possible due to the type of construction and the presence of asbestos. The current, antiquated system also has to be manually adjusted, requiring a service call for an HVAC technician, as this area is not connected to the existing DDC control system.
ANZY089026	Provide Air Circulation Fans forJ1/J2 High Bay	Utility Upgrades	B-10	This project would install large-diameter circulation fans, louvers, and side-wall fans to replace the existing fans in the ceiling of ETF-A Test Building 880 to provide comfort for workers in the facility and freeze protection for the building.	This project is needed because the existing ceiling fans do not circulate heated air from the ceiling down to the floor level.
ANZY080107	Renovate 2nd Floor, HQ Building, Facility 100	Utility Upgrades	B-2	This project would provide a modern and efficient HVAC system and associated components for the second floor at Facility 100 and would bring the system up to USAF standards.	This project is needed because the existing ductwork and air distribution system is 55 years old. Environmental control is difficult, and the system is deteriorating, causing particulates to infiltrate the airstream. Numerous calls regarding indoor air quality issues have been received, but duct cleaning is not possible due to the type of construction and the presence of asbestos. The current, antiquated system also has to be manually adjusted, requiring a service call for an HVAC technician, as this area is not connected to the existing DDC control system.
ANZY149036	Repair by Replace HVAC System for Labs in Facility 390	Utility Upgrades	B-2	This project would modernize the HVAC system at Facility 390 by installing a new HVAC unit, piping, ducting, insulation, electrical components, controls, and valves and would bring the system up to USAF standards.	This project is needed because the existing HVAC nits are 16 years old and past their life expectancy. When the laboratories were modified, the current HVAC system became insufficient. Installing a larger unit or a unit that serves multiple areas would better fit the needs of this building.
ANZY099006	Install SL2 High Bay Heat	Utility Upgrades	B-8	This project would upgrade the SL2 high bay into a workable area in the winter months without the use of portable kerosene heaters.	This project is needed because portable kerosene heaters are currently used to supplement a single steam heater to provide heat in order to maintain a workable environment during the winter months.
ANZY099066	Upgrade FSD Research Building 648 (Old Centaur)	Utility Upgrades	B-10	This project would modernize the existing HVAC system and ensure the HVAC system meets current codes and regulations.	This project is needed to bring the building up to present-day codes and standards.

Project ID	Project Name	Project Type	Figure Reference	Description of the Proposed Action	Project Need
ANZY179015	Repair by Replace Heat, Ventilation, Windows High Bay Facility 451	Utility Upgrades	B-12	This project would modernize Facility 451 by replacing the existing, antiquated heating and ventilation systems and high-bay windows.	This project is needed because the existing heaters are high wall mounted and are ineffective and unsafe to maintain (approx. 40 feet from the floor). These heaters are slowly failing and are continually declining, and if all fail the building will be without heat, as they will not be repaired or maintained. The existing high-bay windows are more than 50 years old and are not energy efficient.
ANZY160015	Repair by Replacing Steam Heaters in Facility 760	Utility Upgrades	B-9	This project would ensure a reliable, working steam heating system at Facility 760.	This project is needed because most heaters are original equipment to the building and no longer operational. During the winter months, while carts are being taken outside and the large roll up door is open, a lack of heat could cause some of the water piping in the high bay to freeze and burst.
ANZY960152	Replace Wash Piping 2nd Reservoir	Utility Upgrades	B-7 and B-8	This project would replace existing washdown piping and create a more modern and efficient piping system.	This project is needed because the old piping has too many underground leaks to be usable. This piping is used to wash sediment out of the reservoir during outages. This is becoming more critical as the environmental discharge limits are tight.
ANZY199016	Replace the Heating System and Exhaust System in Facility 878	Utility Upgrades	B-9 and B-10	This project would provide a modern heating and cooling system in Building 878 by replacing the existing heating system, including piping, valves, pneumatic controls, unit heaters, electrical components, and exhaust fans and controls.	This project is needed because the existing high bay heaters are inoperable or not producing enough heat during the winter months. As the system reaches the end of its useful life, components become much less efficient and much more likely to have critical failures. Currently, most unit heaters are nonfunctional. The roof exhaust fans are needed to remove unwanted heat in the summer months, so the high bay does not reach a temperature that is unacceptable to work in.
ANZY079057	Replace Emergency Generators ETFA	Utility Upgrades	B-10	This project would replace existing, old emergency generators and to ensure the USAG has operable emergency generators that meet current codes and regulations.	The existing emergency generators that do not meet current AFI criteria and are old, with diminished performance.
ANZY160026	Repair HVAC in High Bay Facility 1077	Utility Upgrades	B-2 and B-3	The purpose of this project is modernize the HVAC system at Facility 1077 to ensure propose cooling of the equipment housed in the facility, as well as occupants operating out of the facility, and to ensure the HVAC system meets current codes and regulations.	This project is needed to cool the facility. During the summer, the 10V high bay gets hot, and during tests, test customers who are in the area, and the security guard who has to sit in the high bay, must tolerate the high temperatures. Due to the equipment that is in the high bay, it needs cooling to be able to operate correctly.
ANZY149023	Replace HVAC at RPA #3, Facility 2210	Utility Upgrades	B-16	This project would modernize the existing HVAC system and ensure the HVAC system meets current codes and regulations.	This project is needed because the existing HVAC unit is old (1991), undersized, currently not functional, and requires an R-22 refrigerant that is regulated by the USEPA.
ANZY189040	Replace Cooling Water Supply Line 5th Street, Facility 20009	Utility Upgrades	B-8 and B-9	This project would modernize the existing cooling water system that feeds the steam plant and other facilities south of 5th Street.	This project is needed because leaks have become more frequent in the past 10 years on this line. The coating is failing and cathodic protecting in this area is not effective. Leaks have no effect on testing but cause issues for buildings with water-cooled air-conditioning units and the backup water supply to Steam Plant A.
ANZY999160	Repair HVAC, ETF AC&T	Utility Upgrades	B-9	This project would modernize the existing HVAC system and bring the facility up to USAF standards.	This project is needed because the existing HVAC units are 20 plus years of age and are reaching the end of useful life. Maintenance requirements are increasing for each unit.

Project ID	Project Name	Project Type	Figure Reference	Description of the Proposed Action	Project Need
ANZY149042	Repair Exhaust Fans, Secondary Pumping Station, 1507	Utility Upgrades	B-8	This project would install new exhaust fans on the roof of the secondary pumping station and create roof access to the new fans for improved safety and ease of access; this will provide safe/easy access by maintenance personnel.	This project is needed because the existing, old fans require service and maintenance on a regular basis to keep them operational; however, their location prevents access by maintenance personnel.
ANZY019117	Repair HVAC, T1/T4/Equip - ETF AC&T	Utility Upgrades	B-9 and B-10	This project would modernize the HVAC system serving the T1 control room, T4 control room, equipment room, and scanner room in Building 878 and bring the facility up to USAF standards.	This project is needed because the current HVAC units that are serving theT1 and T4 control rooms are manufactured by EDPAC, which is no longer in business. Replacement parts are very hard to find, and the units are approximately 20 years in age. The HVAC unit for the scanner room is approaching 20 years in age and has a few minor water leaks. These older units require more maintenance and repair to stay in operation.
ANZY080086	Renovate PWT Offices, Facility 740	Utility Upgrades	B-9	This project would modernize Facility 740, including replacing the existing 40-ton chiller, four equipment room doors, and a personnel door; installing a halon system sprinkler system and new fire protection potable water line; renovating interior offices and restrooms; and bringing the facility up to USAF standards.	This project is needed to bring the building up to present-day codes and standards.
ANZY199030	Repair by Replace Cooling Water Lines, Facility. 20009	Utility Upgrades	B-3 and B-9	This project would modernize the existing water lines at Facility 20009 and bring the facility up to USAF standards.	This project is needed because the existing water lines are over 60 years old and are in poor condition. Deterioration of the piping has resulted in significant contamination of the cooling water. The existing manual strainers consistently become clogged with debris, resulting in a loss of cooling capability.
ANZY189051	Upgrade 75-Ton PWT Outdoor Overhead Crane to 110-Ton, Facility773	Utility Upgrades	B-10	This project would upgrade the current PWT outdoor overhead crane at Facility 773 by adding a plate to a small portion of the bridge girders, replacing the trolley with a new 110-ton trolley, replacing trolley rails, replacing end truck equalizer pins, and replacing axels and wheels as well as ensuring compliance with current USAF standards.	This project is needed because the current crane is undersized. Upgrading the facility to include a larger crane would alleviate issues with overloading the crane.
ANZY120022	Replace Potable, Raw, Storm, Sewer Piping Mark I Building 1075	Utility Upgrades	B-3	This project would modernize the potable, raw, storm, and sewer water system piping at Building 1075 so that the water supply to the building can be restored and would bring the system up to USAF standards.	This project is needed because the water chase has a leak in a place that is hard to repair. Further, the piping is in poor condition and cannot be repaired. Water supply to the building is currently shut off.
ANZY099065	Upgrade Building FSD Maintenance Shop 645	Utility Upgrades	B-10	This project is needed to modernize the building and includes replacing doors, replacing lighting and associated lighting panels and transformers, installing a wet-pipe sprinkler system, upgrading interior finishes, upgrading HVAC, replacing the steam-heating system, repairing the ceramic tile floor, providing venting in the equipment room, replacing exterior windows, and refinishing all floors to industrial grade as well as bringing the facility up to USAF standards.	This project is needed to bring the building up to present-day codes and standards.

Project ID	Project Name	Project Type	Figure Reference	Description of the Proposed Action	Project Need
ANZY099011	Provide Utilities Building 1073	Utility Upgrades	B-3	Building 1073 currently has no utilities (e.g., electricity, water, steam). The purpose of this project to restore the electricity, water, and possibly steam services to this building that were disconnected several years ago.	This project is needed to provide lighting for the safety of individuals working in the building during normal daylight hours and additionally for those individuals working in the building after dark. This building needs a conditioned climate (heating and cooling), as it is used for storage of test-related equipment that requires a temperature-conditioned atmosphere.
ANZY1260146	Replace VKF C92 Compressor, Facility 651	Utility Upgrades	B-10	This project would replace the existing equipment, provide connections points for rental compressors in case of failure, and ensure compliance with the Energy Policy Act of 2005 (Public Law 109-58) and Energy Independence and Security Act 2007 (Public Law 110-140), which requires continued energy reduction in the federal sector.	This project is needed to support the operations of the current JM3 compressors. The existing compressor has gone through several years of service and is reaching the end of its useful life. The compressor is oversized for the current mission, and excess air is typically vented to the atmosphere.
ANZY199027	Add C-Plant Waste Fuel Tank Fire Protection	Utility Upgrades	B-9	This project would install a fire protection system for the C-Plant waste fuel tank to meet current codes and regulations.	This project is needed because the C-Plant waste fuel tank does not have a fire protection system. Further, per UFC-460-1 May 2018 Section 8-6, the tank does not meet the requirements of a fire-resistant tank.

ID – identification; **GN2** – gaseous nitrogen; **AFI** – Air Force Instruction; **LN2** – liquid nitrogen; **USAF** – United States Air Force; **SF** – square foot/feet; **AT/FP** – antiterrorism/force protection; **UFC** – Unified Facilities Criteria; **HVAC** – heating, ventilating, and air conditioning; **ft** – foot/feet; **ETF** – Engine Test Facility; **ANSI** – American National Standards Institute; **AFMC** – Air Force Material Command; **NFPA** – National Fire Protection Association; **OSHA** – Occupational Safety and Health Administration; **AEDC** – Arnold Engineering Development Complex; **NDAA** – National Defense Authorization Act; **ASHRAE** – American Society of Heating, Refrigeration, and Air-Conditioning Engineers; **UV** – ultraviolet; **ADA** – Americans with Disabilities Act; **IESNA** – Illuminating Engineering Society of North America; **LED** – light-emitting diode; **DBIDS** – Defense Biometric Identification System; **JSIS** – Joint Standard Instrumentation Suite; **FOC** – Full Operational Capability; **FY** – fiscal year; **HQ** – headquarters; **approx.** – approximately; **USEPA** – United States Environmental Protection Agency; **AFFF** – aqueous-film-forming foam; **CO** – carbon monoxide; **kV** – kilovolt; **CO_2** – carbon dioxide; **NPDES** – National Pollutant Discharge Elimination System

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APPENDIX C

National Environmental Policy Act Supporting Documentation

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Natural Resources Report

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FINAL
NATURAL RESOURCES REPORT FOR THE

ENVIRONMENTAL ASSESSMENT

FOR

INSTALLATION DEVELOPMENT AT ARNOLD AIR FORCE BASE, TENNESSEE

PREPARED BY:

Department of the Air Force

November 2020

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GLOSSARY OF ABBREVIATIONS AND ACRONYMS

AEDC	Arnold Engineering Development Complex
AFB	Air Force Base
AT/FP	antiterrorism/force protection
BCR	Bird Conservation Region
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CMA	Cooperative Management Agreement
CWA	Clean Water Act
DoD	Department of Defense
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EO	Executive Order
ESA	Endangered Species Act
FY	fiscal year
GCN	Greatest Conservation Need
IBA	Important Bird Areas
IBP	Institute for Bird Populations
IDP	Installation Development Plan
IPP	Invasive Pest Plant
INRMP	Integrated Natural Resources Management Plan
MAPS	Monitoring Avian Productivity and Survivorship
NEF	National Ecological Foundation
NEPA	National Environmental Policy Act of 1969
PIF	Partners in Flight
PDM	Post-Delisting Monitoring Plan
RPM	reasonable and prudent measure
ROW	right-of-way
SPCR	Spring Creek Road
TDEC	Tennessee Department of Environment and Conservation
TNARNG	Tennessee Army National Guard
TNC	The Nature Conservancy
TSDCI	Test Support Division, Civil Engineer Branch, Installation Management Section
TVA	Tennessee Valley Authority
TWRA	Tennessee Wildlife resources Agency
UFC	Unified Facilities Criteria
USACE	United States Army Corps of Engineers
USAF	United States Air Force
USC	United States Code
USDA	U.S. Department of Agriculture
USFWS	United States Fish and Wildlife Service
USNVC	US National Vegetation Classification System
WMA	Wildlife Management Area
WNM	Wildlife in Need of Management
WNS	white nose syndrome

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1.0 INTRODUCTION

1.1 BACKGROUND

Arnold Air Force Base (AFB) is home to the Arnold Engineering Development Complex (AEDC), which uses a 3,682-acre industrial aerospace test facility. AEDC and its mission are unlike that of any other Air Force facility in the United States. The complex operates 68 aerodynamic and propulsion wind tunnels as well as rocket and turbine engine test cells, space environment chambers, and other specialized units. A total of 27 of the complex's test units have capabilities unmatched elsewhere in the United States; 14 are unique in the world. Facilities can simulate flight conditions from sea level to an elevation of 300 miles and from subsonic velocities to Mach 20. AEDC is a vital resource for the nation's air and defense operations.

Since the establishment of Arnold AFB, Installation development has been a continual activity. Each year, structures are demolished, facilities are constructed, infrastructure is upgraded, and resources are studied. Arnold AFB has identified priorities for Installation improvement projects to be able to maintain the Installation's mission and proposes to implement these projects over the next 5 years and is preparing an Installation Development Environmental Assessment (EA) to evaluate potential environmental impacts of these proposed projects in compliance with the National Environmental Policy Act of 1969 (NEPA). This Natural Resources Report is being prepared as part of the NEPA process for the Installation Development EA.

1.2 LOCATION

Arnold AFB is located in south-central Tennessee, approximately 72 miles southeast of Nashville, and 61 miles northwest of Chattanooga (**Figure 1-1**). The Installation straddles Coffee and Franklin counties; nearby cities include Tullahoma, Manchester, Winchester, Estill Springs, Decherd, and Sewanee (**Figure 1-2**).

Due to the nature of the mission, an unusually large amount of land is needed at Arnold AFB. Arnold AFB encompasses 38,863 acres; AEDC's mission area composes 3,682 of those acres. This expansive area lends privacy and security to the AEDC mission and provides a large buffer space for Installation operations. Within base boundaries, certain activities, such as testing and evaluation operations, Tennessee Army National Guard (TNARNG) military training exercises, and periodic airfield operations, can produce high levels of noise. While the secure cantonment area is a relatively small portion of the base, the mission requires a larger footprint.

1.3 PROPOSED ACTION

The Proposed Action analyzed in the EA is to implement a range of selected projects, such as demolition of aging facilities, new facility construction, facility upgrades, facility repair and renovation, utilities upgrades, and infrastructure improvement, including road maintenance that would be among those proposed to be completed or implemented during the next five years (from fiscal year [FY] 2021 to FY 2026).

Of the 357 projects included in the Proposed Action, six are demolition projects and 351 are infrastructure projects. Of the infrastructure projects, 30 are new construction, 186 are facility renovations, 12 are road maintenance, and 123 are utility upgrades. **Figure 1-3** depicts the

Figure 1-1. Regional Location of Arnold Air Force Base

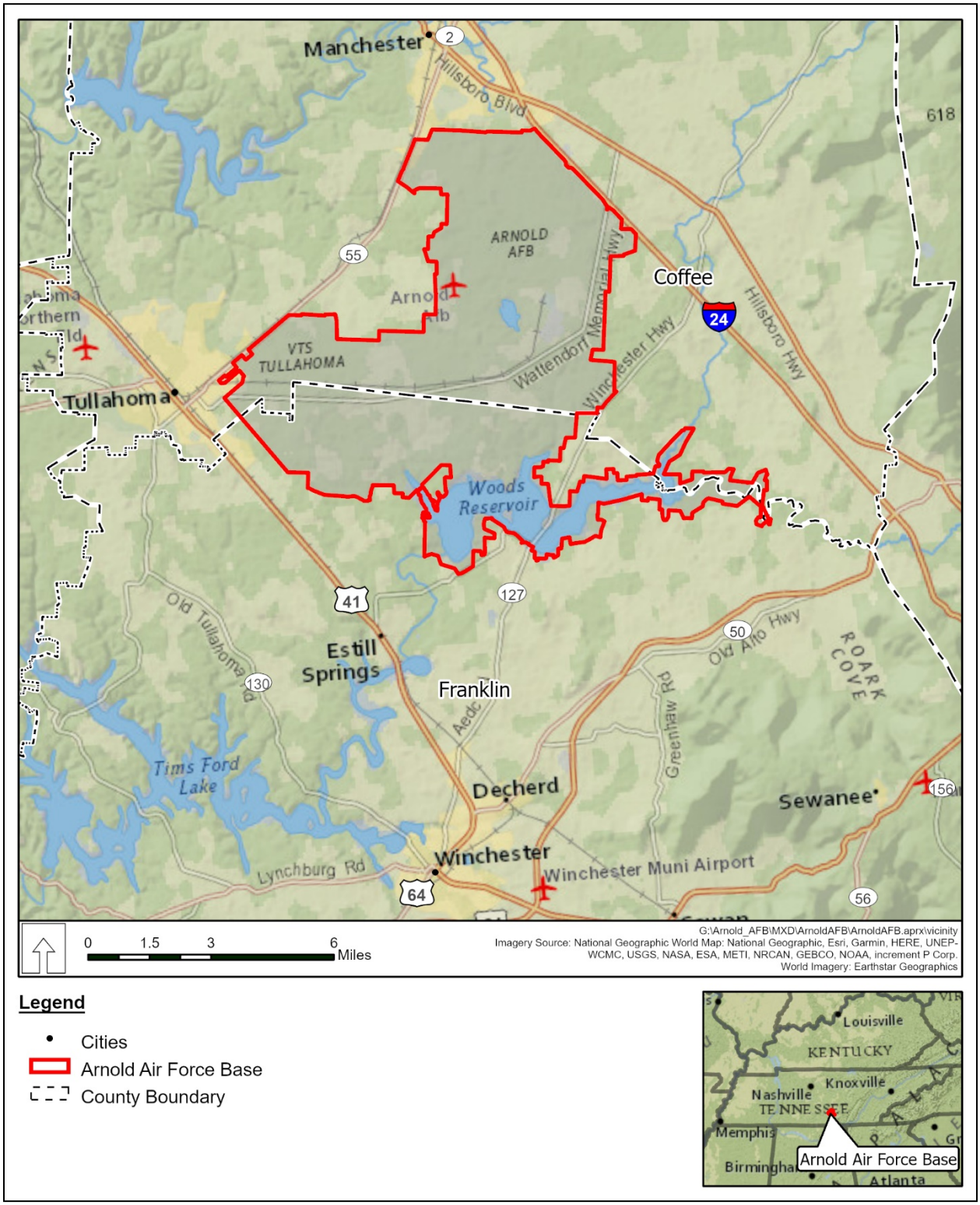

Figure 1-2. Location of Arnold Air Force Base and Surrounding Area

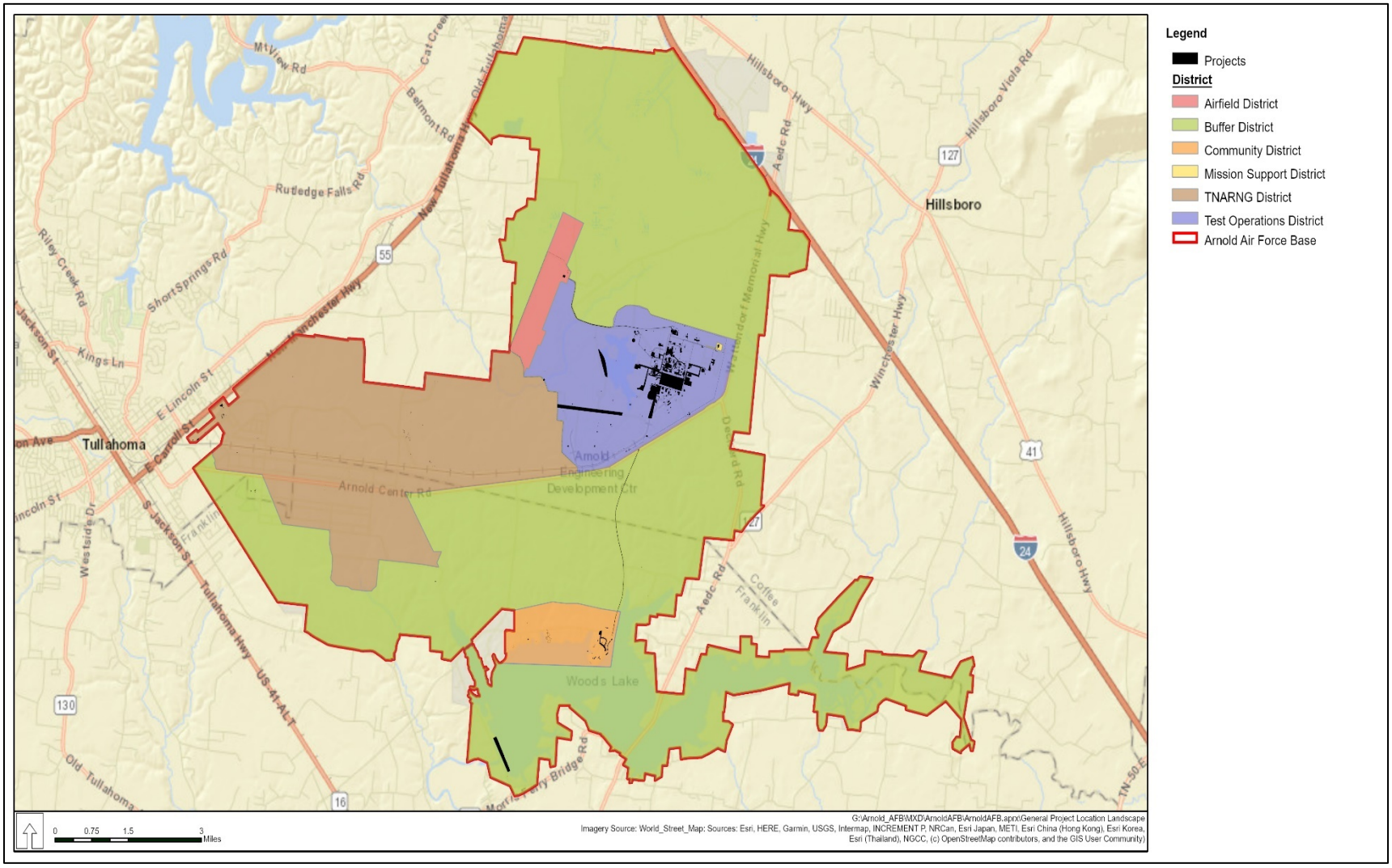

Figure 1-3. Proposed Installation Development Projects at Arnold Air Force Base

general locations of all 357 projects and also shows the boundaries for the six development districts of the Installation that were identified in the Installation Development Plan (IDP): Test Operations, Mission Support, Airfield, TNARNG, Community, and Buffer Districts.

Collectively, demolition projects would remove an estimated 76,650 square feet (1.76 acres) of facilities over the next five FYs. New construction projects would have an estimated 3,291,300 square feet (75.6 acres) of ground disturbance, and road maintenance projects would result in disturbance to an estimated 798,550 square feet (18.3 acres) over the next five FYs. These projects have the potential to effect natural resources at Arnold AFB.

1.3.1 Purpose of the Proposed Action

The purpose of the Proposed Action is to support Arnold AFB and AEDC mission requirements by improving facilities, infrastructure, and utilities for current and future use through the Installation development process as described by the Arnold AFB IDP. Collective analysis of all appropriate projects in a single EA fulfills the following functions:

- Coordinate land use planning and infrastructure development
- Proactively address potential roadblocks to project execution
- Reduce Installation, reviewing agency, and major command workloads
- Document an understanding of potential environmental consequences associated with the continuing Installation development process
- Evaluate environmental consequences that are reasonably foreseeable and have a reasonably close causal relationship to the Proposed Action
- Maintain a baseline for future analysis
- Support strategic decision making
- Encourage agency coordination
- Streamline NEPA review to eliminate project segmentation
- Meet the US Air Force's (USAF's) Environmental Impact Analysis Process (EIAP) goals

The Installation development process is designed to support Arnold AFB and AEDC mission requirements by completing selected demolition and infrastructure projects that address deficiencies throughout the Installation. These projects would include construction of new facilities and new infrastructure, repair of existing facilities, and demolition of redundant facilities. If current deficiencies are not addressed, mission effectiveness would deteriorate as mission and regulatory demands outpace Installation capabilities.

1.3.2 Need for the Proposed Action

The need for Installation development at Arnold AFB is to improve and update facilities and infrastructure that are no longer adequate to meet technologically advanced and specialized aerospace testing and flight simulation requirements. Installation development is to be done in a manner that:

- Meets applicable Department of Defense (DoD) Installation master planning criteria, consistent with Unified Facilities Criteria (UFC) 2-100-01, *Installation Master Planning*
- Aligns with the 2011 Air Force Civil Engineering Strategic Plan
- Meets current USAF requirements for functional space, consistent with Air Force Manual 32-1084, *Facility Requirements* (20 April 2012)
- Meets applicable DoD antiterrorism/force protection (AT/FP) criteria, consistent with UFC 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings*, and the Air Force Installation Force Protection Guide

- Reduces consumption of fuel, energy, water, and other resources; maximizes the use of existing facilities; and reduces the footprint of unnecessary or redundant facilities and infrastructure in accordance with Executive Order (EO) 13693, *Planning for Federal Sustainability in the Next Decade,* the Energy Policy Act of 2005, and the USAF's 20/20 by 2020 initiative
- Provides reliable utilities and an efficient transportation system to support Arnold AFB, consistent with Air Force Manual 32-1084
- Supports and enhances the morale and welfare of personnel assigned to the Installation, and their families, consistent with DoD Instruction 1015.10, *Military Morale, Welfare, and Recreation Programs* (6 July 2009)

2.0 LANDSCAPE CHARACTERIZATION

Arnold AFB is contained within Coffee and Franklin counties. These are predominately rural areas in transition from agricultural to manufacturing-based economies. Land use in Coffee and Franklin counties is still predominantly rural. Agriculture is a primary land use with 52 percent and 34 percent of land area classified as some type of farmland respectively (US Department of Agriculture [USDA] 2012). The farm acreage in these two Tennessee counites is subdivided into four categories (Table 2-1). Forest covers approximately 41 percent of Coffee and 50 percent of Franklin counties (Miles 2005).

Table 2-1. Land in Farms by Land Use in Coffee and Franklin Counties

Farm Land Use	Coffee County	Franklin County
Cropland	54.5 percent	59.6 percent
Pastureland	25.7 percent	22.6 percent
Woodland	17.5 percent	15.2 percent
Other	2.3 percent	2.6 percent

Eight natural areas, parks, and/or wildlife management areas occur within a five-mile radius of Arnold AFB (**Figure 2-1**). Included within these are three designated natural areas at Arnold AFB: Goose Pond, Sinking Pond, and Arnold AFB's AEDC Power Line Barrens. Arnold AFB signed a renewed nonbinding agreement with the state of Tennessee registering these Natural Areas in 2016 (Arnold AFB 2020a).

2.1 GOOSE POND

Dr. H. R. DeSelm, University of Tennessee, nominated Goose Pond (**Figure 2-1**) to the National Park Service for consideration as a National Natural Landmark in 1973. It was accepted for registration by the US Department of Interior in 1975 and is also a Registered State Natural Area (nonbinding, voluntary agreement to protect sites of ecological importance. Goose Pond is a 90-acre area that contains a 31-acre open marsh, one of the few on the highland rim. Cover consists of northern bog plants and southern relic bog species of grass and sedge. It is a natural relatively undisturbed marsh with seven marsh vegetation types and three fringing forest types present from the deepest to shallowest water zones. This marsh is dominated chiefly by Coastal Plain plants, some of which occur nowhere else in Tennessee. Goose Pond is a superior pristine example of an open marsh area and one of the very few marshes remaining on the Highland Rim.

Goose Pond's shallow marsh is surrounded by better drained uplands of sub-xeric southern red oak flatwoods. It is underlain by St. Louis limestone. Soils are silt loams with fragipan at a depth ranging from 20 to 107 centimeters below the soil surface. Upland topography is gently rolling to undulating.

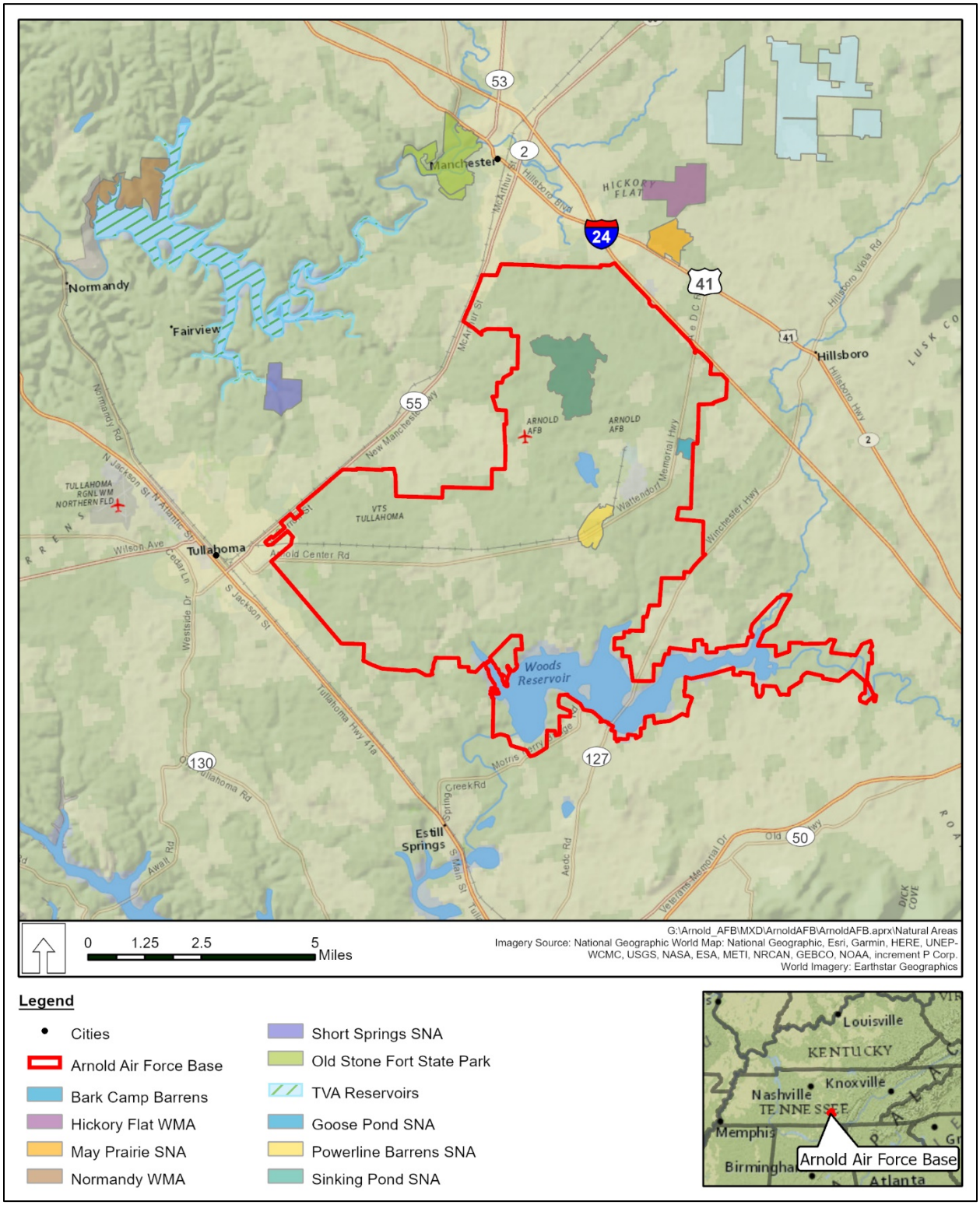

Figure 2-1. Natural Areas on and within a 5-Mile Radius of Arnold Air Force Base

Several rare plants listed by Tennessee are known to exist at Goose Pond. Most of these are Southern Coastal Plain species which are peripheral in the Barrens of the Highland Rim. Rare plants observed here are creeping St. John's wort (*Hypericum adpressum)*, Carolina redroot (*Lachnanthes caroliniana*), and fringed yellow-eyed-grass (*Xyris fimbriata*), listed as endangered; dwarf sundew (*Drosera brevifolia*), slender blue flag (*Iris prismatica*), Canby's lobelia (*Lobelia canbyi*), globe-fruited false loosestrife (*Ludwigia sphaerocarpa*), obscure beak-rush (*Rhynchospora perplexa*), grass-leaved arrowhead (*Sagittaria graminea var. graminea*), and iris-leaved yellow-eyed-grass (*Xyris laxifolia var. iridifolia*), each listed as threatened (Arnold AFB 2020a). Other state listed species of concern include cluster fescue (*Festuca paradoxa*), narrowleaf bushclover (*Lespedeza angustifolia)*, maidencane (*Panicum hemitomon*), and Virginia chainfern (*Woodwardia virginica*). (See Appendix A for state rankings.) The barking treefrog (*Hyla gratiosa*), a Tennessee Wildlife resources Agency (TWRA) Wildlife in Need of Management (WNM) species, has also been documented breeding at Goose Pond.

2.2 SINKING POND

Dr. H. R. DeSelm, University of Tennessee, also nominated Sinking Pond (see **Figure 2-1**) to the National Park Service for consideration as a National Natural Landmark in 1973. It was accepted for registration by the US Department of Interior in 1975 and also received national registration from the Society of American Foresters as a registered research natural area in 1975 and is also a Registered State Natural Area. It is a 1,053-acre site containing 267 acres of bottomland hardwoods in a karst area which also contains a small, pure stand of overcup oak (*Quercus lyrata*). This area is a swamp forest with secondary fringing upland forests typical of the Highland Rim of Tennessee and the Pennyroyal of Kentucky. It is a superior example of the swamps characteristic of the Eastern Highland Rim.

Sinking Pond consists of a series of sinkholes of varying depths and sizes connected by a channel that receives water from surface drainage. The area may also receive water from springs in winter. Maximum winter water depth varies from a few inches to 15 feet in various parts of the site, but the entire pond is usually dry in late summer and early fall. Several vegetation zones exist in and around Sinking Pond, mainly along a depth of flooding gradient. The deepest areas (6 to 15 feet water depth) are generally unvegetated or have scattered overcup oak. The largest area of the pond surface (3 to 6 feet water maximum water depth) is in almost pure stands of overcup oak, which are up to 51 inches in diameter at breast height. Some areas at this depth are in younger stands of overcup oak and river birch (*Betula nigra*), indicative of prior disturbance. The zone of 1 to 3 feet winter water depth is a mixed forest of overcup oak, river birch, willow oak (*Quercus phellos*), sweetgum (*Liquidambar styraciflua*), and red maple (*Acer rubrum*). This community also contains some water tupelo (*Nyssa aquatic*a), which is disjunct here at its northern limit. Areas surrounding this zone, primarily at the pond margin that is rarely flooded by more than a few inches, support a forest of water oak, willow oak, red maple, and blackgum (*Nyssa sylvatica*).

In the zones surrounding the actual winter water level, the vegetation takes two forms depending on the degree of fragipan formation and slope. On Dickson (Fragiudult) soils on a relatively flat topography, there is a quick transition to southern red oak (*Quercus falcata*) communities. On more sloping areas, probably with Mountview soils (Paleudult), the forest is dominated by white oak (*Quercus alba*), with various hickory species (*Carya* spp.) as associates. This area represents the largest and best developed overcup oak upland swamp in existence on the Highland Rim. The globally imperiled forest community (i.e., overcup oak, river birch [*Betula nigra*], and resurrection fern [*Pleopeltis polypodioides*]) occurs in only one location, Arnold AFB, Coffee County, Tennessee (The Nature Conservancy [TNC] 1998).

Rare plant species occurring at Sinking Pond include southern twayblade orchid (*Listera australis*), listed as endangered; dwarf sundew (*Drosera brevifolia*), dwarf huckleberry (*Gaylussacia dumosa*), slender blue flag (*Iris prismatica*), globe-fruited false loosestrife (*Ludwigia sphaerocarpa*), foxtail clubmoss (*Lycopodiella alopecuroides*),small-leaved panic grass (*Panicum ensifolium*), and iris-leaved yellow-eyed-grass (*Xyris laxifolia* var. *iridifolia),* listed as threatened. Other state listed species of concern include swamp frullania (*Frullania obcordata*), Eggert's sunflower (*Helianthus eggertii*), narrowleaf bushclover (*Lespedeza angustifolia*), and maidencane (*Panicum hemitomon*). The four-toed salamander (*Hemidactylium scutatum*), a TWRA WNM species, has also been documented from Sinking Pond.

Sinking Pond once contained one of the largest great blue heron (*Ardea herodias*) rookeries in the state. It has been in continuous use since at least 1965. Numbers peaked in 2000 with 743 active nests. The 2000 census noted the first declines in this rookery. This decline continued through 2004 with the majority of active nests concentrated in the deepest part of Sinking Pond. The 2006 survey documented a slight increase in the number of active nests with in Sinking Pond. In 2008, only 41 active nests were found.

A study conducted by McCarthy and Evans (2000) noted an absence of regeneration of overcup oak. A subsequent three-year study was initiated in 1999 to determine the extent and cause of this regeneration failure (Wolfe et al. 2004). Based on analysis of tree size class distribution and hydrologic models, Wolfe et al. (2004) determined that increased duration of ponding since 1970 was the proximate cause of recruitment failure. They suggested that this increase in inundation was the result of global climate change.

2.3 AEDC POWER LINE BARRIERS

An agreement between Arnold AFB and Tennessee Department of Environment and Conservation (TDEC) to register AEDC Power line Barrens Registered State Natural Area as a state natural area was signed in 1989. This agreement was renewed in 2016. This small strip of barrens under a high-voltage power line is one of the most significant botanic areas on the barrens of the Eastern Highland Rim. The annual autumn mowing under the power line has preserved or created a grassy barrens community that is similar in species composition to the nearby May Prairie State Natural Area. Mowing has prevented the invasion of trees, which has presented a serious problem at May Prairie. Additionally, the Tennessee Valley Authority (TVA) has begun spot treating unwanted woody species with herbicide. A total of 271 acres, the site also contains 56 acres of wetlands, which contains many other sensitive plant and animal species like the slender glass lizard and northern pine snake.

Six species on Tennessee's rare plant list are currently known from this site. Most notable for this area is the recent discovery of the yellow fringeless orchid (*Platanthera integra*), which is listed as endangered in Tennessee and was formally under federal review for listing. This discovery represents one of only two known populations in Tennessee for the yellow fringeless orchid, both of them small. Barrett's sedge *(Carex barrattii)*, coastal sweet pepper-bush (*Clethra alnifolia*), and rose pogonia (*Pogonia ophioglossoides*) are also listed as endangered by Tennessee. Eight species of plants listed as threatened in Tennessee occur here. These are dwarf sundew (*Drosera brevifolia*), white-bracted thoroughwort (*Eupatorium leucolepis*), dwarf huckleberry (*Gaylussacia dumosa*), slender blue flag (*Iris prismatica*), Canby's lobelia (*Lobelia canbyi*), Nuttall's milkwort (*Polygala nuttallii*), obscure beak-rush (*Rhynchospora perplexa*), and a thriving population of death-camus (*Zigadenus leimanthoides*). Other state listed species of

concern include narrowleaf bushclover (*Lespedeza angustifolia*) and Eggert's sunflower *(Helianthus eggertii*) (Arnold AFB 2020a).

2.4 ARNOLD AFB IMPORTANT BIRD AREA

The Arnold AFB Important Bird Areas (IBA) program is founded on the premise that identifying and conserving key habitat areas for significant populations of birds is essential to the overall bird conservation effort. The DoD Partners in Flight (PIF) program endorses IBAs on military lands, where appropriate. Arnold AFB has been designated as an IBA in Tennessee (Arnold AFB 2020a). There are no legal or management requirements associated with an IBA designation. Rather, it is recognition by outside organizations (American Bird Conservancy, National Audubon Society, or both) of the excellent stewardship of military lands in managing and conserving habitats for resident and migratory birds.

2.5 NATURAL AREAS WITHIN A 5-MILE RADIUS OF ARNOLD AFB

2.5.1 May Prairie Natural Area

May Prairie is a 346-acre Class II Natural-Scientific State Natural Area in Coffee County near Manchester. It adjoins the Hickory Flats Wildlife Management Area (WMA), which provides more than 1,000 acres of public land. The most impressive feature at May Prairie is the open grassland community that protrudes into the surrounding oak forest.

The open grassland is primarily composed of a little bluestem (*Schizachyrium scoparium*) community and a tall grass prairie community with an occasional sedge meadow found in wet depressions. A swamp forest forms the headwaters of what once was the "prairie tributary." The tall grass prairie component with big bluestem (*Andropogon gerardii*), Indian grass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*) and plume grass (*Erianthus giganteus*) tend to follow this old prairie tributary.

The little bluestem community represents the drier end of the prairie gradient and is prevalent throughout the open grassland. In spring, the little bluestem community provides a splendid floral display of orange, blue, and white color as Indian paintbrush (*Castilleja coccinea*), false indigo (*Baptisia* spp.), and bluets *(Houstonia* spp.) appear in full bloom. In late summer many species of sunflower *(Helianthus* spp*.)* are common with the rare southern dock (*Silphium pinnatifidum*) and two species of blazing star (*Liatris spicata* and *L. microcephala*) prominently flowering.

May Prairie is one of the state's most floristically diverse natural areas with 25 of its more than 300 plant species considered rare in Tennessee. May Prairie supports disjunct plants known from the Atlantic and Gulf Coastal Plains, including the only state location for both the snowy orchid (*Platanthera nivea*) and the coastal false-asphodel (*Tofieldia racemosa*). In addition, May Prairie has many species common to the Midwest tall grass prairie that are unusual in the Southeast. May Prairie was discovered during a botany foray in 1947 by Dr. A. J. Sharp and colleagues from the University of Tennessee while stopping for lunch at the Prairie Café. They were told that a prairie could be found behind the restaurant. May Prairie and the grasslands at Arnold AFB have many similarities in that both sites include a unique assemblage of Coastal Plain and Midwest disjunct plant species.

Management goals at May Prairie include restoring hydrology (including the prairie tributary) where draining for agriculture had occurred and controlling the woody vegetation encroachment. Prescribed burning is a management tool used in the open grassland and in the oak barrens. There are hundreds of acres of potential oak barrens associated with the natural area and the

WMA. May Prairie is also recognized by the US Department of the Interior as a National Natural Landmark (Arnold AFB 2020a).

2.5.2 Hickory Flats Wildlife Management Area

Hickory Flats is a TWRA wildlife management area that consists of 800 acres of mostly hardwoods, except for 20 acres in old-field succession south of May Prairie. The management goal for this site is to maintain it as a State of Tennessee WMA, providing hunting opportunities for several game species. TWRA maintains all signs and posts the boundary regularly so the land is readily identifiable as a WMA. Hunting is allowed in conjunction with statewide seasons for white-tailed deer (*Odocoileus virginianus*), eastern wild turkey (*Meleagris gallopavo silvestris*), mourning dove (*Zenaida macroura*), Virginia opossum (*Didelphis virginiana*), northern bobwhite (*Colinus virginianus*), eastern cottontail (*Sylvilagus floridanus*), raccoon (*Procyon lotor*), Wilson's snipe (*Gallinago delicata*), eastern gray squirrel (*Sciurus carolinensis*, including the spring squirrel season), and American woodcock (*Scolopax minor*), except that all deer hunting closes on the third Saturday in December each year (Arnold AFB 2020a).

2.5.3 Bark Camp Barrens Wildlife Management Area

Bark Camp Barrens WMA (3,000 acres) is located along Hickerson Road near Manchester, Tennessee. In the 1980s, 1,000 acres of wet bottomland hardwood barrens were ditched, tiled, and drained by the landowner in an unsuccessful effort to bring the area into profitable agricultural production (Pyne 2000). The landowner went bankrupt, and the land was acquired by the National Ecological Foundation (NEF) and eventually became part of a wetland mitigation settlement associated with the Coffee County Interstate Industrial Park. Wetland oak species were planted in a plantationlike fashion to restore the original bottomland hardwood habitat in 1996. In February 2001, an arsonist burned 150 acres on the western portion of Bark Camp Barrens, and this currently is managed for early successional habitat. NEF owned 1,155 acres of the Bark Camp Barrens until they deeded the property to TWRA to include in Bark Camp Barrens WMA. Currently, most of this area contains vegetation consisting of a grass-forb combination interspersed with shrub thickets as well as wetlands and small continuous tracts of oak-hickory forests.

Currently, there are 400 acres of grassland at Bark Camp Barrens, with additional acreage considered. Previously, the grassland restoration and the additional areas dedicated to grassland birds at Bark Camp Barrens supported a population of Henslow's sparrow (*Ammodramus henslowii*) (Sulkers 2005). However, only two Henslow's sparrows were identified during attempts to locate and band individuals to band in 2016 (Arnold AFB 2020a).

2.5.4 Old Stone Fort State Archaeological Park

Old Stone Fort State Archaeological Park, located in Coffee County is dedicated to the preservation, protection, study, and interpretation to the public of this significant survival of ancient culture. The park offers educational and entertaining programs which increase understanding of the Old Stone Fort, archaeology, and Native American cultures. The visitor center and exhibit hall complex include exhibits relating to the history and archaeology of the Old Stone Fort and its builders (Arnold AFB 2020a).

2.5.5 Short Springs Natural Area

Short Springs Class I Scenic-Recreational State Natural Area is a 420-acre natural area located in Coffee County approximately 3.5 miles northeast of Tullahoma. The natural area provides an excellent contrast between Highland Rim and Central Basin geology and vegetation. When descending along the Machine Falls trail, a visitor can observe exposed black Chattanooga

shale at midslope, which is a formation that delineates the Central Basin from the Highland Rim. Thickets of mountain laurel (*Kalmia latifolia*) grow on the upper slopes under a dry oak-hickory forest canopy that is characteristic of Highland Rim vegetation. The lower slopes and riparian areas along Bobo Creek support towering sycamore (*Platanus occidentalis*), buckeye (*Aesculus* spp.), magnolia (*Magnolia* spp.), beech (*Fagus grandifolia*), and tulip poplar (*Liriodendron tulipfera*) trees with a biologically rich shrub layer and herbaceous cover.

Short Springs is one of the very best spring wildflower locations in the state. In the spring, moist slopes are covered in trout lilies (*Erythronium* spp.*),* Virginia bluebells (*Mertensia virginica*), jack-in-the-pulpit (*Arisaema triphyllum*), larkspur (*Delphinium spp.*), and Dutchman's breeches (*Dicentra cucullaria*). Large flowered trillium (*Trillium grandiflorum*), southern red trillium (*Trillium sulcatum*), and barren strawberry (*Waldsteinia fragarioides*) are uncommon plants for Middle Tennessee that occur here. The natural area also supports two state-listed endangered plant species, nestronia (*Nestronia umbellula*) and broadleaf bunchflower (*Melanthium latifolium*).

This biological diversity is related to the rich forest slopes and ravines, low cascades, springs and waterfalls that support it. Scenic features, like Machine Falls, are common. Machine Falls drops more than 60 feet and is nearly equal in length across. The Upper and Lower Busby Falls on Bobo Creek are two prominent cascading waterfalls that can be seen from overlooks on the Bobo Creek trail. The steep escarpment with its numerous wet weather seeps is particularly impressive during the moist winter and spring months. Water is a significant feature at Short Springs, as it once was the water supply for Tullahoma before construction of Normandy Dam (Arnold AFB 2020a).

2.6 SURFACE WATERS

2.6.1 Watersheds

Arnold AFB lies within the Duck River and the Elk River watersheds (**Figure 2-2**). The drainage divide between these two watersheds runs southwest to northeast through the Arnold AFB Security Area. 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 Watershed 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 (Wolfe 1996).

2.6.2 Major Impoundments

Impoundments at Arnold AFB include Woods Reservoir, the Secondary Reservoir, and the Retention Reservoir (see **Figure 2-3**).

Woods Reservoir is a 3,632-acre man-made reservoir that contains approximately 26 billion gallons of water. It was created by damming the Elk River in 1952 to supply the base with large quantities of cooling water for the test facilities as well as potable water for human consumption, air conditioning, and fire protection. No federally listed endangered or threatened species occur in Woods Reservoir, and no critical habitat has been designated. The fisheries are stocked and managed by the TWRA.

Woods Reservoir has nearly 75 miles of shoreline and provides recreational activities for base personnel, and the surrounding communities. Woods Reservoir collects surface runoff from Bradley, Dry, Brumalow, Rowland, and Hardaway Branch creeks. Surface runoff from the industrial facility is returned to Woods Reservoir via gravity flow through Bradley, Brumalow, and

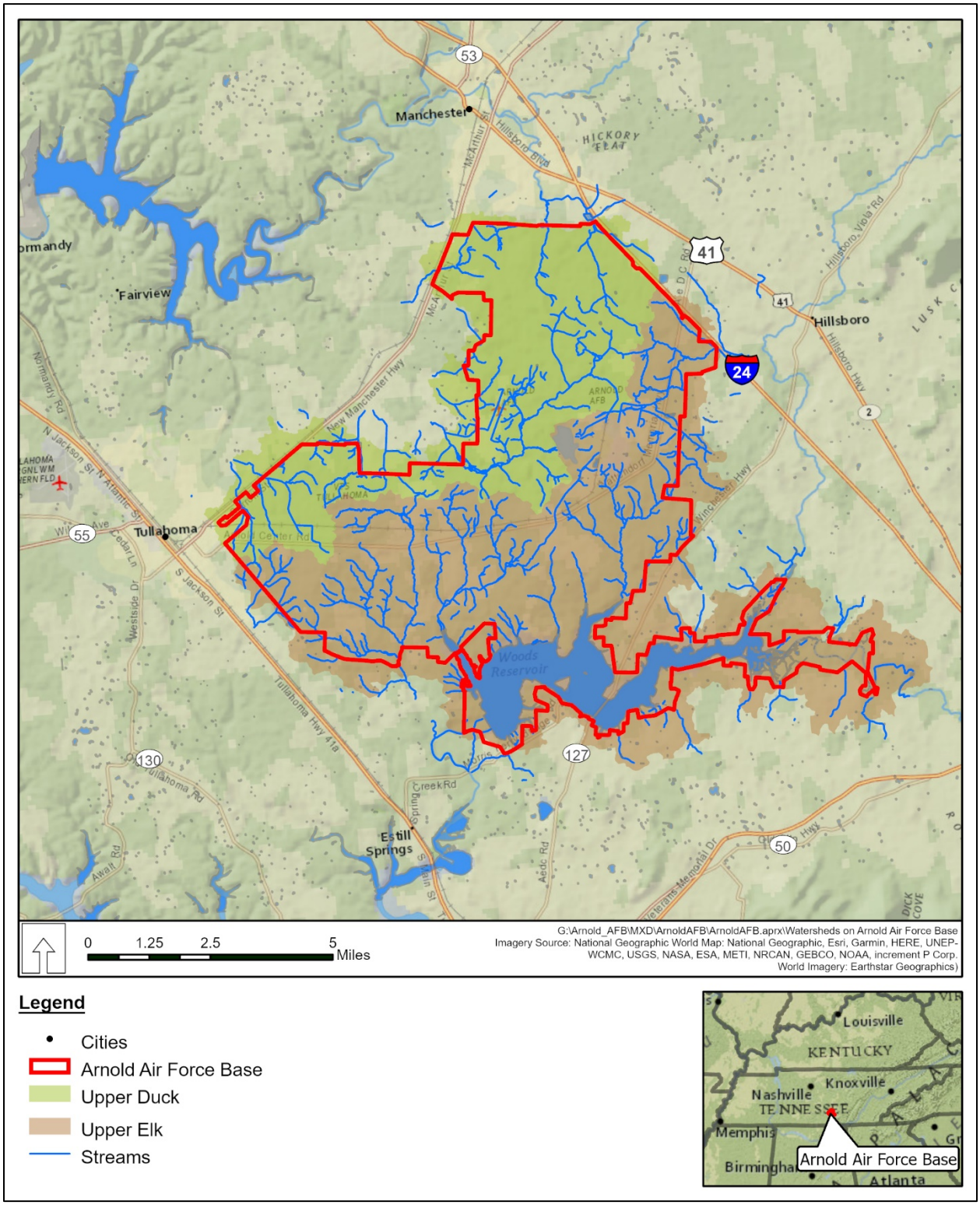

Figure 2-2. Watersheds at Arnold Air Force Base

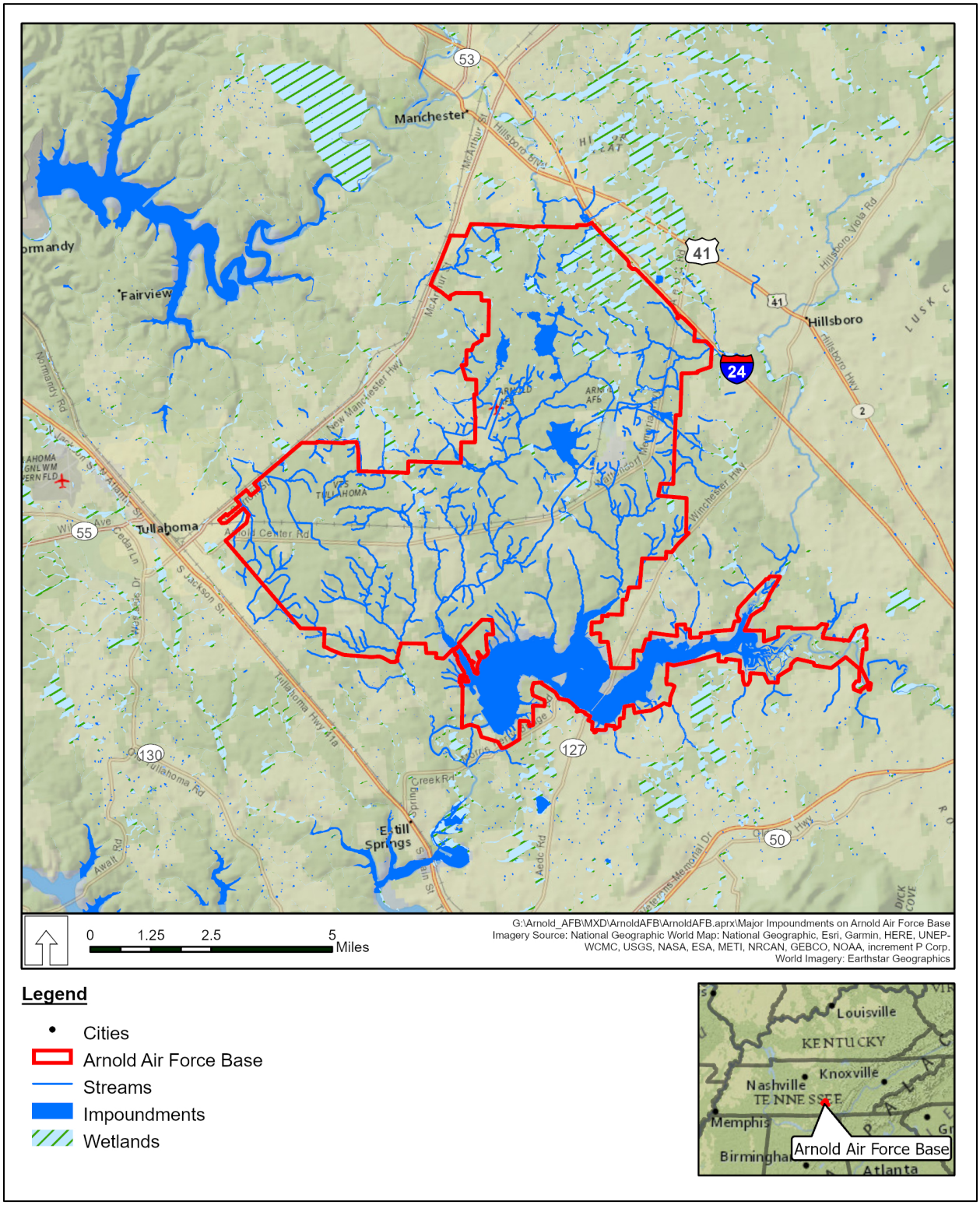

Figure 2-3. Major Impoundments at Arnold Air Force Base

Rowland creeks. Process wastewaters and cooling water are returned to Woods Reservoir via gravity flow through Rowland Creek.

2.6.3 Wetlands and Floodplains

The 1,894 total acres of wetlands at Arnold AFB vary in size individually from 0.05 acre to 267.36 acres, with most being less than one acre (Bingham and Winford 1998). The majority of the wetland acreage occurs in the northern portion of the base. Within the Arnold AFB Security Area, there are 99.12 acres of wetlands (**Figure 2-4**). Prominent wetlands on the base include Sinking Pond, Westall Swamp, Willow Oak Swamp, Tupelo Swamp, and Goose Pond (see **Figure 2-4**).

Most of the wetlands at Arnold AFB occur in three major geomorphic features: karst pans, compound sinks, and intermittent headwater streams (Wolfe 1996). Karst pans typically have depths less than 4.9 feet and flat bottom topography. Compound sinks generally have depths greater than 8.2 feet and complex bottom topography dominated by internal drainage systems composed of coalesced sinkholes and connecting channels. Wetland flats occur in association with both intermittent headwater streams and interstream divides. Headwater streams ebb and flow in response to seasonal precipitation patterns. A small proportion of the wetlands at Arnold AFB occur on fringes of impoundments or in floodplains of larger streams and the Elk River. Hydrologic monitoring at Arnold AFB has revealed two contrasting styles of wetland water regime corresponding to the major geomorphic classes of sinkhole wetlands. Three compound sinks, Sinking Pond, Westall Swamp, and Willow Oak Swamp, share the geomorphic characteristics of about 9.8 feet of internal relief and plainly visible sinkhole drains. Their water regimes are characterized by abrupt seasonal rises and recessions, typically 6.6 feet or more during periods as short as one to three days, and close interactions between surface water and ground water. These interactions include water table control of sinkhole drainage and very flashy groundwater response under the influence of concentrated recharge through the sinkholes. The annual flooding behavior of compound sinks is more sensitive to rainfall during the fall and early winter than to total annual rainfall (Wolfe 1996).

Arnold AFB received a jurisdictional determination from US Army Corps of Engineers (USACE) Nashville District for wetlands mapped throughout the Installation in 1998 that was reverified by the district in 2006. During a 13 June 2014 visit to Arnold AFB, USACE Nashville District representatives determined that they could not reverify the jurisdictional determination because noted changes in the wetland hydrology that had occurred since the 1998 jurisdictional determination, as well as identification of several additional wetlands and the lack of inclusion of perennial, intermittent, and ephemeral streams in the 1998 delineation. Additionally, the 1998 delineation was conducted using methodologies outlined in the USACE's 1987 Wetland Delineation Manual guidance (USACE 1987), and USACE requested that the wetlands be delineated to include the performance standards of the USACE 2012 Regional Supplement (USACE 2012).

Since the 2014 visit, the USACE implemented updated Clean Water Act (CWA) rules, effective 25 August 2015. The updated CWA rule now includes upstream waters, including headwaters and wetlands, and Arnold AFB has not determined if wetlands previously classified as nonjurisdictional are now considered protected. Therefore, until another basewide wetlands delineation can be accomplished, any future project that may affect wetlands will require a project specific wetland delineation and evaluation of possible impacts.

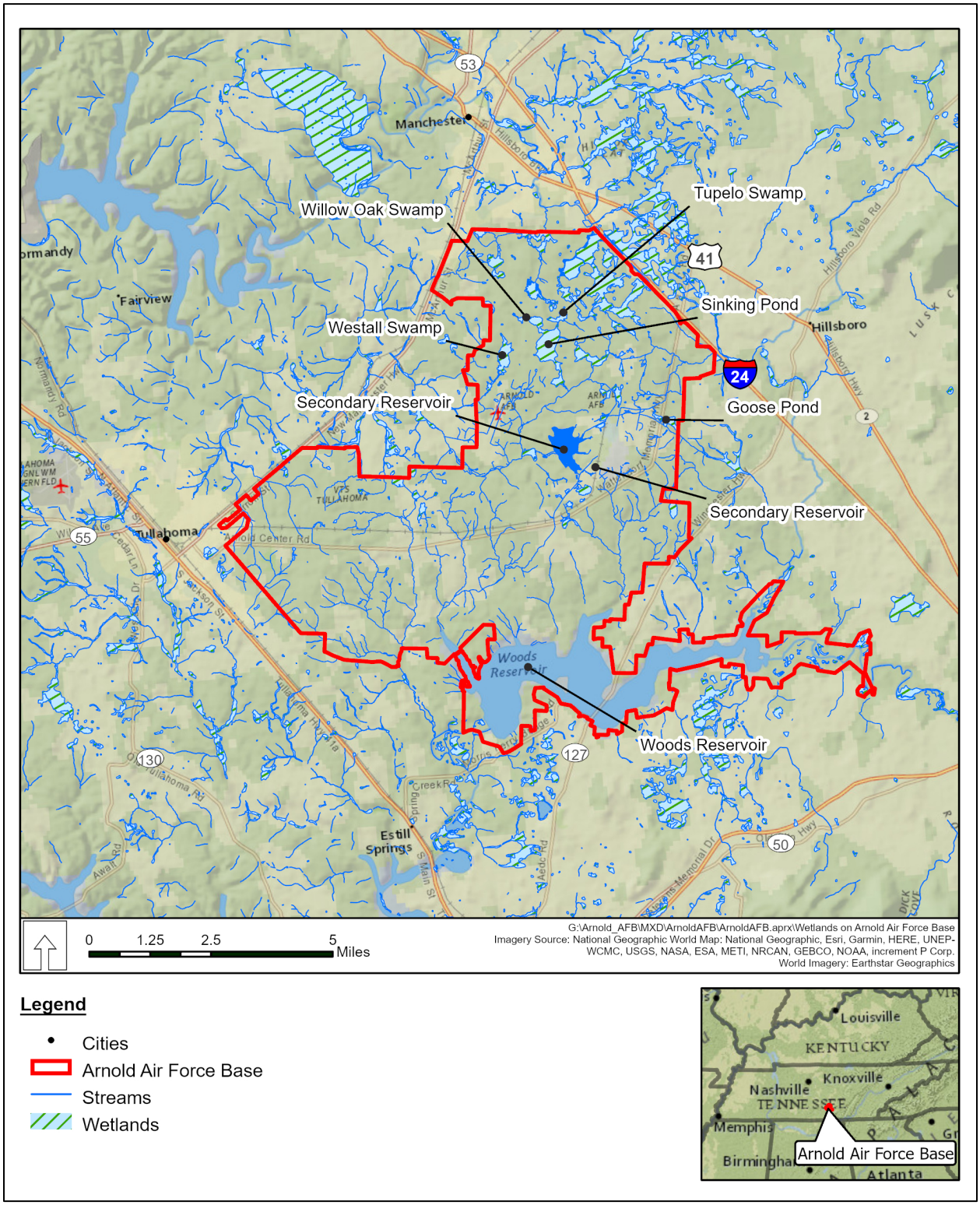

Figure 2-4. Wetlands at Arnold Air Force Base

2.7 ECOSYSTEMS AND THE BIOTIC ENVIRONMMENT

2.7.1 Ecosystem Classification

The National Hierarchical Framework Ecological Units were developed as a planning tool to facilitate conservation planning and implementation of ecosystem management at multiple spatial scales (Cleland et al. 1997). Arnold AFB is classified, from the largest planning unit to the lowest currently defined, as follows (McNab and Avers 1994):

Domain – Humid Temperate

Division – Hot Continental

Province – Eastern Broadleaf Forest (Continental)

Subregion – Interior Low Plateau

Section – Highland Rim

Pyne (2000) defined the Barrens ecoregion (**Figure 2-5**), which encompasses the majority of the base. This planning unit was used by TNC as a phase one target site for its ecoregion-based conservation planning (TNC 1998).

2.7.2 Vegetation

2.7.2.1 Historic Vegetative Cover

Arnold AFB lies in the heart of the Barrens region of the Eastern Highland Rim. The term "barrens" was used by early travelers and settlers of the region to refer to grassy openings that were barren of trees. Barrens most often refers to grasslands similar to the Midwestern tallgrass prairie but may also be used to describe openings with scattered trees that resemble savanna or shrubland. Presettlement barrens were likely maintained by frequent fire and grazing of large herbivores, including bison and elk (Pyne 2000, DeSelm 1994a). Under this disturbance regime, the presettlement landscape in the region was most likely a mosaic of open grassland, savanna, shrubland, and forest in various successional stages. Oak, hickory, and chestnut dominated upland forests on well-drained soils, whereas mixed mesophytic forest of beech, oak, dogwood, hickory, maple, and tulip tree occurred in bottomlands and dissected uplands. Sources of information about historical vegetation in the region include the accounts of early travelers, explorers, surveyors, and settlers.

A land survey conducted in 1807 prior to settlement in southern middle Tennessee crossed through Arnold AFB. On the flat to rolling parts of the rim (primarily Dickson soil series) the surveyors saw "barrens" at almost every point. Oaks made up 80 percent of the tree species recorded in these areas. Tree diameters tended to be greater in 1807 than present, with many more trees in the greater than 29-inch-diameter class (DeSelm 1994b). Imlay (1797) also described barrens in his travels through Tennessee, writing that "the land, though without timber, is frequently very good; the Indians in burning the long grass must have destroyed the trees.” Baily (1856) saw a place on the eastern rim as "... a plain almost void of trees and covered entirely with grass...” Openings were scattered throughout the eastern rim, mainly on the flat portions (DeSelm 1990). Safford (1869) described the barrens as "in great part level and

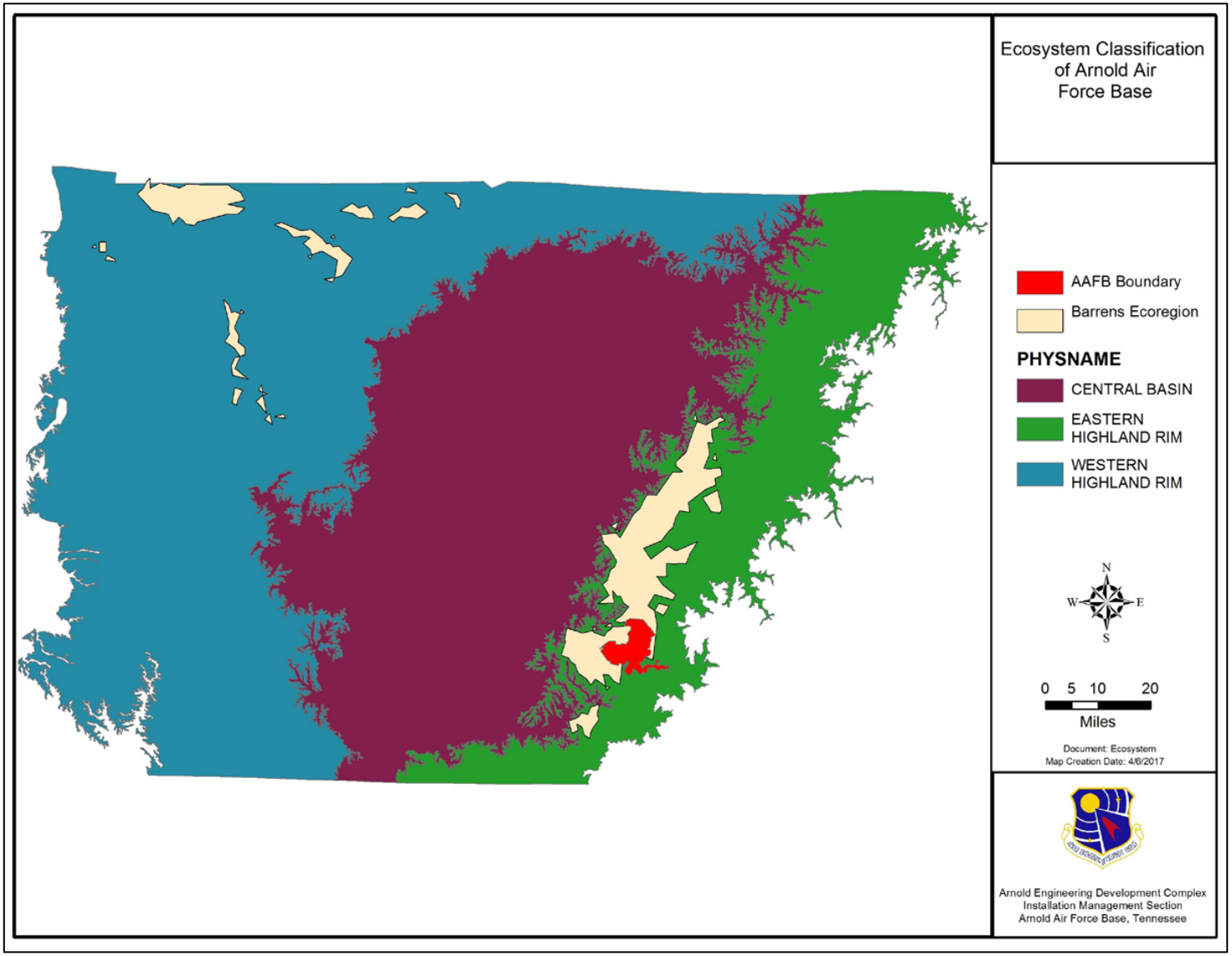

Figure 2-5. Ecosystem Classification at Arnold Air Force Base

thinly wooded. At some points 'scrub-oaks' occupy whole square miles." In the first description of the counties of the eastern rim, Killebrew and Safford (1874) wrote that the barrens "afford luxuriant range for cattle... It also produces, in open woods, a coarse, rank grass, which, when young and tender is palatable to stock. Thousands of cattle and sheep subsist on these highland pastures... These barren lands are usually very level and thinly wooded and present to the eye a beautiful surface." Gattinger (1887, 1901) listed dozens of plant species as occurring in "the barrens at Tullahoma." Bennett et al (2005) reconstructed past vegetation patterns with pollen analysis from three wetlands at Arnold AFB. This study indicated that the area has been covered by an oak-hickory-pine forest that included significant open areas for most of the Holocene period. It is important to note that pine is not native to Arnold AFB but is in the pollen record most likely due to windblown pollen being deposited from nearby regions.

An oral tradition speaks of expanses of thick, tall cane throughout the county, but which had largely disappeared by the end of the 19th century (Goodspeed Publishing Co. 1887). By the latter decades of the 19th century, the natural communities had been modified substantially by land use associated with American settlement. For example, the 1860 federal census reports that by that time more than 100,000 acres of Coffee County were in farms, with about 56,000 of those acres listed as "improved." By the time of the creation of Camp Forrest in 1941, much of the land area had been converted to cultivation and pasture.

2.7.2.2 Current Vegetative Cover

Present vegetation at Arnold AFB is predominately upland and swamp oak forest. Of the forested areas, 21,233 acres are in native hardwoods and 5,130 acres are in planted pines. Forested areas are most frequently characterized by closed canopies dominated by various oaks. Dry sites are dominated by post oak, blackjack oak, scarlet oak, southern red oak, and black oak. Wet sites are dominated by white oak, willow oak, water oak, and overcup oak. Understories include a wide variety of species including dogwoods, maples, sassafras, sourwood, and blueberries. Numerous wetlands occur across the base, with prevailing vegetation ranging from grassland to closed canopy forest. Several hundred acres of open, prairielike barrens occur primarily in the airfield and along power line and railroad rights-of-way (ROWs). To date, more than 900 vascular plant species have been recorded on the base.

TNC and the Tennessee Division of Natural Heritage assessed and described the vegetation at Arnold AFB according to the US National Vegetation Classification System (USNVC) and produced a report and vegetation map in 1998 (TNC 1998). The Vegetation Subcommittee of the Federal Geographic Data Committee adopted the USNVC in 1997 as the standard for vegetation mapping across all federal agencies (Grossman et al. 1998). A detailed description and map of the existing vegetation of the base was completed by TNC in 1998. A total of 33 associations (i.e., vegetation types) were identified from Arnold AFB (TNC 1998) and are divided into four main vegetation formation-classes (**Figure 2-6**): forest, woodland, shrubland, and herbaceous vegetation, most of which differ from one another in terms of dominance relationships, but overlap considerably in composition. These main classes were subdivided into nine formation names:

1. Lowland or submontane cold-deciduous forest,
2. Temporarily flooded cold-deciduous forest,
3. Seasonally flooded cold-deciduous forest,
4. Cold-deciduous woodland,
5. Seasonally flooded cold-deciduous shrubland,

6. Tall sod temperate grassland,
7. Seasonally flooded temperate or subpolar grassland,
8. Semipermanently flooded temperate or subpolar grassland, and
9. Semipermanently flooded temperate perennial forb vegetation.

These formation names can be categorized into three general ecological groups: upland, wetland, and floodplain – floodplain terrace/bottomland.

In the rolling uplands, the current vegetation is composed of either pine plantations or a nearly continuous hardwood forest that is mostly dominated by combinations of southern red oak, scarlet oak, and post oak. In the seasonally wet flats of the lowlands, extensive tracts of willow oak dominate, and the isolated wetlands in karst depressions support unique hydrophytic plant communities. However, other than in certain wetlands and along utility corridors, extensive herbaceous communities do not exist.

The ecological significance of the barrens region was not recognized until the mid-20th century, when botanical studies revealed that a large number of plant species occur there as disjunct populations, far removed from their principal ranges in the Coastal Plain. Most of these species are herbaceous plants that characteristically occur in open woodlands or prairie, therefore the initial scientific interest was focused on the floristics of the open grassy areas within the barrens region. Gradually, ecologists have come to recognize that the open lands that sustain rare plant species also contribute to the maintenance of regional biological diversity in various other ways. At the same time, these systems present unique conservation problems. Barrens and similar open lands represent a tension zone between the forest and prairie regions of North America. Prior to settlement, fire and other factors evidently were responsible for creating and maintaining openings within the generally forested landscape, but with settlement came changes that have caused many former savannas and prairies to revert to forest (DeSelm 1981, 1989, 1990, 1994a; TNC 1998; Pyne 2000).

2.7.2.3 Turf and Landscaped Areas

EO 13112, *Invasive Species,* 3 February 1999, calls federal agencies to prevent the spread of invasive species. Though budget reductions across the USAF halted Arnold AFB landscaping practices, Arnold AFB will analyze any proposed landscaping for threat of invasive species.

Arnold AFB uses the most current list produced by the Tennessee Exotic Pest Plant Council to determine invasive threat and maintain an Arnold AFB Approved Installation Plant List. Current practices are described in the following paragraphs.

Tall fescue (*Festuca elatior*) is commonly planted and continually mowed along many of the road ROWs in the industrial areas as well as along Wattendorf Memorial Highway, South Hap Arnold Drive, Winchester Highway, and others. This is the only approved invasive on the Tennessee Exotic Pest Plant Council list, as Arnold AFB has yet to determine a viable alternative.

The fairways and tees at Arnold Golf Course are a mix of common Bermuda and 419 Bermuda. The greens are SR1020 Creeping Bentgrass. The roughs and other grassy areas are maintained in an exotic mix of fescues, common Bermuda, and other grasses.

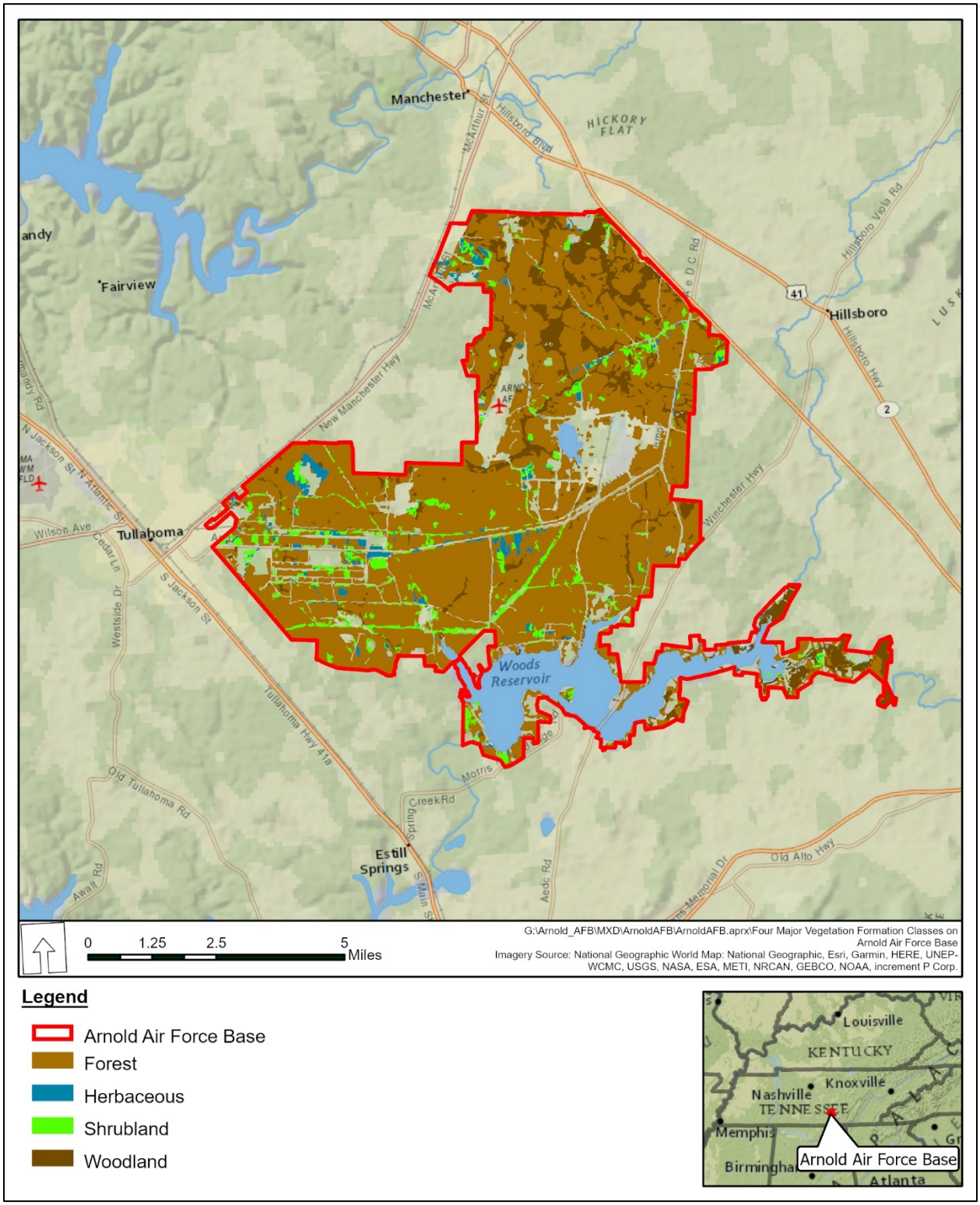

Figure 2-6. Four Major Vegetation Formation Classes at Arnold Air Force Base

The Arnold AFB Approved Installation Plant List includes the following species that are maintained within the improved areas for AEDC:

Groundcover: carpet bugle (*Ajuga reptans*), cotoneaster (*Cotoneaster* spp.), garden pinks (*Dianthus plumarius*), winter creeper (*Euonymus radicans*), juniper (*Juniperus* spp.), liriope (*Liriope muscari*), and mondo grass (*Ophiopogon japonicum*)

Shrubs: Indian azalea (*Azalea indica*), Kurume azalea (*Azalea obtusum*), Satsuki azalea (*Azalea satsuki*), barberry (*Berberis thunbergii*), boxwood (*Buxus* spp.), cotoneaster (*Cotoneaster* spp.), border forsythia (*Forsythia intermedia*), "Nana" dwarf yaupon holly (*Ilex vomitoria*), juniper (*Juniperus* spp.), redtip (*Photinia fraseri*), and rhododendron (*Rhododendron hybrida*)

Trees: Japanese maple (*Acer palmatum*), red maple (*Acer rubrum*), sugar maple (*Acer saccharum*), river birch (*Betula nigra*), common hackberry (*Celtis occidentalis*), redbud (*Cercis canadensis*), dogwood (*Cornus florida*), hawthorn (*Crataegus* spp.), American beech (*Fagus grandiflora*), eastern red cedar (*Juniperus virginiana*), golden rain tree (*Koelreuteria paniculata*), sweet gum (*Liquidambar styraciflua*), tulip tree (*Liriodendron tulipifera*), flowering crabapple (*Malus* spp.), black gum (*Nyssa sylvatica*), white pine (*Pinus strobus*), Carolina cherry (*Prunus caroliniana*), flowering cherry (*Prunus serrulata*), scarlet oak (*Quercus coccinea*), willow oak (*Quercus phellos*), littleleaf linden (*Tilia cordata*), and zelkova (*Zelkova serrata*)

2.7.3 Fish and Wildlife

Arnold AFB has a diversity of habitats ranging from closed canopy forests to open grasslands. The variety of habitats provides for a highly diverse assemblage of fish and wildlife. To date, 412 species of vertebrates (Arnold AFB 2020a) have been identified from the base including:

- 234 species of birds (includes summer residents, migrants, and wintering species)
- 35 species of reptiles
- 26 species of amphibians
- 44 species of mammals
- 83 species of fish

Two species of animals at Arnold AFB are considered big-game species, white-tailed deer (*Odocoileus virginianus*) and eastern wild turkey (*Meleagris gallopavo*) (Arnold AFB 2020a). The most popular small-game animals are squirrels, quail, rabbit, and various waterfowl species (Arnold AFB 2020a).

2.7.4 Protected Species

Three federally listed species are currently known to occur at Arnold AFB: (1) gray bat (*Myotis grisescens*; endangered), (2) Indiana bat (*Myotis sodalis*; endangered), and (3) northern long-eared bat (*Myotis septentrionalis*; threatened) (Figure 2-7). Bald eagles (*Haliaeetus leucocephalus*) nest and winter at Arnold AFB and are protected by the Bald and Golden Eagle Protection Act. In addition, 21 animals and 63 plants are state listed as threatened, endangered or special concern species (Appendix A).

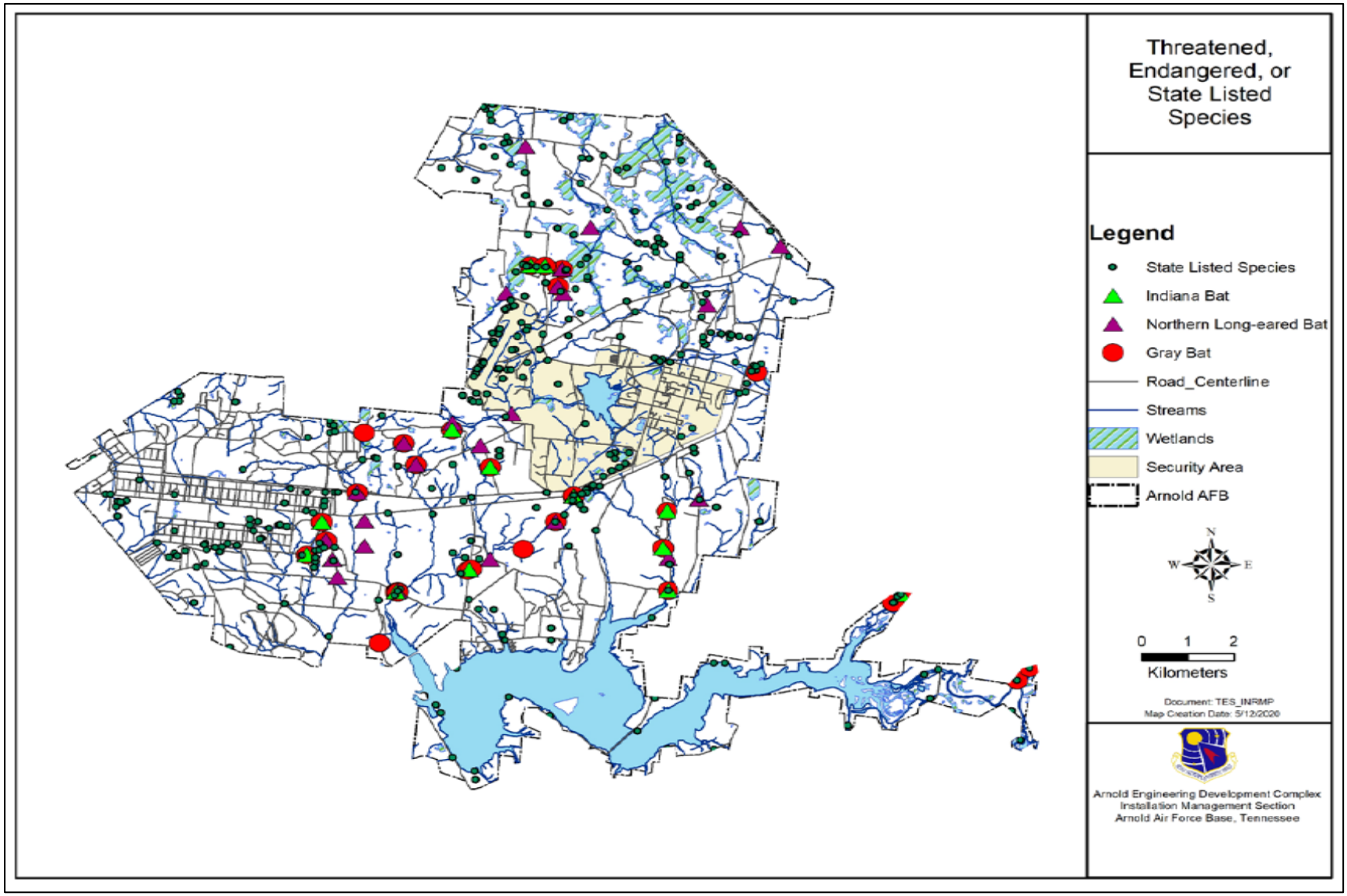

Figure 2-7. Threatened, Endangered, and Species of Special Concern Known at Arnold Air Force Base

3.0 PROTECTED SPECIES SURVEYS

Arnold AFB conducts studies examining each of the four levels of biodiversity described by Noss (1990), including genetic, population-species, community-ecosystem, and regional landscape. The genetic and taxonomic distinction and population genetics of the formerly federally listed threatened Eggert's sunflower (*Helianthus eggertii*) were the subjects of a three-year study (Cruzan 2002). The results of this project provide information to help develop management strategies for conserving the species' genetic diversity locally and assess the species' local genetic diversity in the context of range wide genetic diversity (Arnold AFB 2020a). The study also provides insight to the population structure of the species at Arnold AFB lands. Eggert's sunflower was officially delisted in September of 2005, due in no small part to the studies and habitat restoration efforts of Arnold AFB.

Many studies supporting ecosystem management have focused primarily on population-species diversity. Baseline inventories and protected species surveys at Arnold AFB have documented over 900 vascular plants species (Clebsch and Pyne 1995), 172 bryophyte (i.e., liverworts, hornworts, and mosses) species, 215 lichen species (Davidson et al. 1999), 354 vertebrate species (Mullen et al. 1995), and at least 1,800 invertebrate species from 30 orders (CH2M HILL 2000, Lambdin et al. 1999).

Rare plant surveys also provided initial documentation of the community-ecosystem diversity on the base. Seventeen of the 33 vegetation associations found at Arnold AFB are considered "imperiled community types" (i.e., ranked G1 to G3 by NatureServe), underscoring the importance of Arnold AFB for conserving diverse, functioning ecosystems as well as rare species (**Figure 3-1**). Four of the five wetland forest associations identified, including the types at Sinking Pond and Westall Swamp, are thought to be endemic to Coffee County. Goose Pond, which contains several G1 and G2 associations in a complex mosaic, is an excellent example of Eastern Highland Rim herbaceous depressional wetlands. The grassland associations surrounding the airfield and in the Power line Barrens Registered State Natural Area, other utility rights-of-way, and the railroad right-of-way are important G2-ranked remnants of the larger barrens system that was once regionally prominent (TNC 1998; see Appendix A).

One of the rare communities at Arnold AFB is a globally imperiled forest community (i.e., overcup oak, river birch, and resurrection fern) that occurs in Sinking Pond. However, a study conducted by McCarthy and Evans (2000) noted an absence of regeneration of overcup oak. A subsequent three-year study was initiated in 1999 to determine the extent and cause of this regeneration failure (Wolfe et al. 2004). Based on analysis of tree size class distribution and hydrologic models, Wolfe et al. (2004) determined that increased duration of ponding since 1970 was the proximate cause of recruitment failure. They suggested that this increase in inundation was the result of global climate change. In FY18, a project began to examine the causes of overcup oak regeneration failure and attempt to plant nursery grown stock grown from Sinking Pond source. This project is ongoing.

3.1 SURVEYS FOR FEDERALLY PROTECTED SPECIES

Arnold AFB began a comprehensive programmatic consultation with the US Fish and Wildlife Service (USFWS) in 2015 to determine the effects of ongoing, routine activities proposed to occur on the Installation on the federally endangered gray bat (*Myotis grisescens*) and Indiana bat (*Myotis sodalis*), and threatened northern long-eared bat (*Myotis septentrionalis*) during the nonhibernating season, per Section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 United States Code [USC] 1531, et seq.).

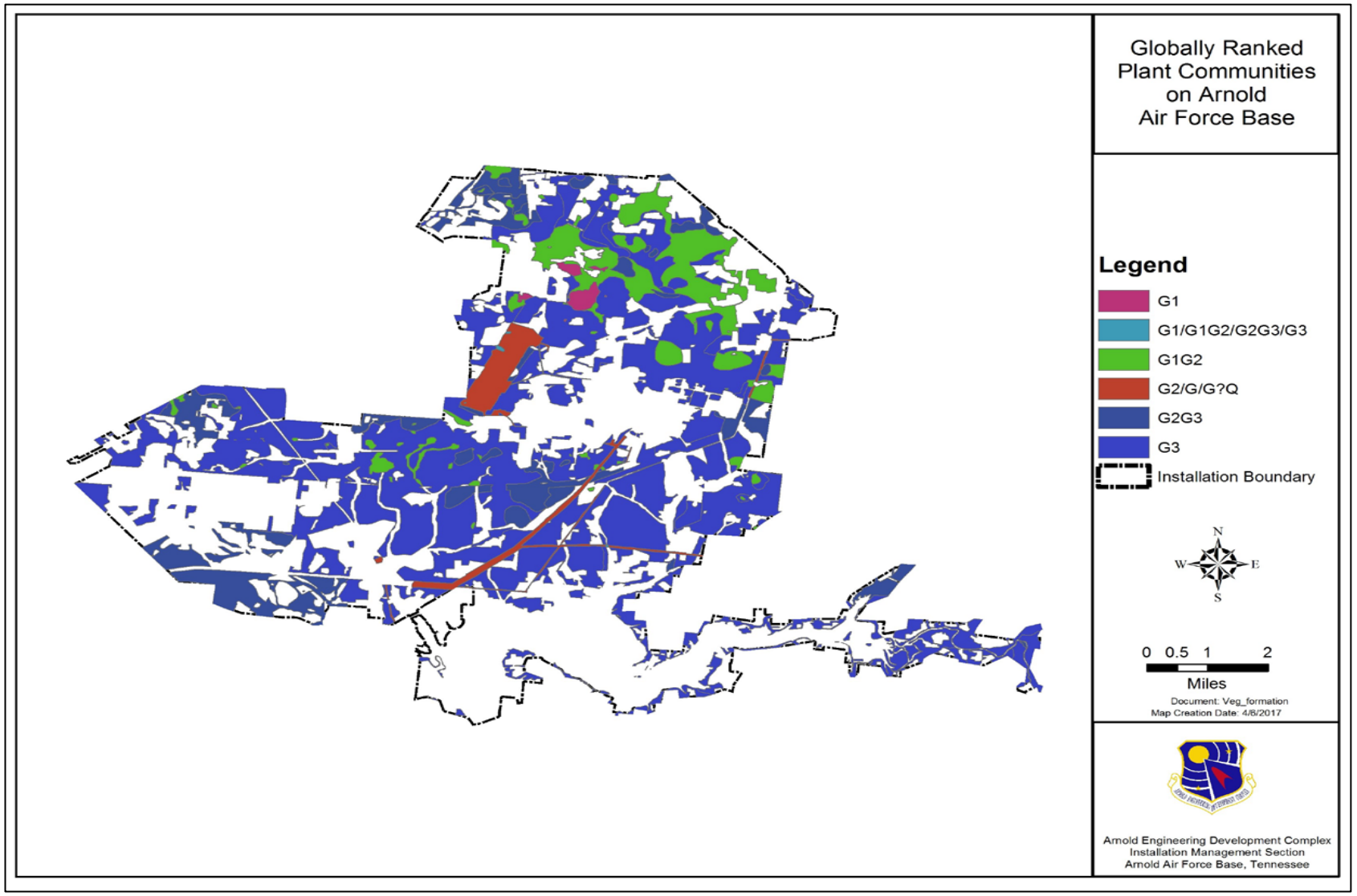

Figure 3-1. Globally Ranked Plant Communities at Arnold Air Force Base

The USFWS concluded in its Biological Opinion (#04ET10000-2015-F-0420) that routine training, land management, and Elk River Dam Operations at Arnold AFB are not likely to jeopardize the continued existence of the gray bat, Indiana bat, or northern long-eared bat (USFWS 2016a). The USFWS reached this conclusion by examining the current status of the species, the environmental baseline for the action area, and various possible effects on the species (including direct, indirect, interrelated and interdependent effects of the proposed federal action, and cumulative effects of other non-federal future actions that may occur in the action area, including state, tribal, local or private activities, and are reasonably certain to occur in the project area).

In the Biological Opinion, the USFWS determined that the proposed action may result in incidental take of the gray bat, Indiana bat, and northern long-eared bat (USFWS 2016a). They determined that incidental take would be exceeded when the take exceeds an unknown number of gray bats in 577 acres of summer foraging habitat, and an unknown number of Indiana bats and northern long-eared bats in 15,935 acres of suitable summer habitat, which is what has been exempted from the prohibitions of Section 9 of the Biological Opinion. Reasonable and prudent measures (RPMs) to minimize the take, and terms and conditions, that must be observed when implementing those RPMs, are also included in the Biological Opinion.

Each of the three bat species is briefly discussed below with a full treatment given in the USFWS Biological Opinion (USFWS 2016a). Arnold AFB submits an annual report to the USFWS regarding actions taken related to the Biological Opinion. The most recent annual report was submitted in January 2020 (Arnold AFB 2020b).

3.1.1 Gray Bat

3.1.1.1 Current Status and Known Distribution at Arnold AFB

Informal Section 7 consultations between representatives from Arnold AFB and the USFWS occurred in 1978, 1979, 1996, 2006, 2009, 2010, and 2011 (Arnold AFB 2020a). Formal consultation was concluded in 2016 (USFWS 2016a). As a result, a management action plan was developed to coordinate continued base operations and protection of the gray bat colony at Woods Reservoir Dam and associated foraging habitat.

The gray bat is federally listed due to declining numbers and loss of habitat. The species has been documented through captures and acoustic monitoring at several sites at Arnold AFB (**Figure 3-2**). A full treatment of the life history, threats, and recovery status is given in the 2016 Biological Opinion (USFWS 2016a).

The gray bat colony that resides at Arnold AFB at Woods Reservoir Dam is listed as a Priority 2 maternity colony in the USFWS Gray Bat Recovery Plan (USFWS 1982) and is one of a handful of maternity colonies known to use manmade structures for maternity roosts. Gray bat caves are prioritized in the USFWS Gray Bat Recovery Plan (USFWS 1982) as follows:

- Priority 1 – major hibernacula and most important maternity colonies
- Priority 2 – contain fewer bats, but are important for geographic or other reasons
- Priority 3 – require further investigation
- Priority 4 – all remaining known caves

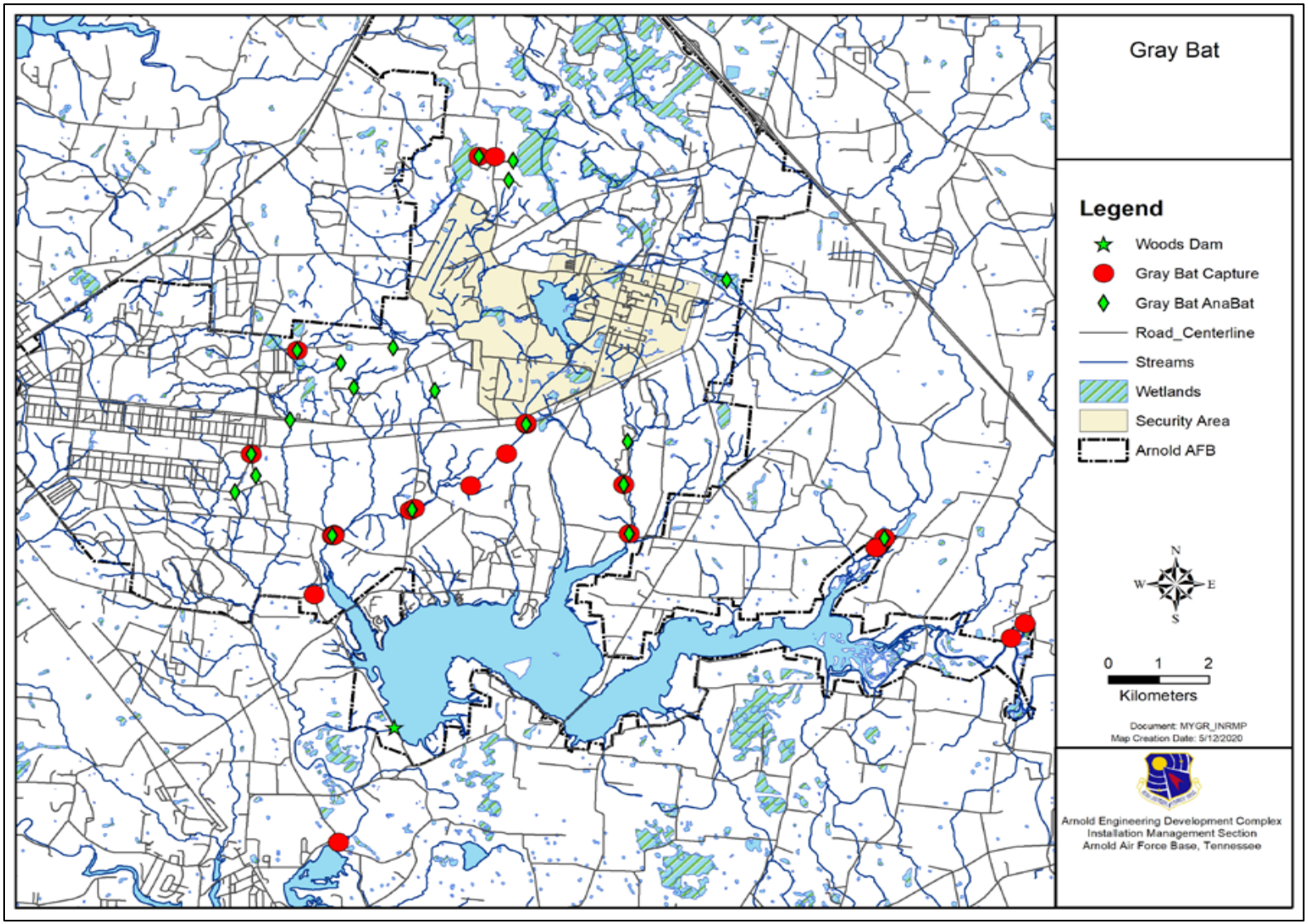

Figure 3-2. Gray Bat Locations at Arnold Air Force Base

Four gate rooms in the Woods Reservoir Dam house gate operation machinery. The maternity colony occupies gate room number 1. The bachelor colony occupies the remaining gate rooms. The expansion joints in the ceilings of the gate rooms are the primary locations used for roosting. The expansion joints have shields below them to prevent guano deposition on the machinery that is used in operating the gates. An estimated 1,009 bats used the Woods Reservoir Dam from 1 April through 15 October 2019 (Arnold AFB 2020b).

The Gray Bat Recovery Plan (USFWS 1982) recommends that possible impacts on gray bat foraging habitat be considered when planning any action within 15.5 miles of a roost. In addition to the Woods Reservoir colony, three known gray bat colonies off Arnold AFB have foraging areas that overlap portions of Arnold AFB, according to data from harp trap studies that capture bats as they exist caves (Arnold AFB 2020a). The harp traps are continually monitored, and bats are periodically removed. Bats are identified to species, sex, and age. Gray bats were also banded (Arnold AFB 2020a).

Using data from the harp trap studies in conjunction with mist net surveys and banding at Arnold AFB, it was hoped that the interconnectivity of colonies may be elucidated over time. This effort expanded in cooperation with other state and federal agencies in response to white nose syndrome (WNS) in 2008 (Arnold AFB 2020a). Banding and subsequent recaptures at these and other caves has allowed data to be gathered about gray bat migration.

In 2018, Arnold AFB funded a telemetry project to track gray bats to determine foraging areas, travel corridors, and day roost sites (Arnold AFB 2020a). Transmitters were attached to 15 adult males and 7 females. All females were captured at Beth Page Bridge. Females remained near the bridge and foraged mainly over the Elk River and Woods Reservoir at Arnold AFB (**Figure 3-3**). The males, however, traveled great distances foraging on and off base and roosting in caves up to 29 miles away (**Figure 3-3**).

3.1.1.2 Woods Dam Management Plan

The colony of gray bats inhabiting the dam is protected under the requirements of the ESA. The policy of Arnold AFB is to comply completely with the provisions of the ESA, while at the same time protecting the operational capability of Woods Reservoir Dam and ensuring freedom of action in case of an emergency that might endanger lives. This colony has been identified as a maternity colony and is highly vulnerable to disturbance during the period of inhabitance from 1 April through 1 November annually. Disturbance during the rearing period often results in high losses of young. Signs have been placed to warn personnel of the presence of the colony.

Due to the sensitivity of the species, the following operational procedures are followed:

1. Routine maintenance will only be performed during the annual period of 1 October to 1 April. Although sensitive to disturbance during all times of inhabitancy, the colony is most sensitive to disturbance from 1 April to 31 July while rearing offspring. During the period of inhabitancy, emergency maintenance must be coordinated, prior to execution, with the Test Support Division, Civil Engineer Branch, Installation Management Section (TSDCI) office through the Operations Center. The USFWS must be informed of the emergency as soon as possible by the Arnold AFB TSDCI office. This is not intended to compromise the integrity of the dam or any of its parts. Further coordination with the USFWS in

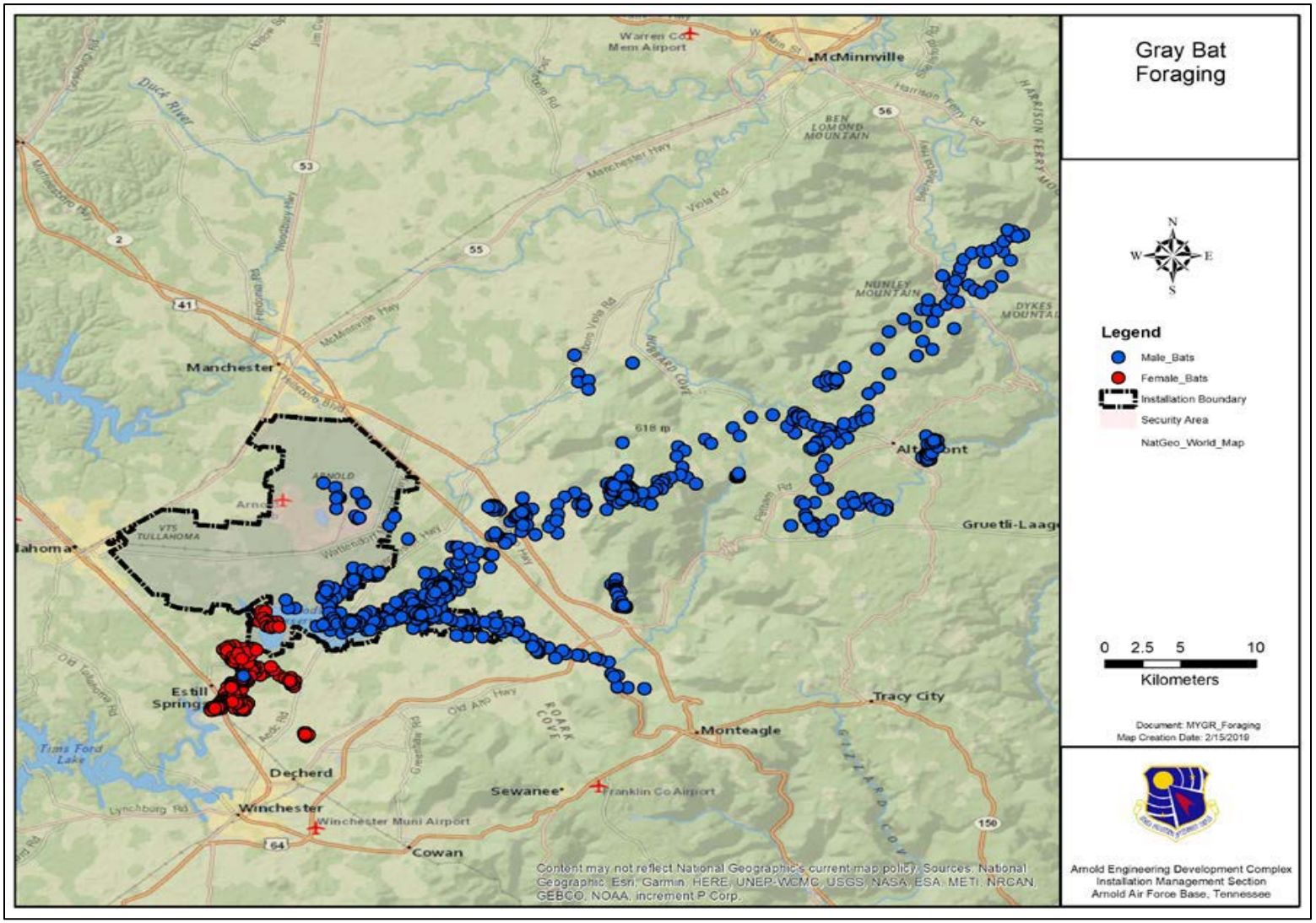

Figure 3-3. Female and Male Gray Bat Foraging Points at and near Arnold Air Force Base

accordance with the emergency consultation procedures contained in the ESA will be accomplished as soon as possible after the emergency is under control. At that time, the USAF will submit information on the nature of the emergency, and actions taken to control the situation. In addition, a statement will be included regarding the impacts on the gray bat colony and the habitat. The USFWS will evaluate the information and issue an after-the-fact Biological Opinion.

2. The Arnold AFB Roads and Grounds Department will coordinate cleanup of the gate control rooms with the TSDCI office as soon as possible after 1 October. Caulking of expansion seams in the areas of the dam inhabited by the bats is not a regular maintenance requirement and will not be performed during annual operations. The seams will not be cleaned with pressurized cleaners. All maintenance directly involving the seams will be evaluated by the TSDCI office and the USFWS prior to execution. The USFWS will be notified prior to cleaning of guano in order to permit population estimates by measuring the surface area of guano that accumulates during one year (this measurement has been made by Arnold AFB personnel since 1998). Guano samples for toxicological analyses will be collected following measurement for population estimates.

3. Service lights adjacent to the area where the bats roost must remain off when service is not being performed.

4. Photography and/or tourist-type visits to the areas inhabited by the bats are prohibited and are interpreted as “taking” under Section 2(a) (14) of the ESA. Periodic monitoring and observation of the colony will be carried out by the appropriate personnel permitted under the provisions of Section 10 of the ESA.

5. Generator operation and testing periods must be carried out during midafternoon, 1500 to 1800 hours, when impact to the bat colony will be minimal. Observations of the bats must be performed to determine if loud noise and low-frequency vibrations produced by the generator have any significant effect on the colony.

6. Normal procedures for operation of the dam have been reviewed and, other than as indicated above, should not be harmful to the bats. However, any nonroutine work operations that need to be performed in the areas inhabited by the bats or proximate to them, should be cleared through the TSDCI office which will contact the USFWS.

7. A maximum of two escorted entries between 1 August and 1 October in a calendar year are allowed. These entries include a combination of contractor prebid inspections and the USACE 5-year inspection of Woods Reservoir Dam. The contractor prebid inspections are not anticipated to occur on an annual basis.

8. If disturbances to the bat colony are detected, reinitiation of consultation and/or modification of Woods Reservoir Dam operations would be in order.

3.1.2 Indiana Bat

3.1.2.1 Current Status and Known Distribution at Arnold AFB

Two Indiana bats, one adult male and one juvenile female, were captured in the summer of 2010 at Arnold AFB (**Figure 3-4**). While the species has been documented from acoustic

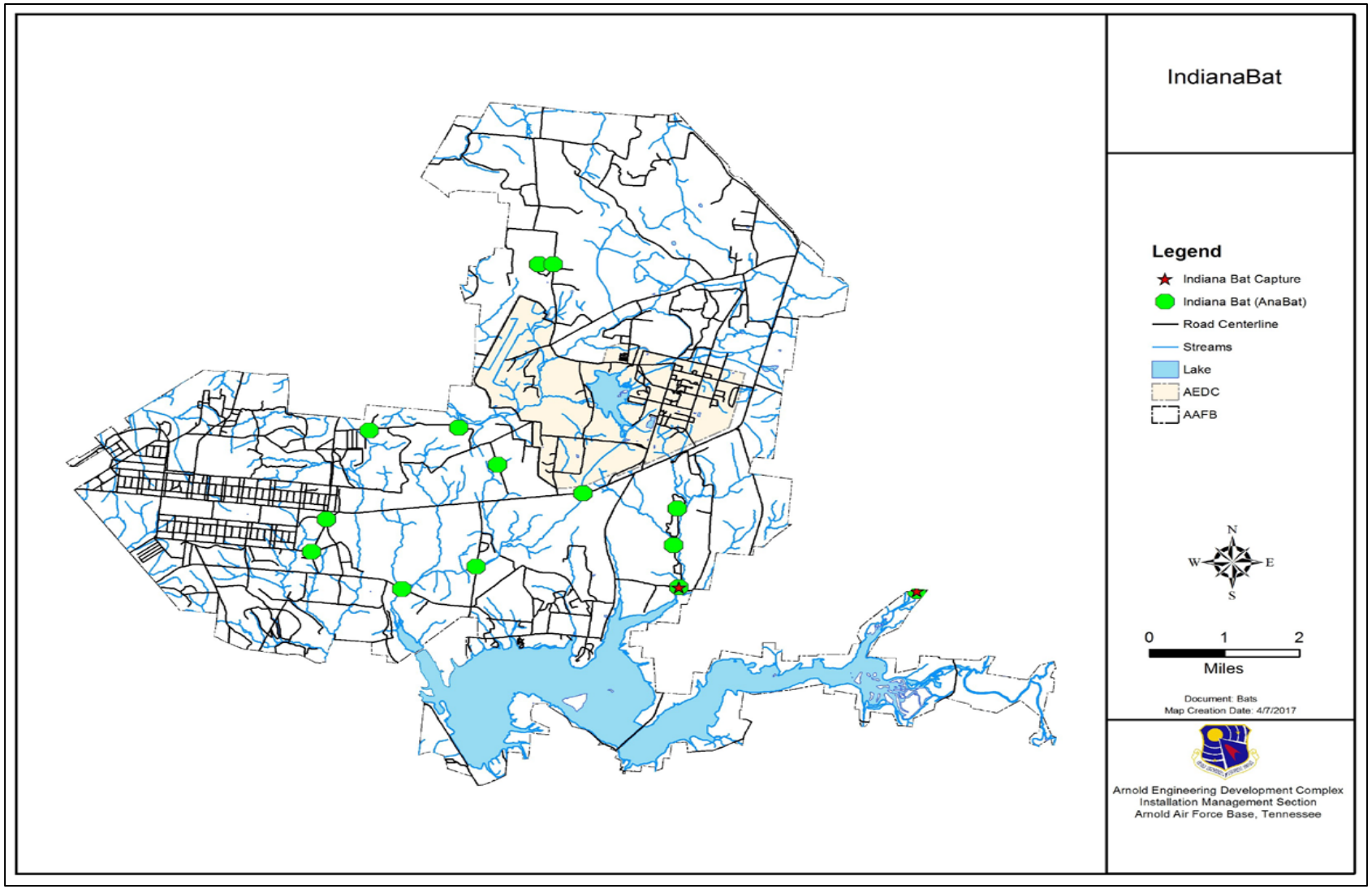

Figure 3-4. Indiana Bat Locations at Arnold Air Force Base

recordings at several sites, these represent the only captures of Indiana bats at Arnold AFB (Arnold AFB 2020a).

The Indiana bat was officially listed as an endangered species on 11 March 1967 (Federal Register 32[48]:4001). The ESA extended full protection to the species. The USFWS (1983) first published a recovery plan for the Indiana bat in 1983. A revised Indiana Bat Draft Recovery Plan was issued in April 2007 (USFWS 2007). The recovery plan identifies the following objectives: (1) conserve and manage hibernacula and their winter populations; (2) conserve and manage summer habitat to maximize survival and fecundity; (3) plan and conduct research essential for recovery; and (4) develop and implement public information and outreach program (USFWS 2007).

No caves exist at Arnold AFB to provide winter hibernacula for bats; however, Indiana bats form maternity colonies in the summer under loose bark of trees in habitats similar to those found at Arnold AFB (USFWS 1999). A full treatment of the life history, threats, and recovery status is given in the 2016 Biological Opinion (USFWS 2016a).

3.1.3 Northern Long-Eared Bat

3.1.3.1 Current Status and Known Distribution at Arnold AFB

The northern long-eared bat was listed as threatened on 4 May 2014. This species is well documented at several capture sites across Arnold AFB (**Figure 3-5**). Northern long-eared bats typically utilize multiple roosts within an area making the protection of single roosts unfeasible. Management of forests tracks to ensure roost site availability and use are essential to the conservation of northern long-eared bats in forested areas. A full treatment of the life history, threats, and recovery status is given in the 2016 Biological Opinion (USFWS 2016a).

3.1.4 Bald Eagle

3.1.4.1 Current Status and Known Distribution at Arnold AFB

The bald eagle (*Haliaeetus leucocephalus*) is a large raptor (30 to 43 inches tall) with a wingspan of seven to eight feet (Nicholson 1997). Known for being the national bird of the United States, the bald eagle occurs from Alaska to California and from Maine to Florida (NatureServe 2005). Bald eagles that reside in the northern United States and Canada migrate to areas of warmer southern climates in the United States. The bald eagle is protected in the United States by the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act (NatureServe 2005). It is also listed as WNM in Tennessee (Withers 2004). The bald eagle was removed from the endangered species list on 28 June 2007.

A pair of bald eagles began nesting at Woods Reservoir for the first time in 2009 (Arnold AFB 2020a). The first nest was built along the Elk River Dam Road. This one was abandoned in favor of a nest approximately 20 meters from the Arnold AFB boundary on private property that was in use through Spring of 2018. In 2016, a juvenile pair built a partial nest at Camp Arrowhead, a Boy Scout Camp at Arnold AFB property, which has since fallen.

In 2018, a bald eagle nest was built just off Northshore Road. In order to determine which nest was active, this nest was checked whenever the Woods Reservoir nest was checked. While adults were seen near both nests in 2019, they were never seen actually sitting on either (Arnold AFB 2020a). A new nest was discovered near Woods Reservoir in 2020 and was

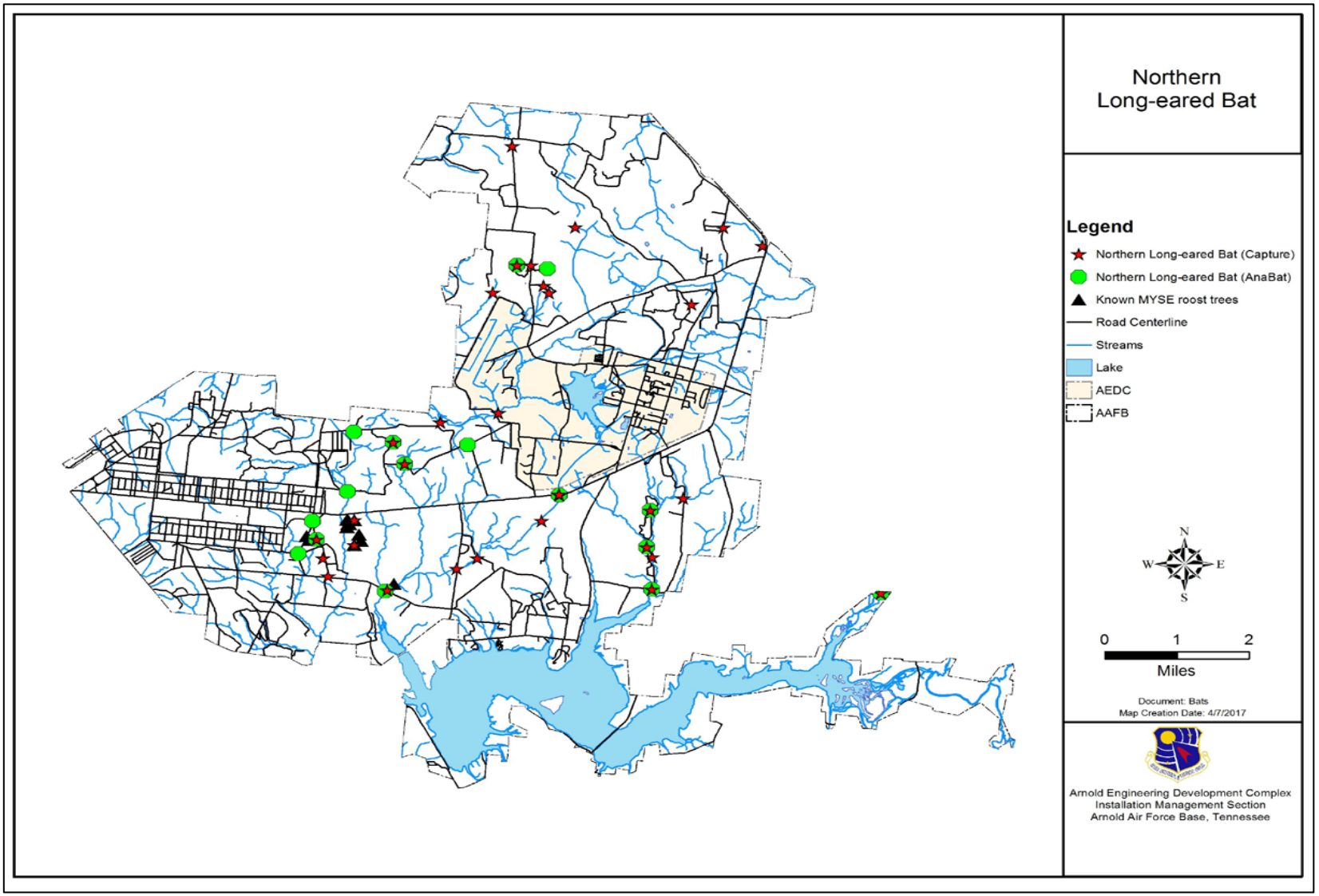

Figure 3-5. Northern Long-Eared Bat Locations at Arnold Air Force Base

determined to be active. This nest was most likely active in 2019 based on anecdotal observations from Arnold AFB employees in the vicinity. An adult was also seen sitting on the nest used prior to 2019 (Arnold AFB 2020a).

3.2 MONITORING AND INVENTORY OF FEDERALLY PROTECTED SPECIES

3.2.1 Bats

The Facility Support contract requires that a USFWS-issued Endangered/Threatened Species Authorization Permit be maintained related to the study of the Indiana bat, gray bat, and northern long-eared bat at Arnold AFB. As part of its agreement with the USFWS, Arnold AFB monitors gray bat, Indiana bat, and northern long-eared bat populations at Arnold AFB. Baseline bat inventories began in 2000 and have been conducted annually since. Inventory efforts allow managers to more fully understand the occurrence, distribution, and relative abundance of bat species at Arnold AFB. Bat surveys at Arnold AFB have employed mist nets since 2000 with a limited use of acoustical monitoring systems in areas where mist netting was not applicable prior to 2014. The most recent annual monitoring results are detailed below (Arnold AFB 2020b).

Six sites were surveyed using standard mist netting protocols in summer 2019 at Arnold AFB (**Figure 3-6**). A seventh site, Beth Page Bridge, south of the Installation near Estill Springs (**Figure 3-6)**, was sampled as a cooperative effort between Arnold AFB, University of the South, and TWRA using a mist net system lowered from the roadbed. In 2019, five species were captured, with gray bats captured at five locations and a tricolored bat captured at one location. No northern long-eared or Indiana bats were captured during 2019 monitoring (Arnold AFB 2020b).

Acoustic monitoring stations have been deployed at five permanent sites at Arnold AFB since the 2014-2015 timeframe (Arnold AFB 2020b). During the most recent monitoring (November 2018 – October 2019), gray, Indiana, and northern long-eared bats were recorded (Arnold AFB 2020b). An increase in the average number of gray bat calls was recorded in 2018 but declined somewhat even though calls recorded remained relatively high in 2019 (Arnold AFB 2020b). Some limited winter activity at Arnold AFB is apparent in gray bats (Arnold AFB 2020b). Indiana bats are still being documented acoustically at monitoring stations; however, this species has not been captured on Arnold AFB since 2010 (Arnold AFB 2020b). Northern long-eared bats are still being documented acoustically at monitoring stations at very low levels; however, this species is more difficult to detect acoustically. No northern long-eared bats have been captured since 2015 (Arnold AFB 2020b).

3.2.2 Bald Eagles

Monitoring for bald eagles at Arnold AFB is conducted opportunistically starting around the end of November and ending around the middle of February (Arnold AFB 2020a). Bald eagle monitoring points were selected subjectively based on the area of shoreline visibility. A pair of bald eagles has nested near Woods Reservoir since 2010. The nest is monitored opportunistically to determine nest success.

Fledge rates determined from monitoring data range from three (2010 through 2014) to zero (2015 to 2016) to one (2017 to 2018) (Arnold AFB 2020a). Two first-year birds were observed around the Woods Reservoir in 2020, and it is assumed they fledged from the new nest (Arnold AFB 2020a).

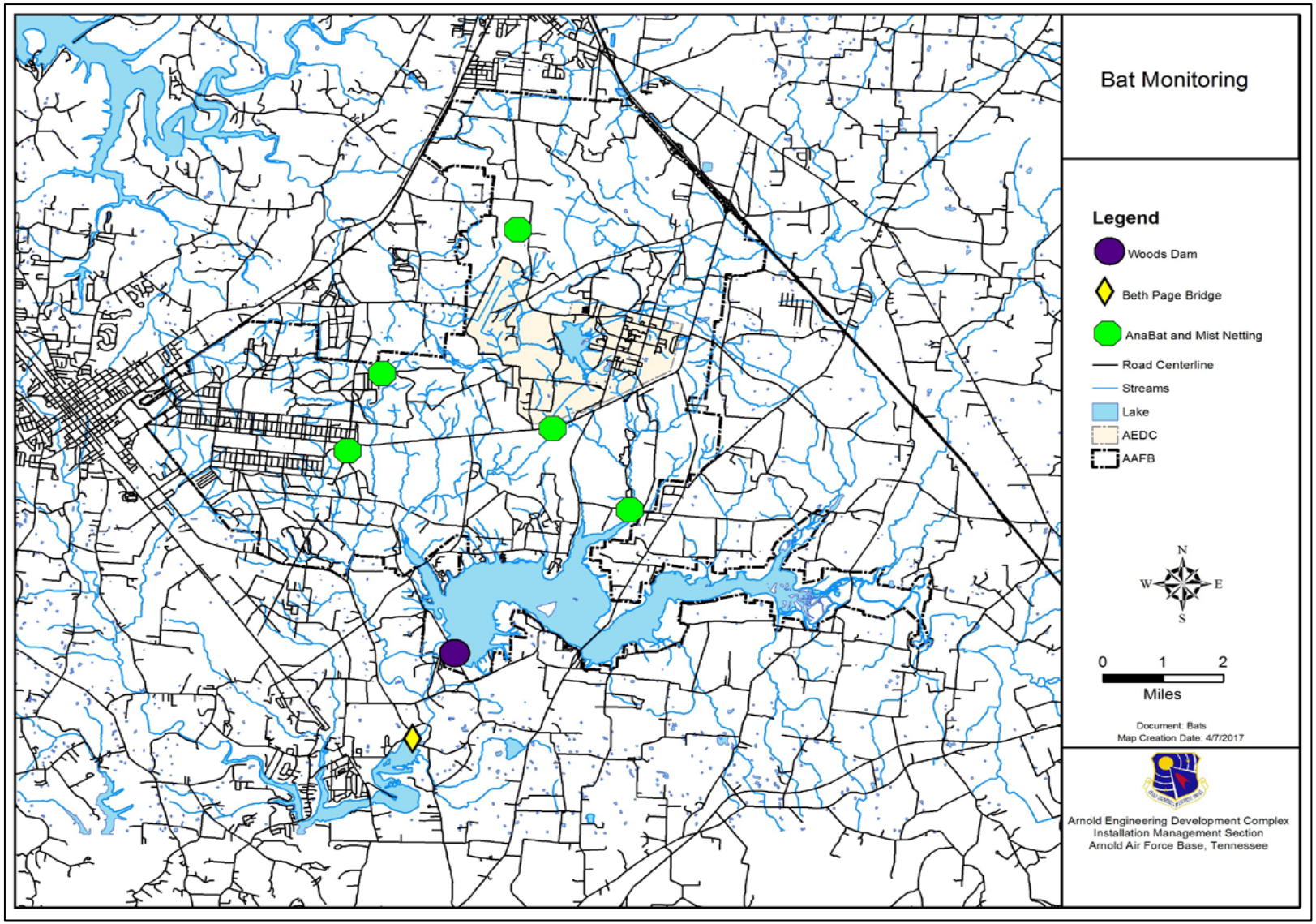

Figure 3-6. Bat Monitoring Sites at Arnold Air Force Base

3.3 STATE-PROTECTED SPECIES

3.3.1 Plants

3.3.1.1 Eggert's Sunflower

Current Status and Known Distribution at Arnold AFB

Eggert's sunflower (*Helianthus eggertii*) is a perennial sunflower of colonial habit that is distributed within the Highland Rim, Central Basin, and Shawnee Hills sections of the Interior Low Plateau region with outlying records on the Cumberland Plateau. The species is typically associated with barrens community types in Alabama, Kentucky, and Tennessee (White and Ratzlaff 2000).

Arnold AFB is home to the largest known occurrence of Eggert's sunflower. This species was, until 2005, listed as federally threatened. Management and monitoring have continued at Arnold AFB to the present, to assist USFWS with its delisting requirements and to fulfill the 2004 Cooperative Management Agreement (CMA) (Arnold AFB 2020a). Eggert's sunflower is considered and incorporated into management via the Integrated Natural Resources Management Plan (INRMP) process, Eggert's sunflower monitoring is coordinated with USFWS (Arnold 2020a).

The USFWS removed Eggert's sunflower from the federal List of Endangered and Threatened Plants on 18 August 2005 "…because recovery actions have secured a number of populations and identified additional populations not previously known" (USFWS 2005). Arnold AFB is the site of 11 of the 27 secured populations and was a primary factor in the rationale for delisting. The ESA further requires USFWS to monitor delisted species and safeguard against unforeseen threats to the species' persistence. The USFWS therefore drafted a Post-Delisting Monitoring Plan (PDM) for Eggert's sunflower with assistance from Arnold AFB staff.

The PDM outlined a protocol to assess select representative locations, by capturing stem numbers, flowering percentages, and potential threats to each site. The plan relied in large part on continued coordination with Arnold AFB's management and monitoring programs. The 2004 CMA provided binding support needed to help justify both the USFWS delisting decision and its monitoring plan. The CMA committed Arnold AFB to (1) management and monitoring specifically for Eggert's sunflower through 2006 and (2) including the plant and its continued indirect management, after 2006, in the basewide, comprehensive, and recurrent INRMP.

Monitoring and Inventory

Data collection at Arnold AFB for the field seasons 2004-2009 followed the protocols of the PDM, with the objectives of determining population trends on base and ensuring the species' persistence. Unfortunately, the sampling design came to be at odds with the intent of the CMA. Initial monitoring assumptions became incompatible with conservation and management strategies. Many of the sampling locations were marginal or isolated sites where management actions for barrens and Eggert's sunflower were necessarily limited or absent. Relatively few monitoring points were located in restoration areas.

This design has provided inadequate information about the sunflower's response to management (Arnold AFB 2020a). Instead, data for the years 2004-2009 show steady and, in retrospect, very predictable declines in stem numbers at points outside of the restoration program. Monitoring for the 2010 season was therefore designed to present a more accurate picture of the species' populations in active management areas. The undertaking was a

thorough survey of select known and possible locations of sunflower occurrences. The dual objectives were to verify the persistence of previously documented occurrences and to document new occurrences in barrens restoration areas. Given the documented extent of sunflower locations, a basewide resurvey was not possible. A set of high-value sites were selected for fieldwork, on the basis of historic location and stem numbers, barrens management, and the practicality of completing a number of meaningful sites and acreages.

In an effort to reestablish population conditions due to a hiatus in surveys, the USFWS proposed a two-year monitoring plan for 2014-2015. The objectives of this effort were to establish current population estimates or trends and expand on past monitoring efforts. Monitoring data were collected in barrens conservation areas and in areas not considered barrens conservation areas to determine the “persistence” of the species in areas that might contain suitable habitat. These non-barrens conservation areas consisted of ROWs and areas adjacent to existing barren management areas. The 2014 survey indicated in some areas where prior barrens management has occurred that Eggert’s sunflower populations have responded well and are still maintaining viable populations. This could be attributed to historic intensive management of barrens habitats from 1997-2007. However, survey results in other barrens management areas indicated that the management goals and objectives of “maintaining and expanding barrens habitats at Arnold AFB” from the 2007-2011 INRMP were not met at all locations.

In 2016 and 2017, a survey effort was undertaken by the USFWS to reassess locations surveyed by Arnold AFB in 2010 (ATA 2011) and selected points surveyed by the USFWS (2015) in 2014 in order to determine the status of the species at Arnold AFB and update management recommendations (USFWS 2016a). Where possible, 2010 points were used as a reference, as it was a more comprehensive study of select Eggert’s sunflower populations than the 2014 survey. Each known location from 2010 and some locations from 2014 were surveyed along with additional walking transects in several new management units (USFWS 2016b).

Routine prescribed burning appeared to have beneficial effect on Eggert’s sunflower populations in many management units. It is notable that this positive correlation with prescribed burning was evident even in 2016, when drought conditions potentially biased monitoring results negatively, either due to true declines in Eggert’s sunflower abundance or due to reduced detectability of the species caused by advanced senescence in the latter part of the monitoring season (USFWS 2015). The 2016 USFWS report concluded that Arnold AFB had not fully met goals for barrens habitat, most notably the barrens conservation areas at the airfield.

It is likely that Eggert’s sunflower populations in the airfield will continue to decline due to airfield reactivation in 2020 (Arnold AFB 2020a). Survey points from 2010, select geospatial data from our 2014, 2016 and 2017 surveys, and management unit boundary information were utilized in determining potential survey locations in 2018. In coordination with AEDC personnel, HEG001, 9299, and other management units in the Camp Forrest area south of Wattendorf Memorial Highway (**Figure 3-7**) were selected as the primary focus areas in 2018, as access was restricted to other management units at Arnold AFB by the TNARNG. Management units with positive Eggert’s sunflower survey results in 2018 are presented in **Figure 3-7**.

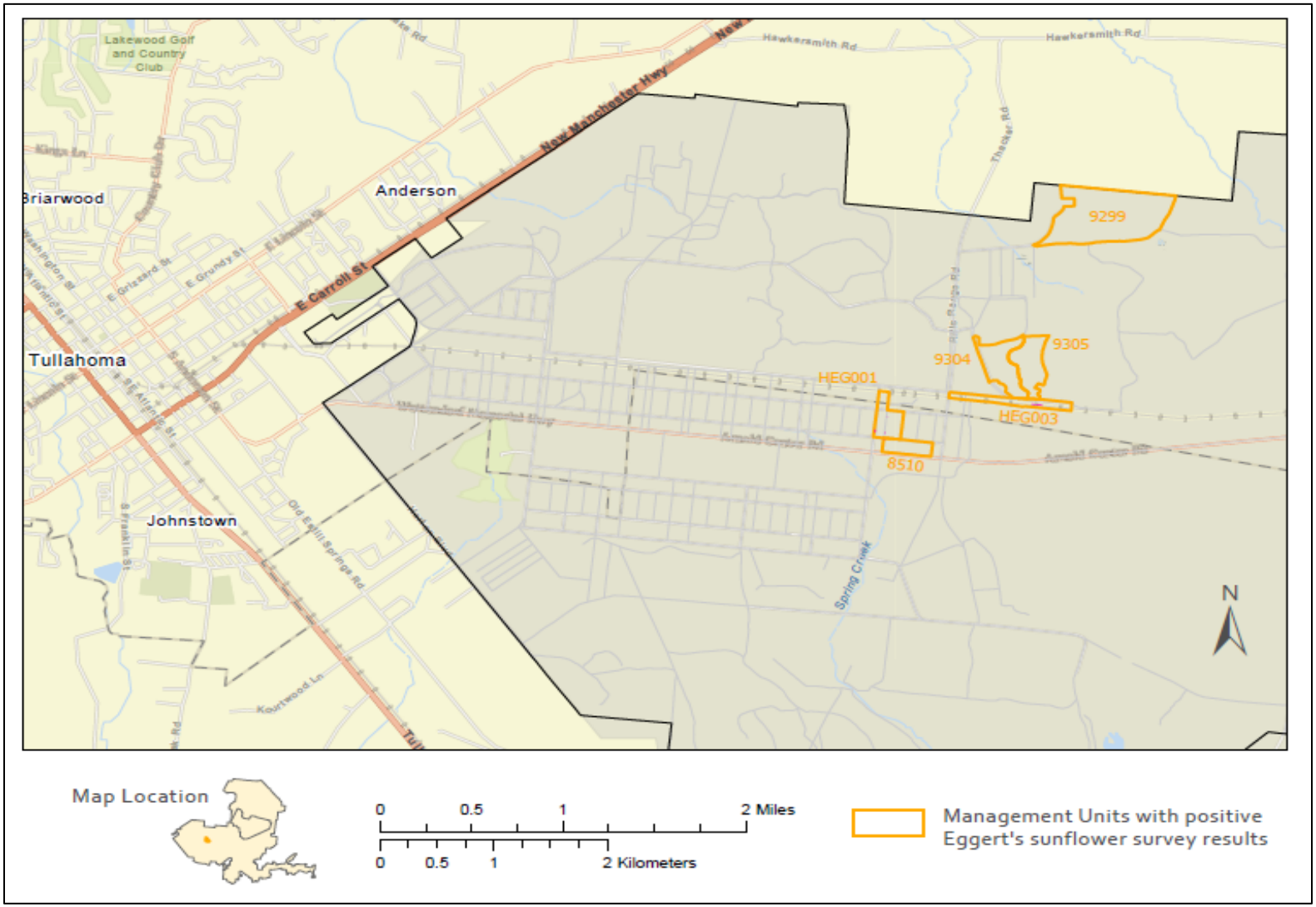

Figure 3-7. Management Units at Arnold Air Force Base with Positive Eggert's Sunflower Survey Results in 2018

3.3.1.2 Prairie Gentian

Current Status and Known Distribution at Arnold AFB

Prairie gentian (*Gentiana puberulenta*) is an upright perennial with showy, deep purple flowers that bloom in autumn. It prefers mesic to dry prairies, gravelly hill prairies, barrens, and limestone glades. Its distribution spans the whole eastern half of North America, as far west as Oklahoma, but is rare in many states. Prairie gentian is often considered an indicator plant of original prairie remnants or high-quality habitat. It is state listed as endangered in Tennessee and is so infrequent that its occurrence at Arnold AFB is potentially one of three known populations in the state (Arnold AFB 2020a). Previous records indicated three populations were present on base at one time, all in grassland barrens habitat (Arnold AFB 2020a).

Monitoring and Inventory

In 2018, two of the original three known populations were found, both on the airfield. The population on the west side of the airstrip was surveyed at length in October 2018. Thirty-three plants were discovered, all flowering (Arnold AFB 2020a). Three prairie gentian plants were found on the east side of the airstrip, but the growing season came to a close before a full survey could be completed (Arnold AFB 2020a). The location of population previously reported along Wattendorf Memorial Highway across from Saltwell Hollow was not found during surveys during the 2017 or 2018 field season. There were no surveys during the 2019 field season.

3.3.1.3 Southern Twayblade

Current Status and Known Distribution at Arnold AFB

Southern twayblade (*Listera australis*) is a diminutive orchid distributed across eastern North America, from Florida to Quebec and around the southern Gulf Coast states to Texas. It is found in low, moist woods with rich humus and a shady overstory. It is only known to occur in Fayette and Coffee counties in Tennessee and is the earliest orchid to bloom in the state. The species state-listed as endangered, though considered globally secure.

Southern twayblade is known to occur in at least three sites at Arnold AFB: one population within Sinking Pond, one along Loop Road, and one near Hunt's Creek (Arnold AFB 2020a). It is likely there are more populations that remain undiscovered considering the large amount of suitable habitat available on base, as well as the small size, brownish coloring, and short flowering period that make the plant extremely easy to miss.

Monitoring and Inventory

A full southern twayblade census was performed on the population next to Loop Road in 2017 and 2019 (Arnold AFB 2020a). This population is of particular interest because it is interspersed with the only known population of least trillium (*Trillium pusillum* var. *pusillum*) on base. In 2017, a total of 116 individuals were found, 4 flowering and 112 nonflowering. In 2019, a total of 493 individuals were found, 286 flowering and 207 nonflowering. The higher numbers may reflect an increase in rainfall in the years since the 2017 survey, which was conducted directly after a drought year.

3.3.1.4 Kentucky Lady's Slipper

Current Status and Known Distribution at Arnold AFB

Kentucky lady's slipper (*Cypripedium kentuckiense*) is a large, showy orchid with a thick, creeping rhizome and hairy stem. It typically grows to 18 to 30 inches tall and produces the

largest flowers of any known lady's slipper. It is native to damp low woodlands, rich alluvial floodplains, moist woodland slopes, and along streams in widely scattered areas from Virginia to Kentucky to Alabama and further west to eastern Oklahoma and eastern Texas.

Kentucky lady's slipper is found at one location at Arnold AFB along Rowland Creek (Arnold AFB 2020a). The habitat consists of alluvial woods along a creek exhibiting a patchwork of shallow wet depressions and higher, more typical alluvial (mesic) conditions. The canopy/ subcanopy was dominated by red maple while shrub, and herbaceous layer dominants varied from spot to spot.

Monitoring and Inventory

The one Kentucky lady's slipper population at Arnold AFB was discovered in the early 1990s and visited infrequently through the years (Arnold AFB 2020a). Most growing season visits have indicated some degree of reproductive success (juveniles present). In 2016, a subsection of the Kentucky lady's slipper site was surveyed. The plants counted were categorized by the following life stages: nonflowering (sterile) adults, flowering adults, and juveniles (two to four leaves). During this survey, five individuals were found, two flowering adults and three sterile adults (Arnold AFB 2020a). The most recent full population census was completed in May 2017. Though some groups are separated by water features, the total population count was 47 individuals (Arnold AFB 2020a). The population contained 13 flowering adults, 26 nonflowering adults, and eight juveniles (Arnold AFB 2020a).

3.3.1.5 Broadleaf Barbara's-Buttons

Current Status and Known Distribution at Arnold AFB

Broadleaf Barbara's-buttons (*Marshallia trinervia*) is a rhizomatous perennial herb endemic to the southeastern United States. It is known from several states, including Tennessee, but is nowhere common. Broadleaf Barbara's-buttons is restricted to specialized seepy calcareous habitats, which is a habitat generally unsuited for other uses. There are four known populations at Arnold AFB along Brumalow Creek, Rowland Creek, and two occurrences on Spring Creek (Arnold AFB 2020a).

Monitoring and Inventory

The four known broadleaf Barbara's-button populations were discovered at Arnold AFB in 1990 (Arnold AFB 2020a). The populations have shown both sexual and asexual reproduction.

3.3.1.6 Least Trillium

Current Status and Known Distribution at Arnold AFB

Least trillium is a small herb with one whorl of three leaves and a solitary flower elevated 0.5 to 1 inches above the leaves. The showy flowers are initially white and change to pink or rose-purple as they age and sometimes are as large as 2.5 inches in diameter. Flowers are solitary and nearly sessile on the bracteal leaves. The species prefers wetter habitats, typically of hardwood bottoms and swamps in areas remaining moist but not permanently or even seasonally inundated. However, least trillium may also be found in drier woodlands.

Only one occurrence/population of least trillium is known to occur at Arnold AFB, which is located in the northern portion of the complex near Hunt Creek Road. The site is previously disturbed and was selectively thinned in 1982/1983.

Monitoring and Inventory

The one least trillium population at Arnold AFB was discovered in 1993 and visited infrequently through the years (Arnold AFB 2020a). All growing season visits have indicated some degree of reproductive success (juveniles present), with surveys showing both decreases and increases in reproductive individuals. A full census of least trillium was completed in April 2017 and 2019. In 2017, the population count was 571 individuals (Arnold AFB 2020a). Though this number is significantly lower than previous surveys from the early 2000s, the population dip is currently believed to be related to drought conditions in 2016 (Luebehusen 2016), rather than the result of land management issues.

In 2019, the population comprised 688 individuals: 68 reproductive (flowering), 300 adult but nonreproductive, and 320 juveniles (one leaf) (Arnold AFB 2020a). The increase in population may be due to increases in rainfall over the last few years.

3.3.2 State-Listed Animals

3.3.2.1 Northern Pine Snake

Current Status and Known Distribution at Arnold AFB

The northern pine snake (*Pituophis melanoleucus melanoleucus*) is a large, secretive, fossorial (burrowing) terrestrial reptile that is limited to a series of apparently disjunct populations from the Atlantic Coastal Plain to the Interior Low Plateau (Conant and Collins 1991) of the eastern United States. The subspecies is listed as threatened in Tennessee (Withers 2004). The northern pine snake in the southeastern United States continues to be a species of conservation concern in Kentucky, Alabama, Georgia, Mississippi, and the Carolinas, but more biological research and field study are needed to determine its conservation status (Jordan 1997).

The majority of northern pine snake occurrences at Arnold AFB are in the South Camp Forrest area with scattered occurrences in other locations. However, no estimate of actual population density has been made.

Monitoring and Inventory

Previously, box traps were used to survey and monitor herpetofaunal populations across Arnold AFB; however, this effort is no longer ongoing (Arnold AFB 2020a).

3.3.2.2 Henslow's Sparrow

Current Status and Known Distribution at Arnold AFB

The Henslow's sparrow is a small to medium-sized sparrow with a relatively short tail and large head. It is typically found in tall, dense grass and rarely seen unless flushed or chased. When flushed, these birds often have a tendency to drop to the ground and run instead of fly. This behavior caused Audubon to refer to the bird as a "mouse with wings" (Pruitt 1996). These secretive birds are generally drab in color but have intricately patterned plumages. The olive-green head and the extensive rufous on the wings of Henslow's sparrow help to distinguish it from the other grassland sparrows (Reinking 2002). Other characteristics include a large gray bill, dark lateral throat stripes, and a finely streaked breast (Sibley 2000). The elusive nature of the Henslow's sparrow makes visually identifying the bird difficult in the field; therefore, the species song is used to reliably identify it. David Sibley (2000) describes the song as a "dry, insect like, feeble hiccup tsezlik or tsillik."

The USFWS identified Henslow's sparrow as a "bird of conservation concern" (USFWS 2008). It has been listed as endangered, threatened, sensitive, species of concern, or potentially in need of management in 22 states, and it is designated as an endangered species in Canada (Burhans 2002). It is listed as threatened in Tennessee. At Arnold AFB, Henslow's sparrows occur on the airfield and model airfield (Arnold AFB 2020a). Additional populations previously occurred at the Tullahoma airport and Bark Camp Barrens, but neither population has been documented recently (Arnold AFB 2020a).

Monitoring and Inventory

Integrated monitoring points on the airfield and model airfield grasslands identified only two Henslow's sparrows in 2019, which was down from 11 birds in 2017 but consistent with two at the same points during 2008 monitoring (Arnold AFB 2020a). Two adult female Henslow's sparrows were banded in 2019 and had smooth brood patches, indicating they had successfully produced young (Arnold AFB 2020a). However, it is unknown if any fledged.

3.3.2.3 Bachman's Sparrow

Current Status and Known Distribution at Arnold AFB

Bachman's sparrow (*Aimophila aestivas*) is listed as endangered in Tennessee and as a species of "management concern" by the USFWS. It is a species of open grasslands with scattered trees (Hamel 1992). At Arnold AFB, this species occurs sporadically and is typically associated with young (3- to 10-year-old) pine plantations; however, it has not been documented at Arnold AFB in approximately 15 years (Arnold AFB 2020a).

Monitoring and Inventory

No specific monitoring and inventory protocols have been developed for Bachman's sparrow (Arnold AFB 2020a). It is hoped that this species will benefit from restoration of larger grassland/savanna/woodland blocks (Arnold AFB 2020a).

3.3.2.4 Little Brown Bat

Current Status and Known Distribution at Arnold AFB

The little brown bat (*Myotis lucifugus*) is listed as a threatened species in Tennessee. This species has a long and narrow tragus. Dorsal fur is bicolored when parted. Calcar is not keeled. Wingspan is 9 to 11 inches. It roosts in hollow trees, under loose bark, in barns, old houses, and attics and hibernates in caves. It only has one pup per year, but may live over 30 years (Choate et al. 1994). It is widely distributed across North America from Alaska to Mexico (Choate et al.1994). At Arnold AFB, little brown bats have been identified from both karst wetlands and streams and springs (**Figure 3-8**).

Monitoring and Inventory

As with other WNS-susceptible species, captures at Arnold AFB have declined (Arnold AFB 2020a). The exception for little brown bats is the Beth Page Bridge location where they appear to be holding on.

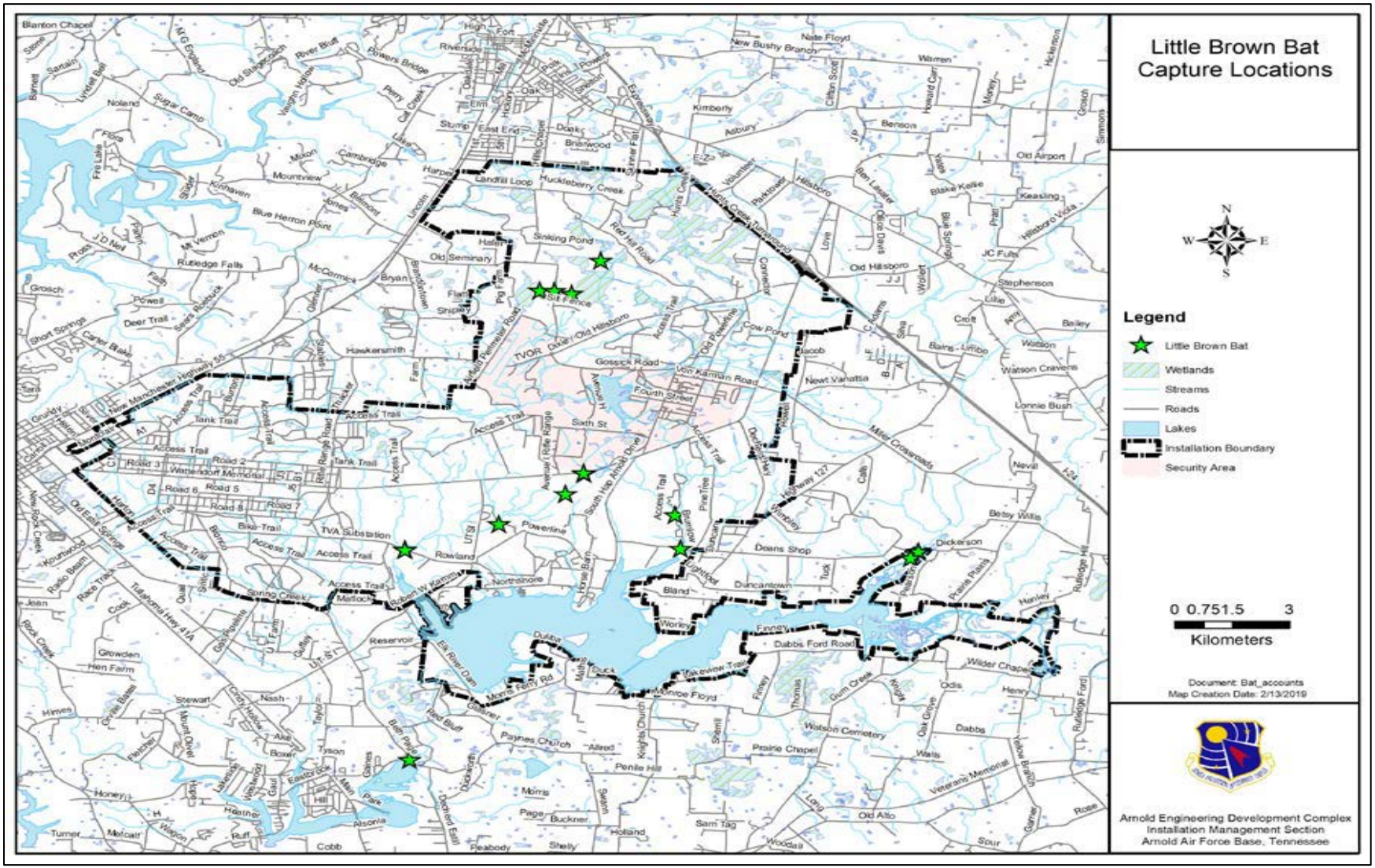

Figure 3-8. Little Brown Bat Capture Locations at Arnold Air Force Base

A recapture of an individual initially banded at Beth Page Bridge at a cave on the University of the South Domain suggests this species might only travel short distances in migration (Arnold AFB 2020a).

A telemetry study in 2015 showed that the little brown bat colony at Beth Page Bridge used Woods Reservoir extensively for foraging and identified two additional artificial roosts—an abandoned house and a bat house—that were used as alternate roosts (**Figure 3-9**).

3.3.2.5 Tricolored Bat

Current Status and Known Distribution at Arnold AFB

The tricolored bat (*Perimyotis subflavus*) is listed as a threatened species in Tennessee. Its tragus is short and blunt. The dorsal fur is tricolored when blown apart and its reddish-orange forearm contrasts sharply with the black wing membrane. Wingspan is 8 to 10 inches. Tricolored bats summer in trees and hibernates in caves. It usually has twins and a lifespan of up to 14 years (Choate et al.1994).

This species is widely distributed throughout most of eastern North America (Choate et al. 1994). At Arnold AFB, it has been identified from both karst wetlands and streams and springs while a foraging study showed it using mostly open water (**Figure 3-10**). It has been impacted heavily by WNS, with captures being significantly reduced (Arnold AFB 2020a).

Monitoring and Inventory

In 2018 Arnold AFB funded a spring migration telemetry project in hope that individuals tracked from a nearby cave would use Arnold AFB property, providing more information on habitat use to add to the previous study. While this did not happen, the data gained provided insight into the previously undocumented regional migration by this species. One individual was followed for two nights over a distance of 150 miles, representing the longest complete migration track recorded for this species (Arnold AFB 2020a).

3.3.3 Tennessee Greatest Conservation Need Species and Wildlife in Need of Management

3.3.3.1 Four-Toed Salamander and Barking Treefrog

Current Status and Known Distribution at Arnold AFB

The barking treefrog (*Hyla gratiosa*) and four-toed salamander (*Hemidactylium scutatum*) are both listed as Greatest Conservation Need (GCN) species, and the four-toed salamander is listed as WNM in Tennessee by TWRA. The barking treefrog occurs in disjunct populations in Tennessee (Wilson 1995) but is fairly common at Arnold AFB (Arnold AFB 2020a). It is the largest treefrog on the Installation, and it breeds in wetland depressions surrounded by woodlands.

The four-toed salamander is a northern species that occurs in disjunct relict populations in the Southeast (Wilson 1995). This species deposits its eggs in moss on the edges of wooded wetlands or small streams in late February and March. At Arnold AFB, suitable wetland habitat is common, and populations found at a given time at a given wetland can be considered part of the larger metapopulation (Arnold AFB 2020a). Movement of four-toed salamanders from one wetland to another is probably not uncommon, especially in times of drought, familiarity with alternate wetlands would be important to the survival (Bailey et al. 2000).

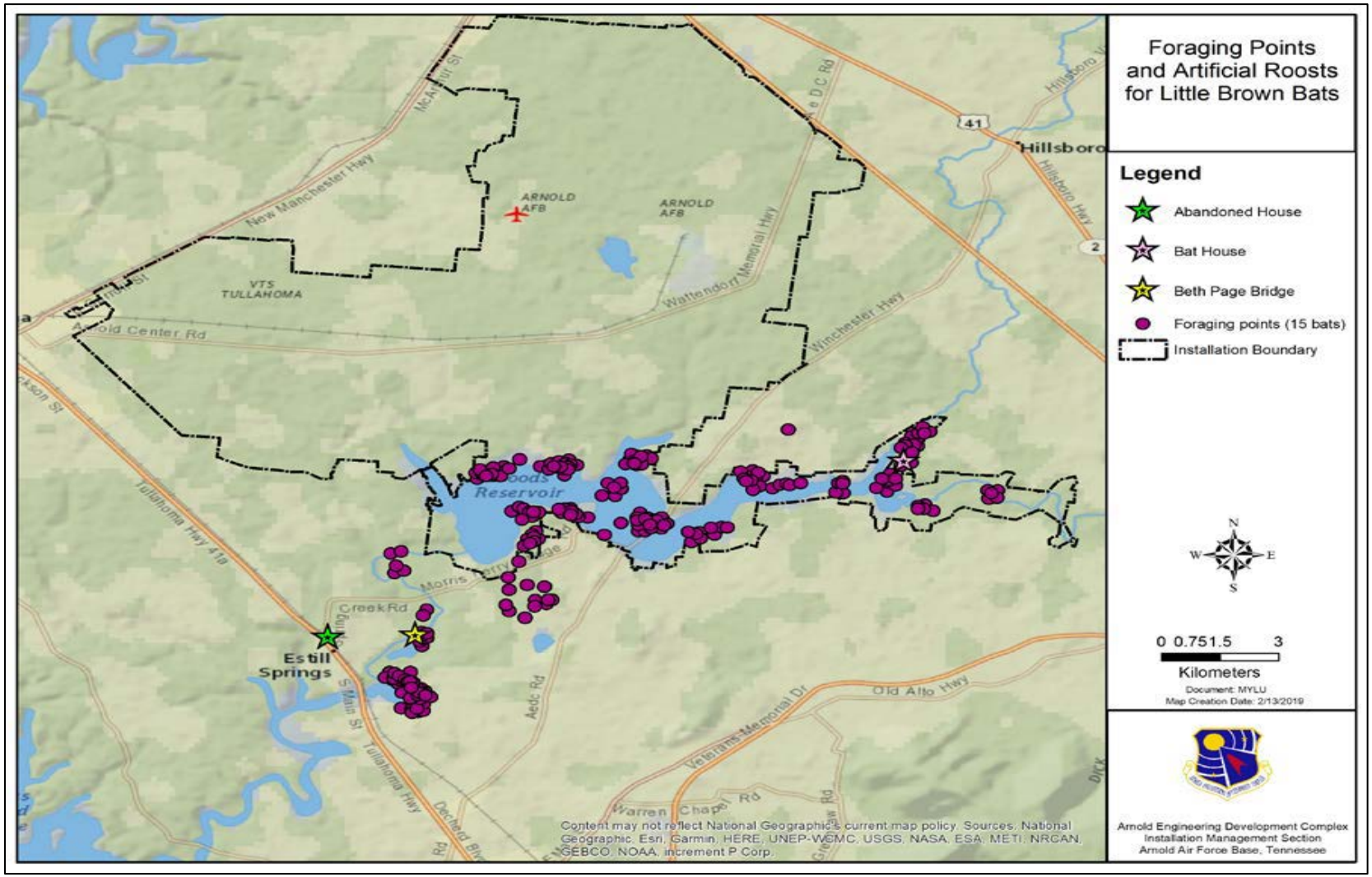

Figure 3-9. Little Brown Bat Foraging Activity and Alternative Roosts Documented during a 2015 Telemetry Study of the Beth Page Bridge Colony

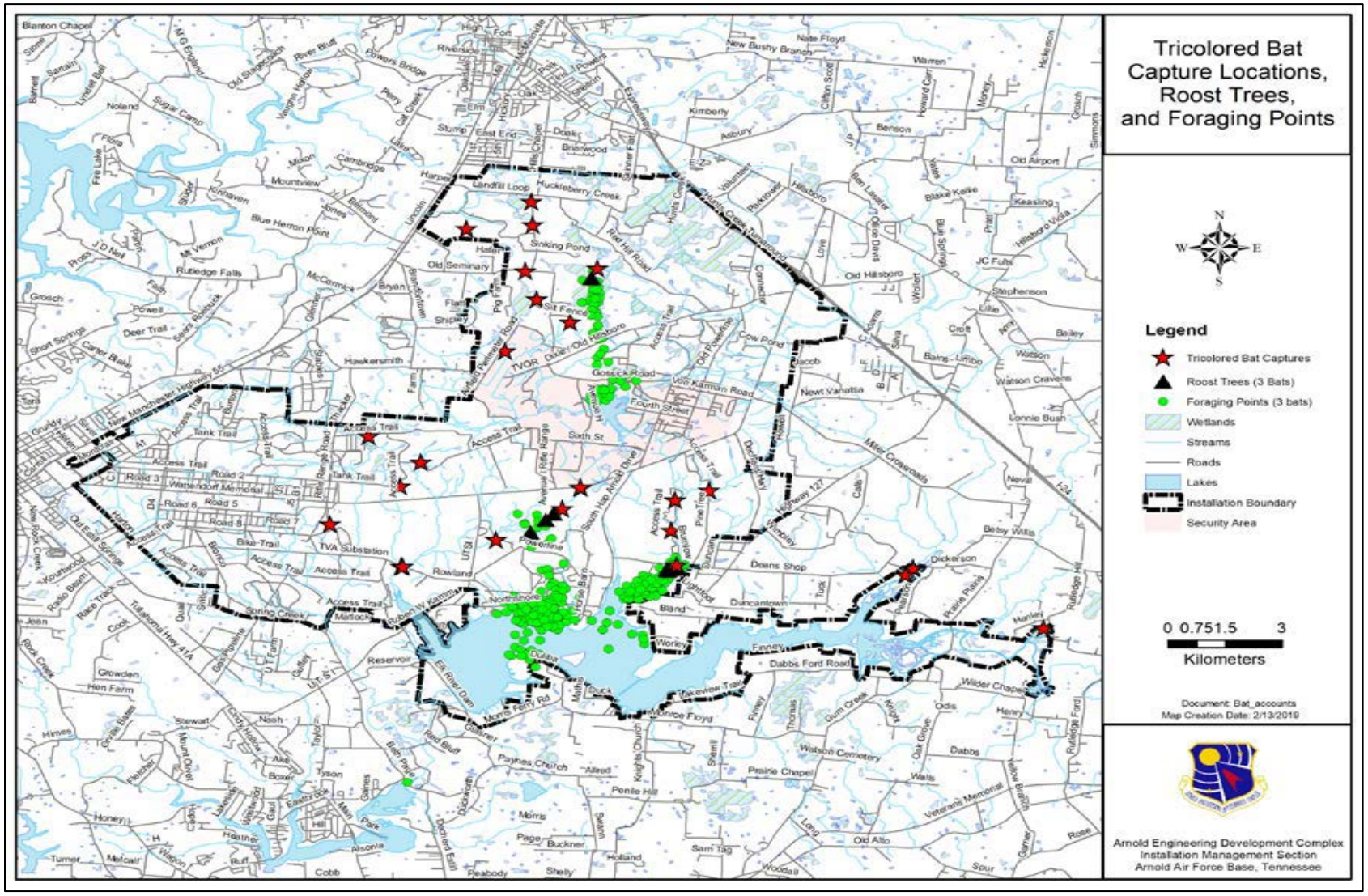

Figure 3-10. Tricolored Bat Capture Locations for All Years and Foraging Activity with Roost Documented in a 2015 Telemetry Study

Monitoring and Inventory

Previously, a variety of monitoring methods were used to monitor as many taxonomic groups as possible (Arnold AFB 2020a). These methods included minnow trapping, cover board arrays, box traps, call counts, visual encounter surveys, time constrained searches, and opportunistic encounters. These methods were employed at various times and intensities to survey specific species throughout the year. As the life histories of this diverse group are highly varied, it takes multiple survey and monitoring methods to accurately gather data on these species.

3.3.3.2 Flame Chub and Rosyface Shiner

Current Status and Known Distribution at Arnold AFB

The flame chub (*Hemitremia flammea*) is listed as WNM in Tennessee by TWRA and is listed as "near threatened" on the International Union for Conservation of Nature Red List. The flame chub is a small (1.5 to 3.0 inches) minnow that occurs in springs and spring runs in Tennessee and Alabama (Etnier and Starnes 1993). It occurs in several drainages throughout Arnold AFB (Arnold AFB 2020a). Ten individuals were found during a survey of Crumpton Creek just south of the Airfield in 2016. It spawns from late January through May, peaking in March (Etnier and Starnes 1993).

The rosyface shiner (*Notropis rubellus*) is listed as WNM in Tennessee by TWRA. It is a common widespread species of riffles in large creeks and small rivers, but populations are thought to be suffering due to increased siltation (Etnier and Starnes 1993). It has only been documented in Bradley Creek at Arnold AFB (Arnold AFB 2020a).

Monitoring and Inventory

No specific monitoring and inventory protocols have been developed for the flame chub or rosyface shiner (Arnold AFB 2020a).

3.3.3.3 Northern Harrier

Current Status and Known Distribution at Arnold AFB

The northern harrier (*Circus cyaneus*) is listed as a GCN species in Tennessee. Northern harriers winter at Arnold AFB and in agricultural fields surrounding the base (Arnold AFB 2020a). The northern harrier is a grassland species that feeds primarily on small mammals (Hamel 1992).

Monitoring and Inventory

No monitoring or management are currently planned for this species; however, management for Henslow's sparrow breeding habitat provides the wintering habitat needed by northern harriers.

3.3.3.4 Sharp-Shinned Hawk

Current Status and Known Distribution at Arnold AFB

The sharp-shinned hawk (*Accipiter striatus*) is listed as a GCN species in Tennessee. It is a forest species that preys primarily on small birds (Hamel 1992). At Arnold AFB it is a commonly seen resident species (Arnold AFB 2020a).

Monitoring and Inventory

No monitoring or management are currently planned for sharp-shinned hawks.

3.3.3.5 Loggerhead Shrike

Current Status and Known Distribution at Arnold AFB

The loggerhead shrike (*Lanius ludovicianus*) is listed as WNM in Tennessee and as a species of "management concern" by the USFWS. It is a species of open areas with scattered brush or trees that feeds primarily on insects but will also take small birds (Hamel 1992). It has been documented sporadically at the airfield at Arnold AFB (Arnold AFB 2020a).

Monitoring and Inventory

No monitoring or management are currently planned for loggerhead shrikes, but management for Henslow's sparrow breeding habitat provides the habitat needed by loggerhead shrikes (Arnold AFB 2020a).

3.3.3.6 Cerulean Warbler

Current Status and Known Distribution at Arnold AFB

The cerulean warbler (*Dendroica cerulea*) is listed as WNM in Tennessee. It is a species that requires mature hardwood forests with an open understory for breeding (Hamel 1992). At Arnold AFB, this species has only been reported a few times in the forests near Sinking Pond (Arnold AFB 2020a).

Monitoring and Inventory

No monitoring or management are currently planned for cerulean warblers.

3.3.3.7 Little Blue Heron

Current Status and Known Distribution at Arnold AFB

The little blue heron (*Egretta caerulea*) is listed as WNM in Tennessee. It is a wading bird that typically occurs in mixed colonies (Hamel 1992). At Arnold AFB, this species was first documented at the Little Elder Island rookery on Woods Reservoir, which has since collapsed due to the die-off of trees due to guano buildup (Arnold AFB 2020a). Little blue herons have not been seen elsewhere at Arnold AFB (Arnold AFB 2020a).

Monitoring and Inventory

No monitoring or management are currently planned for little blue herons.

3.3.3.8 Black-Crowned Night Heron

Current Status and Known Distribution at Arnold AFB

The black-crowned night heron (*Nycticorax nycticorax*) is listed as WNM in Tennessee. It is a wading bird that typically occurs in colonies near water (Hamel 1992). At Arnold AFB, this species was first documented as a breeding bird at the Little Elder Island rookery on Woods Reservoir, which has since collapsed due to the die-off of trees due to guano buildup (Arnold AFB 2020a). It is rarely seen elsewhere on base; however, it is typically nocturnal (Arnold AFB 2020a).

Monitoring and Inventory

No monitoring or management are currently planned for black-crowned night herons.

3.3.3.9 Wood Thrush

Current Status and Known Distribution at Arnold AFB

The wood thrush (*Hylocichla mustelinais*) is listed as WNM in Tennessee and as a species of "management concern" by the USFWS. It is a species that prefers mature hardwood forests that are moist with a well-developed understory (Hamel 1992). At Arnold AFB, this species is widespread and has been documented during numerous point counts during the breeding season (**Figure 3-11**; Arnold AFB 2020a).

Monitoring and Inventory

No monitoring or management are currently planned for the wood thrush; however, it is commonly documented during point-count surveys at Arnold AFB (Arnold AFB 2020a).

3.3.3.10 Meadow Jumping Mouse

Current Status and Known Distribution at Arnold AFB

The meadow jumping mouse (*Zapus hudsonius*) is listed as a GCN species in Tennessee. It prefers grasslands and old fields and consumes seeds, insects, and fungi (Choate et al. 1994). The species is not currently known at Arnold AFB.

Monitoring and Inventory

No monitoring or management are currently planned for the meadow jumping mouse; however, a survey of several sites at Arnold AFB in 2016 failed to capture any individuals (Arnold AFB 2020a).

3.3.3.11 Eastern Wood Rat

Current Status and Known Distribution at Arnold AFB

The eastern wood rat (*Neotoma floridana*) is listed as WNM in Tennessee. It is the largest native rat on the Installation and is typically found in early successional habitats at Arnold AFB (Arnold AFB 2020a).

Monitoring and Inventory

No monitoring or management are currently planned for the eastern wood rat; however, it was captured regularly in box traps in Camp Forrest during a pine snake study in 2001-2002 (Arnold AFB 2020a).

3.3.4 Additional Monitoring Programs

3.3.4.1 Monitoring Avian Productivity and Survivorship

Monitoring Avian Productivity and Survivorship Program

Previously, Arnold AFB participated in the Monitoring Avian Productivity and Survivorship (MAPS) program, a continent-wide, constant effort bird-banding program (Arnold AFB 2020a). The Institute for Bird Populations (IBP) established the MAPS program in 1989 in order to obtain long-term demographic information on land birds at multiple spatial scales across North America. It is necessary to combine data from many locations in order to obtain a sufficient sample size to allow inferences regarding species' status and to elucidate possible causes of decline.

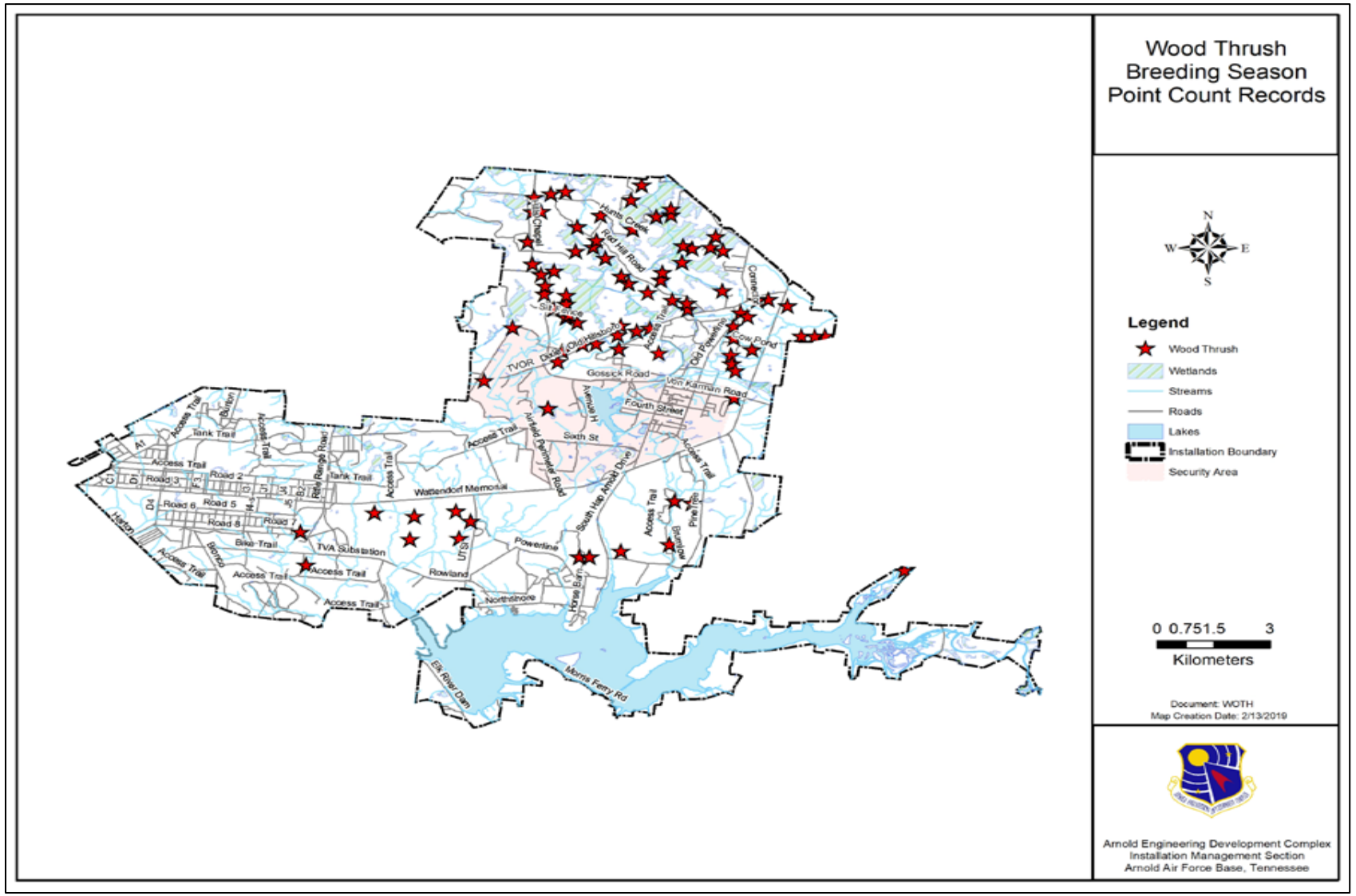

Figure 3-11. Point-Count Locations with Wood Thrush at Arnold Air Force Base

Detecting population trends and the factors driving them is important for developing strategies to conserve bird populations, especially through habitat protection and restoration. This additional monitoring effort provides needed information regarding survivorship and productivity of birds at multiple spatial scales (i.e., regional, national, and international). Productivity refers to the successful production of fledglings, whereas survivorship refers to individuals surviving to return and breed the following season.

The Monitoring Working Group of PIF and the USFWS endorse the MAPS program as an important tool for monitoring the demographic parameters of land birds. This work is in keeping with the 1992 Air Force Memorandum of Agreement for participation in the PIF's Neotropical Migratory Bird Conservation Program referenced in AFMAN 32-7003 3.34, Protection of Migratory Birds. Additionally, the 2002 DoD PIF Strategic Plan identified participation in the MAPS program as a "DoD Bird Conservation Priority." The DoD is an active partner in the PIF program. In the DoD PIF Strategic Plan (2002), Assistant Deputy Under Secretary of Defense (Environment) stated "…I wholeheartedly and enthusiastically support the PIF program and look forward to DoD's leadership role in this important partnership."

PIF assigns concern scores to species in order to assist land managers in making decisions regarding species' management needs. PIF concern scores are based on population size, size of breeding and nonbreeding ranges, threats during breeding and nonbreeding seasons, population trend, and relative abundance, with 25 being the highest possible total score. PIF regards 21 species banded at the Spring Creek Road (SPCR) MAPS Station at Arnold AFB over the last 12 years as priority species in the Central Hardwoods Bird Conservation Region (BCR). The USFWS publication "Birds of Conservation Concern" (USFWS 2008) lists five species captured at the SPCR MAPS station at the BCR and/or UFWS Regional levels. EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, mandates protection of species on these lists by federal agencies. The majority of these species are dependent on early successional habitats such as shrub grasslands or oak savanna.

Nightjar Monitoring

Recognizing the importance of declines in neotropical migrant bird species, the DoD became a partner in the PIF program in 1991 (Leslie et al. 1996). Established in 1990, PIF – Aves de las Americas is an international effort to:

- Determine the status and specific causes of population declines,
- Maintain stable populations, and
- Reverse population declines through habitat management and restoration.

Previously, in order to determine the status of nightjars breeding at Arnold AFB, nocturnal point call counts were conducted annually beginning in 1994. Monitoring of nightjars has been limited within the United States; only recently has a united effort been put forth to monitor these species (US Nightjar Survey Network). The lack of this information leaves incomplete knowledge of the bird fauna in an area.

Wading Bird Rookery Monitoring

The Sinking Pond great blue heron rookery and the Little Elder Island rookery were two historically important wading bird rookeries at Arnold AFB. To monitor the status of these colonies, observers used boats to quietly maneuver around the colony to count nesting birds. Sinking Pond is historically home to one of the largest great blue heron rookeries in Tennessee. This 400-acre seasonally flooded, forested wetland is the only example globally of the "critically

imperiled globally" overcup oak/river birch/resurrection fern forest community type. The great blue heron received Tennessee state listing as WNM in 1974. However, the TWRA delisted the species from that status in 1990 due to its increase in numbers.

The Sinking Pond colony enjoys protection from human disturbance and habitat destruction, two major causes of the species declines in the late 1960s and early 1970s. Carlson and McLean (1996) noted that repeated human intrusions to the nesting area, particularly during the early stages of breeding, might lead to nesting failure or colony abandonment. Watts and Bradshaw (1994) emphasized the importance of location of the rookery away from human structures such as buildings and roads. Gibbs and Kinkel (1997) reinforced this idea with their findings that colony size is positively correlated with amount of swamp and open wetland within 1 kilometer of a site along with the size of the forest stand in which a colony is located. They also noted that herons appear to locate colonies within regional wetland complexes, making Sinking Pond ideally suited for a large colony. The Sinking Pond rookery was censused in 1965 by Dubke 1976 (Arnold AFB 2020a), in 1988 by Pullin (1990), and by the ATA Conservation Department in 2000, 2002, 2004, 2006 and 2008 (unpublished data).

Due to manpower and budget constraints monitoring moved from a two-year monitoring cycle to a five-year cycle after the 2008 survey. From 2009 through 2015 monitoring was discontinued due to budget reductions. However, it was surveyed again in 2016 to document possible bird aircraft strike hazards since the airfield was reopening. This survey found 70 active nests (**Figure 3-12**; Arnold AFB 2020a).

Little Elder Island Rookery

Little Elder Island is a small island located in the middle of Wood's Reservoir. For a number of years, it was the location of a large cattle egret population, but beginning in 2006 a number of priority species began nesting on the island, warranting further investigation and monitoring. This colony built up to over a hundred nests of eight species in 2010 but has declined since that time to receiving little to no use. The density of birds and resultant buildup of guano has now eliminated roost trees on the island. Further investigation of other islands on Woods Reservoir is needed to determine if a rookery exists elsewhere (Arnold AFB 2020a).

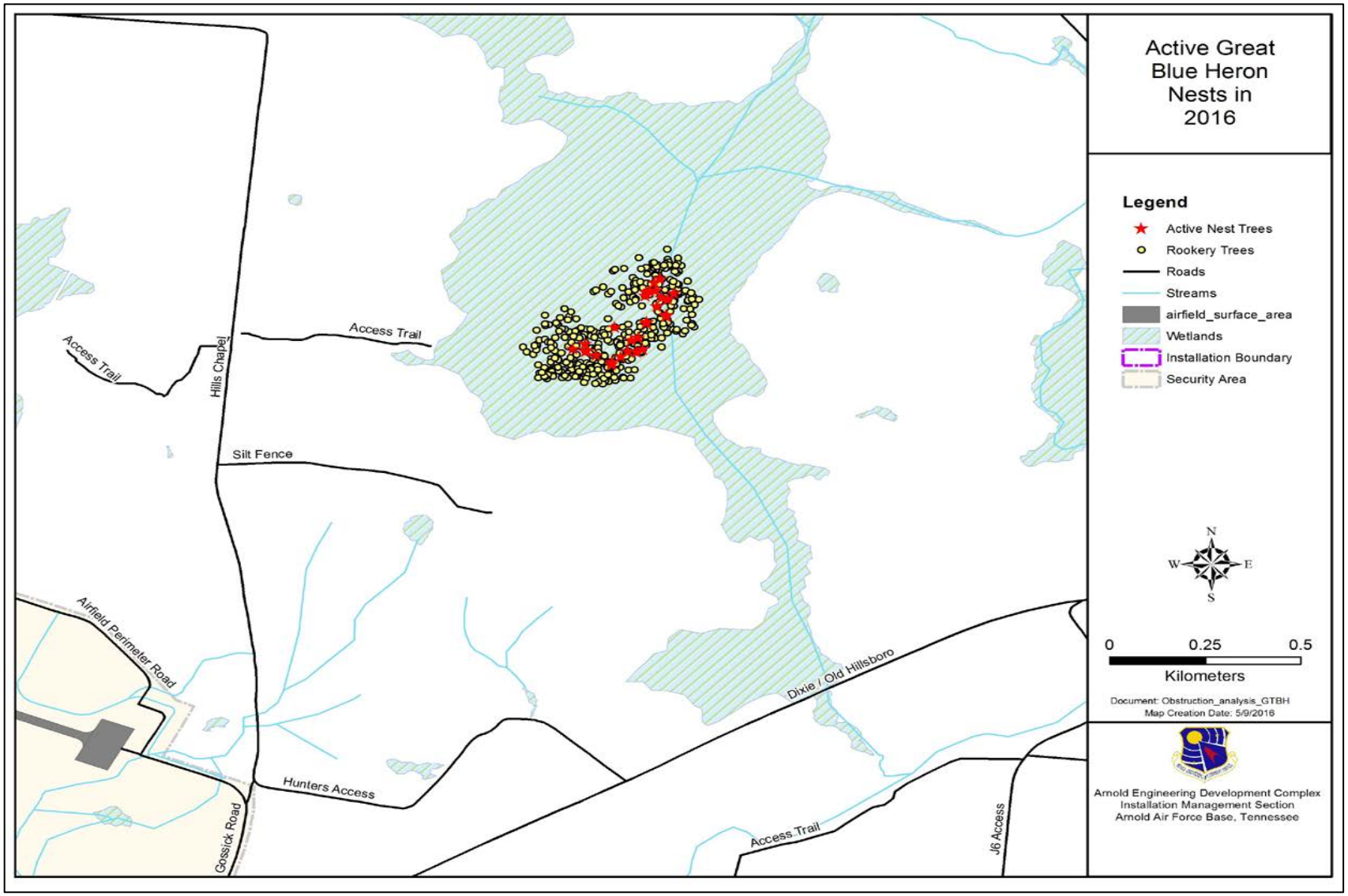

Figure 3-12. Great Blue Heron Nest Trees Identified in 2016 at Arnold Air Force Base

4.0 EFFECTS OF THE PROPOSED ACTION ON THE LANDSCAPE AND PROTECTED SPECIES

Collectively, demolition projects would remove an estimated 1.76 acres of facilities over the next five FYs. New construction projects would have an estimated 75.6 acres of ground disturbance, and road maintenance projects would result in disturbance to an estimated 18.3 acres over the next five FYs. These projects have the potential to effect natural resources at Arnold AFB.

Impacts on natural resources may occur due to various aspects of the proposed projects, including direct physical impacts, habitat alteration/loss (including some land clearing), and short-term disturbance during new construction, road maintenance, or demolition activities. The Proposed Action has the potential to effect vegetation communities and wildlife, including sensitive species. The plant and animal resources potentially affected are identified based on habitat type and previously documented occurrence. Projected conditions were compared with baseline conditions within the context of regional habitat availability and species populations, and a determination was made as to whether impacts would be adverse. An *adverse* impact would degrade habitat quality or diminish species health. A *significant adverse* impact would be one that is likely to jeopardize the continued existence of a species or result in an overall decrease in population diversity, abundance, or fitness.

Some minor adverse impacts on natural resources have been identified due to land-clearing activities. However, none of the proposed projects are likely to jeopardize the continued existence of a species or result in an overall decrease in population diversity, abundance, or fitness. Further, prior to any new construction actions, the USAF would conduct a pre-construction habitat assessment to ensure potential impacts to wildlife are minimized. Consequently, the USAF has not identified any significant adverse impacts on natural resources.

4.1 VEGETATION

Most of the proposed projects would occur in developed, improved, or maintained areas. Examples of these types of areas include existing facilities and associated parking lots, landscaped or mowed parcels, and roadside shoulders. Although a relatively small number of wildlife species may occur in such areas (generally those tolerant of human presence and activity), the limited habitat value substantially decreases the biological importance of these sites. Therefore, impacts on vegetation and the associated wildlife resulting from projects located within developed or maintained areas are generally considered minor.

Vegetation removal associated with new construction projects would represent long-term habitat loss. Trees and other vegetation may support foraging, nesting, and other behaviors for mammals, birds (including migratory birds), reptiles, and amphibians. While any habitat loss could adversely affect individuals, the amount of impacted forest, grassland, and wetland habitat is relatively small compared with similar habitat available in the vicinity, and most of the proposed project locations are in areas near current human activity. Overall, population-level effects on any species are not expected as a result of vegetation removal. To the extent practicable, Arnold AFB would schedule any tree and vegetation removal associated with the proposed projects to occur outside of times of increased migratory bird and bat activity.

4.2 WILDLIFE

Construction activities within or adjacent to forests, grasslands, and wetland areas could potentially result in injury, mortality, or disturbance of wildlife species. The potential for injury or mortality would result from direct strike by vehicles or construction equipment. Mobile species, such adult birds, would not be as susceptible to physical strikes, while others, such as smaller

and/or less mobile species, would have greater potential to be impacted. It is not expected that substantial numbers of wildlife would be physically impacted.

In addition, most of the wildlife species expected in the project areas are locally and regionally common, and mortality or injury to a small number of individuals would not result in an overall decrease in population diversity, abundance, or fitness of any species. Wildlife in the proposed project areas could also be temporarily disturbed or displaced due to increased noise and human activity associated with construction or demolition. It is expected that these effects would be short term and would affect only animals in the immediate project areas. Affected individuals would generally be able to return to the area after completion of activities. While some individuals might avoid project sites long term, the affected areas are small compared with other, similar available habitat nearby.

4.3 WATER RESOURCES

Reduced habitat would also occur as a result of any wetlands fill. For example, wading bird foraging area and amphibian habitat could be decreased. However, the total area of wetland habitat affected would be minor. Any wetland loss could adversely affect individuals, but population-level effects are unlikely based on the size and regional context of the affected area. Some proposed projects would have potential impacts on a jurisdictional wetland and floodplain habitats; prior to the commencement of construction activities for this project, USAF would coordinate with the USACE and a Section 404 permit pursuant to the CWA would be obtained for any impacts on jurisdictional wetlands. The USAF would comply with all appropriate mitigation requirements included in the permit.

Soil disturbance and changes to stormwater flow could result in discharge of sediments and pollutants into the surrounding wetlands, reducing water quality and value as wildlife habitat on the Installation and in downstream areas. However, the USAF would continue to implement species and habit-specific management consideration and measures to offset potential impacts (see **Section 5.0**).

4.4 PROTECTED SPECIES

Removal of vegetation associated with the proposed new construction projects could result in potential direct and indirect impacts on federally listed bat species and state listed protected species. However, the USAF would consult with the USFWS on a project-by-project basis. The USFWS's 2016 Biological Opinion/Incidental Take Statement will provide a framework for mitigation and adaptive management measures that would be negotiated for each project with the potential to affect federally listed species. In addition, in accordance with the INRMP, the USAF would continue to implement species and habit-specific management consideration and measures to offset potential impacts on protected species (see **Section 5.0**). Consequently, impacts on federally listed bat species and state-listed protected species would be less than significant.

5.0 MANAGEMENT CONSIDERATIONS AND MEASURES TO OFFSET POTENTIAL IMPACTS

Management considerations are fully described in detail in the USFWS Biological Opinion (USFWS 2016a) and described briefly in the following paragraphs, along with other measures that Arnold AFB will implement to offset potential impacts on natural resources as result of the Proposed Action. Additional details regarding species and habitat-specific management considerations are found in the Arnold AFB INRMP – 2020 Update (Arnold AFB 2020a).

5.1 BATS

Operational procedures outlined in the Woods Dam Reservoir Management Plan for the protection of gray bats (see **Section 3.1.1.2**) will continue to be implemented. Therefore, potential impacts associated with the proposed shoreline stabilization project at the Woods Reservoir are not anticipated.

5.1.1 White-Nose Syndrome

Arnold AFB began working with its partners to address the need for a coordinated response to WNS in April of 2009. Arnold AFB biologists were invited to participate in a WNS planning committee to establish a coordinated response plan for WNS in Tennessee. WNS is an ailment affecting cave dwelling bats (Gargas et al. 2009). It is included here because of the possible impacts on affect all of Arnold AFB's federally listed species as well as the possibility that additional bat species known to occur on the Installation will be listed. WNS was first documented in caves in New York in 2007, although cavers had photographed bats with symptoms in 2006. It continues to spread south and west.

In affected cave systems, mortality has been observed at 95 to 100 percent for some species. Bats returning to these caves show no signs of immunity and are continuing to become infected. All species of cave-dwelling bats in the east have shown signs of infection. This dramatic decline in bat populations will have dramatic human implications if it continues unabated, from increased pesticide use, to the potential of additional endangered species listings. With cave-hibernating bat populations much higher in Tennessee than in the northeast and with over 10,000 caves in Tennessee, the potential for loss is great (Arnold AFB 2020a).

Five of nine bats found at Arnold AFB are known to be susceptible to WNS. These are the Indiana bat, northern long-eared bat, little brown bat, tricolored bat, and the big brown bat (Arnold AFB 2020a). All of these species roost in caves during the winter where they are vulnerable to WNS. The remaining bats at Arnold AFB use forests year around. Currently, no forest bats have shown signs of WNS infection, but monitoring will continue to determine if forest bats are susceptible.

5.2 EGGERT'S SUNFLOWER

No proposed projects are located within barrens restoration areas at Arnold AFB, and potential impacts associated with any proposed projects near the barrens areas are not anticipated. Arnold AFB is committed to the following management considerations for Eggert's sunflower:

- Barrens restoration actions, such as burning and/or mowing, should be implemented and continued at regular intervals at each of these sites.
- In the Camp Forrest restoration site, burning frequency should be increased, to a 2-year average burn rotation.
- Monitoring for Eggert's sunflower should continue periodically, in conjunction with the USFWS.
- Further refinements to an understanding of Eggert's sunflower population dynamics, pollinator ecology, microhabitat preferences, response to industrial forestry, etc. may be undertaken as individual projects when funding becomes available, and where the conservation benefit is clearly defined.
- The short-term objective of securing Eggert's sunflower populations at Arnold AFB through management is demonstrably achievable. Eggert's sunflower is currently, and

will continue to be, forefront in the comprehensive INRMP, as a significant part of the Barrens ecosystem.

- Continued habitat management and monitoring and implementation of INRMP goals and objectives will ensure the long-term persistence of the species on base.

5.3 PRAIRIE GENTIAN

No proposed projects are located within known prairie gentian habitat at Arnold AFB, and potential impacts associated with any proposed projects near the known habitat are not anticipated. Prairie gentian prefers open grassy areas. It is well adapted to frequent wildfire, as burns remove grassy debris that can smother the plant if left unchecked. Lapses in regular burning may affect these populations. Although main management recommendations for the species are to continue prescribed fire on a 2-year rotation, this will likely be impossible due to airfield reactivation. The new mowing schedule for the airfield is currently unknown but may impact the population if it is done too frequently or during the prairie gentian's flowering period.

Secondary management considerations include the presence of sericea lespedeza (*Lespedeza cuneata*), an invasive fire-resistant plant that has established itself on the airfield and poses a threat to native species. Airfield reactivation will likely halt invasive species removal efforts in this area, and sericea will not be kept in check by mowing. Attempts will be made to survey in 2020 to assess impacts of both threats (Arnold AFB 2020a).

5.4 SOUTHERN TWAYBLADE

Protection from invasive species is the main management goal for the southern twayblade population at Arnold AFB, and the control of invasive species would be a component of the implementing the proposed IDP projects.

5.5 KENTUCKY LADY'S SLIPPER

In the 2018-2020 Invasive Pest Plant (IPP) contract update, the 8-acre area that contains and surrounds the Kentucky lady's slipper population has been recommended as a new site for IPP removal, focusing on multiflora rose (*Rosa multiflora*) and privet (*Ligustrum* spp.) through targeted treatments. Invasive populations are currently within manageable bounds. As long as treatment occurs within the next several years and there is no major storm event that affects the forest structure in the area, the Kentucky lady's slipper population is unlikely to be in any real danger. Protection of the population from recreational traffic is an additional management goal. There are no established trails in the vicinity, so little traffic of any kind is expected. No proposed projects are located within known habitat for the species at Arnold AFB, and potential impacts associated with any proposed projects near the known habitat are not anticipated.

5.6 BROADLEAF BARBARA'S-BUTTON

Protection of the broadleaf Barbara's-button population from recreational traffic and invasive plants is the main management goal, and the control of invasive species would be a component of the implementing the proposed IDP projects. Unless there is a major storm event that affects the forest structure in the area, any invasive plant problems will be minimal and easily controlled through target treatments (e.g., hand-pulling). One population occurs along railroad tracks which must be maintained.

5.7 LEAST TRILLIUM

Protection from invasive species is the main management goal for the least trillium population on Arnold AFB, and the control of invasive species would be a component of the implementing the proposed IDP projects.

5.8 NORTHERN PINE SNAKE

Pine snakes are typically found in areas that have been recently burned, where openings are maintained, in open pine stands, or relatively open deciduous forests. The snakes avoid both closed-canopy pine and closed canopy hardwood forest (Bailey et al. 2003). Conservation strategies should focus on maintaining a mosaic of open, frequently burned (i.e., every two to three years) management units for their value as habitat for northern pine snakes. Based on home range and maximum movement distances, landscape restoration efforts concentrated in the undeveloped approximately 4,500 acres immediately east of Saltwell Hollow and south of Wattendorf Memorial Highway would likely result in eventual recolonization, expansion, and increased stabilization of the northern pine snake population (Bailey et al. 2003). As a general goal, restored habitats should be maintained in blocks of at least 500 acres separated by no more than 1,640 feet (Bailey et al. 2003).

No projects are proposed within forested areas. Vehicle traffic associated with implementation of the Proposed Action could lead to mortality or injury of pine snakes; however, Arnold AFB would continue to implement vehicle restrictions within and near areas of known pine snake habitat.

Additional management considerations include:

- Forest Composition and Prescribed Burning – The goal should be to maintain native herbaceous groundcover. Thinning is recommended to reduce canopy closure to no more than 60 to 70 percent to allow sufficient sunlight penetration to the ground (Bailey et al. 2003). Pine snakes would likely benefit from increased use of fire in both the pine stands and hardwood areas. Although pine snakes may avoid an area (or remain underground) in the first days or weeks following fire, they quickly move in to exploit the herbaceous cover and the increasing small mammal and bird populations (Bailey et al. 2003).
- Timber Harvest and Site Preparation – Precommercial thinning may enhance pine snake habitat. Stumps should be left in the ground to serve as future den sites. If mechanical or chemical site preparation is required, less intensive methods should be employed so that native herbaceous plant diversity is not impacted. Whenever possible, fire should be used in site preparation. All loggers and field personnel should be informed of the possible presence of pine snakes and instructed to refrain from killing any snake (Bailey et al. 2003).
- Mowing Timing and Frequency – Consideration should be given to maintaining wide, brushy unmowed margins around food plots and along utility ROWs. These could be burned or mowed in the winter (December to March) but should be allowed to remain weedy throughout the growing season (Bailey et al. 2003).
- Retention of Old Structures – Pine snakes use old building foundations where available. These structures may be of tremendous importance to the survival of the local population. Future land management plans should allow for the long-term retention of these structures (Bailey et al. 2003).

- Restriction of Vehicle Traffic – Because northern pine snakes are susceptible to both road mortality and illegal collecting, the seemingly robust population in the Camp Forrest area would be jeopardized if the network of roads there received an increased amount of use, whether from civilian or military traffic. Gating some of the paved roads during the April-October primary activity period would reduce these threats (Bailey et al. 2003). Currently, gates are closed to nonmilitary traffic from mid-May through mid-September. Several studies suggest that the impacts of roadway mortality on snake populations can be substantial. Possibly as many as 50 percent of radio-tracked black pine snakes (*Pituophis melanoleucus lodingi*) were killed while crossing roads according to one Mississippi study (Duran 1998). In a Texas study, trapping results suggested that populations of larger snake species, including Louisiana pine snakes (*Pituophis ruthveni*), are depressed by up to 50 percent within several hundred feet of road corridors (Rudolph et al. 1999).

5.9 FOUR-TOED SALAMANDER AND BARKING TREEFROG

Management at Arnold AFB is directed at the wetlands and uneven-aged oak forest conservation targets, particularly where they occur together as a matrix and not the species specifically, although four-toed salamanders and barking treefrogs benefit from these conservation efforts. No IDP projects are proposed within wetlands or uneven-aged oak forests at Arnold AFB.

5.10 FLAME CHUB AND ROSYFACE SHINER

Management at Arnold AFB is directed at the riparian systems conservation target and not the flame chub and rosyface shine specifically, although these species benefit from riparian conservation efforts. No IDP projects are proposed within riparian habitat at Arnold AFB.

5.11 HENSLOW'S SPARROW

No proposed projects are located within known grassland areas at Arnold AFB, and potential impacts associated with any proposed projects near the Henslow's sparrow habitat are not anticipated. Henslow's sparrow is a nested conservation target for the grassland focal target. This species requires open habitat greater than approximately 75 acres with a relatively high cover of tall, standing grassy vegetation, a well-developed litter layer, and low woody stem densities (Zimmerman 1988). These birds avoid both shrublands and closed canopy hardwood forest. Zimmerman (1998) found that Henslow's sparrow would successfully breed in areas maintained by fire (every three to five years) with a high percentage of tall grassy vegetation, scattered forbs, a well-developed litter layer, and low woody stems. Findings by Sulkers (2005) indicate that Henslow's sparrow occupy grassland areas with a significantly higher percent cover of graminoids, ferns, and percent daily solar radiation, and significantly less percent cover of forbs, invasive plant species, woody species within 3 to 9 feet tall, and canopy height. The litter layer was measured but it did not significantly differ between sites occupied by Henslow's sparrow and those not occupied by Henslow's sparrow.

Changing management requirements on the airfield have the potential to eliminate Henslow's sparrow habitat from those management units. Monitoring will continue in order to determine if this occurs.

Additional management considerations include:

- Management Unit Size and Configuration – Conservation strategies should focus on maintaining large (greater than 75 acres) grasslands as management units for breeding habitat. Henslow's sparrows are restricted to large grassland areas greater than 75 acres (Herkert 1994). In the past Henslow's sparrow have been found breeding in relatively small fields, however, larger populations in suitable habitats have occurred in close proximity (Moss 2001).
    - An example of this is found at Arnold AFB. In 1999, two breeding pairs have been found at the Arnold AFB model Airplane field (50 acres). This area is less than 4 miles from the central population at the Arnold AFB airfield.
    - As a general goal, restored habitats should be maintained in blocks of at least 500 acres, with the size of individual management units ranging between 75 and 370 acres.
    - Management should focus on protecting large continuous tracts of grasslands, expanding currents barrens restoration areas, maintaining structurally diverse habitat, avoid large fragmentation and edge effects, and avoid inadequately timed mowing and prescribed burning.
    - Also, maintaining the burning rotation at the airfield barrens is recommended and treating the model airplane field as one management unit is also recommended.
- Prescribed Burning – Prescribed burning is conducted to reduce woody cover and enhance herbaceous vegetation. Past literature suggests that this species does not do well in recently burned areas. For that reason, Zimmerman (1988) recommended a rotational burning plan of an area approximately 75 acres in size every three to five years. However, greater amounts of annual rainfall at Arnold AFB result in a more productive growing season than the Midwest; therefore, the management goal is to conduct burns at two-year intervals.
    - Of the six management units at the airfield, four are burned on this two-year cycle in late fall or early spring. This rotation reduces the woody and shrub component and promotes suitable habitat for the population. Prescribed burning across the installation has been problematic in recent years due to changing USAF policy and authorities, and sole reliance on external entities to assist Arnold AFB in the implementation of prescribed burns.
    - A balanced combination of mowing, herbicide treatments and fire may all be necessary to continue maintenance of these areas. Burning at the airfield might be discontinued due to new mission requirements.
- Mowing Timing and Frequency – Henslow's sparrows arrive at Arnold AFB from late March to late April, and nest from May to August (TNC 2001). Fall migration begins in September, and by October the birds have left their breeding grounds (TNC 2001). Two of the six management units in the airfield barrens restoration area are mowed. In order to avoid nest mortality, mowing should be done before the birds have arrived in the spring or after the young have fledged in the fall.

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6.0 REFERENCES

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Appendix A. List of Federal and State Threatened, Endangered, and Special Concern Species and Rare Communities

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Table A-1. List of Federal and State Threatened, Endangered, and Special Concern Species and Rare Communities

Scientific Name	Common Name	State Status	GCN Species	State Rank	Federal Status	Global Rank
Plants						
Agalinis oligophylla	Ridge-Stem False Foxglove	E	N/A	S1	N/A	G4
Carex barrattii	Barratt's Sedge	E	N/A	S2	N/A	G4
Carex buxbaumii	Brown Bog Sedge	S	N/A	S1	N/A	G5
Castanea dentata	American Chestnut	S	N/A	S2S3	N/A	G4
Clethra alnifolia	Coastal Sweet-Pepperbush	T	N/A	S1	N/A	G5
Cypripedium acaule	Pink Lady's-Slipper	E-CE	N/A	S4	N/A	G5
Cypripedium kentuckiense	Southern Lady's-Slipper	E	N/A	S2	N/A	G3
Dichanthelium aciculare	Needle-Leaf Rosette Grass	E	N/A	S1	N/A	G4G5
Dichanthelium dichotomum var. *ensifolium*	Small-leaved panic grass; Eaton's Witchgrass	S	N/A	S2	N/A	G4
Drosera brevifolia	Dwarf Sundew	T	N/A	S2	N/A	G5
Echinacea pallida	Pale Purple-Coneflower	T	N/A	S1	N/A	G4
Eleocharis intermedia	Intermediate Spike-Rush	S	N/A	S1	N/A	G5
Eryngium integrifolium	Blue-flower Coyote-thistle	T	N/A	S1	N/A	G5
Eupatorium leucolepis var. leucolepis	White-bracted throughwort	E	N/A	S1	N/A	G5
Festuca paradoxa	Clustered Fescue	S	N/A	S1	N/A	G5
Gaylussacia dumosa	Dwarf Huckleberry	T	N/A	S3	N/A	G5
Gentiana puberulenta	Downy Gentian	E	N/A	S1	N/A	G4G5
Gymnopogon brevifolius	Short-Leaf Skeleton Grass	S	N/A	S1S2	N/A	G5
Helianthemum propinquum	Low Frostweed	S	N/A	S1S2	N/A	G4
Helianthus eggertii	Eggert's Sunflower	S	N/A	S3	N/A	G3
Hypericum adpressum	Creeping St. John's-Wort	E	N/A	S1	N/A	G2G3
Iris prismatica	Slender Blue Iris	T	N/A	S2S3	N/A	G4G5
Isoetes melanopoda	Black-Foot Quillwort	E	N/A	S1S2	N/A	G5
Juglans cinerea	White Walnut	T	N/A	S3	N/A	G3G4
Lachnanthes caroliana	Carolina Redroot	E	N/A	S1	N/A	G4
Lechea pulchella var. *pulchella*	Legget's pinweed	E	N/A	S1	N/A	G5
Lejeunea sharpii	(Liverwort) Sharp's Lejeunea	E	N/A	S1S2	N/A	G1G2
Lespedeza angustifolia	Narrow-Leaf Bush-Clover	T	N/A	S2	N/A	G5
Lilium michiganense	Michigan Lily	T	N/A	S3	N/A	G5
Liparis loeselii	Yellow Wide-Lip Orchid	T	N/A	S1	N/A	G5
Listera australis	Southern Twayblade	E	N/A	S1S2	N/A	G4
Ludwigia sphaerocarpa	Globe-Fruit Primrose-Willow	T	N/A	S1	N/A	G5
Lycopodiella alopecuroides	Fox-Tail Club-Moss	T	N/A	S2	N/A	G5
Lysimachia quadrifolia	Whorled Loosestrife	E	N/A	S1	N/A	G5?
Marshallia trinervia	Broad-Leaf Barbara's-Buttons	T	N/A	S2S3	N/A	G3
Muhlenbergia glabriflora	Smooth Muhly	S	N/A	S1	N/A	G4?

Scientific Name	Common Name	State Status	GCN Species	State Rank	Federal Status	Global Rank
Muhlenbergia torreyana	New Jersey Muhly	E	N/A	S1	N/A	G3
Myriophyllum pinnatum	Cut-Leaf Water-Milfoils	T	N/A	S1	N/A	G5
Panicum hemitomon	Maiden-Cane	S	N/A	S2	N/A	G5?
Pellia appalachiana	(a Liverwort)	S	N/A	S2	N/A	G1?
Platanthera integra	Yellow Fringeless Orchid	E	N/A	S1	N/A	G3G4
Pogonia ophioglossoides	Snake-Mouth Orchid	E	N/A	S2	N/A	G5
Polygala mariana	Maryland Milkwort	S	N/A	S1	N/A	G5
Polygala nuttallii	Nuttall's Milkwort	E	N/A	S1	N/A	G5
Prenanthes aspera	Rough Rattlesnake-Root	E	N/A	S1	N/A	G4?
Prunus pumila var. depressa	Sand Cherry	T	N/A	S1	N/A	G5
Pseduognaphalium helleri	Heller's Rabbit-Tobacco	S	N/A	S2	N/A	G4G5
Ranunculus flabellaris	Greater Yellow Water Buttercup	T	N/A	S2	N/A	G5
Rhynchospora caduca	Angle-Stem Beak Sedge	S	N/A	S1	N/A	G5
Rhynchospora perplexa	Pineland Beak Sedge	T	N/A	S2	N/A	G5
Riccardia jugata	(a Liverwort)	S	N/A	S2	N/A	G2
Sagittaria graminea var. graminea	Grassleaf Arrowhead	T	N/A	S1	N/A	G5
Solidago gracillima	Virginia Goldenrod	S	N/A	S1	N/A	G4?
Symphyotrichum oolentangiensis	Sky-Blue Aster	S	N/A	S1	N/A	G5
Trillium pusillum var. pusillum	Least Trillium	E	N/A	S2	N/A	G3
Utricularia subulata	Zigzag Bladderwort	T	N/A	S1	N/A	G5
Vaccinium elliottii	Elliott's Blueberry	E	N/A	S1	N/A	G5Q
Vaccinium macrocarpon	Large Cranberry	T	N/A	S2	N/A	G4
Woodwardia virginica	Virginia Chain Fern	S	N/A	S2	N/A	G5
Xyris fimbriata	Fringed Yellow-Eyed-Grass	E	N/A	S1	N/A	G5
Xyris laxifolia var. iridifolia	Wide-Leaved Yellow-Eyed-Grass	T	N/A	S2	N/A	G4G5T4T5
Zigadenus leimanthoides	Pine-Barren Deathcamas	T	N/A	S2	N/A	G4Q
Plant Communities						
CEGL004112 - *Juncus effusus* Herbaceous Vegetation	Soft Rush Seasonally Flooded Herbaceous Vegetation	NA	NA	NA	NA	G5
CEGL004126 - *Panicum hemitomon* - *Dulichium arundinaceum* Herbaceous Vegetation	Maidencane - Threeway Sedge Herbaceous Vegetation	NA	NA	NA	NA	G1
CEGL004150 - *Typha latifolia* Herbaceous Vegetation	Common Cattail Southern Herbaceous Vegetation	NA	NA	NA	NA	G5
CEGL004709 - *Quercus stellata* - (*Quercus coccinea*) / *Quercus marilandica* / *Vaccinium pallidum* - (*Vaccinium stamineum*) Woodland	Post Oak - (Scarlet Oak) / Blackjack Oak / Hillside Blueberry - (Deerberry) Woodland	NA	NA	NA	NA	G2G3

Scientific Name	Common Name	State Status	GCN Species	State Rank	Federal Status	Global Rank
CEGL004712 - *Nyssa aquatica* / *Cephalanthus occidentalis* Forest	Swamp Tupelo / Buttonbush Seasonally Flooded	NA	NA	NA	NA	G1?
CEGL004742 - *Cephalanthus occidentalis* - *Hibiscus moscheutos* ssp. *moscheutos* Shrubland	Buttonbush - Eastern Rose-mallow Shrubland	NA	NA	NA	NA	G3?
CEGL004748 - *Eleocharis microcarpa* - *Juncus repens* - *Rhynchospora corniculata* - (*Mecardonia acuminata* - *Proserpinaca* spp.) Herbaceous Vegetation	Small-fruit Spikerush - Creeping Rush - Shortbristle Horned Beaksedge - (Mecardonia - Mermaid-weed species) Herbaceous Vegetation	NA	NA	NA	NA	G2G3
CEGL004750 - *Saccharum baldwinii* - *Calamagrostis coarctata* - *Panicum rigidulum* - *Rhynchospora capitellata* Herbaceous Vegetation	Slender Plumegrass - Nuttall Reedgrass - Redtop Panicgrass - Northern Beaksedge Herbaceous Vegetation	NA	NA	NA	NA	G2G3
CEGL004751 - S*cirpus cyperinus* - *Panicum rigidulum* var. *elongatum* - *Rhynchospora corniculata* Herbaceous Vegetation	Woolgrass Bulrush - Tall Flat Panic-grass - Shortbristle Horned Beaksedge Herbaceous Vegetation	NA	NA	NA	NA	G3?
CEGL004922 - *Quercus* (*falcata*, *stellata*) / *Quercus marilandica* / *Gaylussacia* (*baccata, dumosa*) Woodland	(Southern Red Oak, Post Oak) / Blackjack Oak / (Black Huckleberry, Dwarf Huckleberry) Woodland	NA	NA	NA	NA	G2G3
CEGL004975 - *Quercus lyrata* / *Betula nigra* / *Pleopeltis polypodioides* Forest	Overcup Oak / River Birch / Resurrection Fern Forest	NA	NA	NA	NA	G1
CEGL004979 - *Quercus nigra* - *Quercus* (*alba*, *phellos*) Forest	Water Oak - (White Oak, Willow Oak) Forest	NA	NA	NA	NA	G3?
CEGL004986 - *Pontederia cordata* - *Sagittaria graminea* - *Sagittaria latifolia* Herbaceous Vegetation	Pickerelweed - Grassleaf Arrowhead - Broadleaf Arrowhead Semipermanently Flooded Herbaceous Vegetation	NA	NA	NA	NA	G1G2Q
CEGL004987 - *Quercus velutina* - *Carya* (*alba, glabra*) / *Vaccinium arboreum* Forest	Black Oak - (Mockernut Hickory, Pignut Hickory) / Sparkleberry Forest	NA	NA	NA	NA	G2G3Q
CEGL007247 - *Quercus falcata* - *Quercus coccinea* - *Quercus* (*stellata, velutina*) / *Vaccinium pallidum* Forest	Southern Red Oak - Scarlet Oak - (Post Oak, Black Oak) / Hillside Blueberry	NA	NA	NA	NA	G4
CEGL007364 - *Quercus phellos* - *Quercus alba* / *Vaccinium fuscatum* - (*Viburnum nudum*) / *Carex* (*barrattii, intumescens*) Forest	Willow Oak - White Oak / Black Highbush Blueberry - (Wild Raisin) / (Barratt Sedge, Bladder Sedge) Forest	NA	NA	NA	NA	G2
CEGL007405 - *Quercus phellos* - *Quercus nigra* - (*Nyssa biflora*) Forest	Willow Oak - Water Oak - (Swamp Blackgum) Forest	NA	NA	NA	NA	G1?

Scientific Name	Common Name	State Status	GCN Species	State Rank	Federal Status	Global Rank
CEGL007701 - *Platanus occidentalis* - (*Liquidambar styraciflua, Acer rubrum*) / (*Carpinus caroliniana*) / *Onoclea sensibilis* Forest	Sycamore - (Sweetgum, Red Maple) / (Ironwood) / Sensitive Fern Forest	NA	NA	NA	NA	G4?
CEGL007702 - *Liquidambar styraciflua* - *Quercus michauxii* - *Carya laciniosa* / *Fagus grandifolia* -(*Aesculus flava*) Forest	Sweetgum - Swamp Chestnut Oak - Kingnut Hickory / American Beech - (Yellow Buckeye) Forest	NA	NA	NA	NA	G2G3Q
CEGL007703 - *Salix nigra* - *Acer* (*rubrum*, *saccharinum*) / *Alnus serrulata* - *Cephalanthus occidentalis* Forest	Black Willow - (Red Maple, Silver Maple) / Smooth Alder - Buttonbush Forest	NA	NA	NA	NA	G5
CEGL007705 - *Andropogon gerardii* - (*Andropogon glomeratus, Panicum virgatum, Sorghastrum nutans*) Herbaceous Vegetation	Big Bluestem - (Bushy Broomsedge, Switchgrass, Yellow Indiangrass) Herbaceous Vegetation	NA	NA	NA	NA	G2?
CEGL007706 - *Andropogon gerardii* - *Schizachyrium scoparium* - (C*alamagrostis coarctata, Panicum virgatum*) Herbaceous Vegetation	Big Bluestem - Little Bluestem - (Nuttall Reedgrass, Switchgrass) Herbaceous Vegetation	NA	NA	NA	NA	G2?
CEGL007707 - *Schizachyrium scoparium* - *Andropogon* (*gyrans, ternarius, virginicus*) Herbaceous Vegetation	Little Bluestem - (Elliott Beardgrass, Silver Bluestem, Old-field Broomsedge) Herbaceous Vegetation	NA	NA	NA	NA	G3?
CEGL007709 - *Quercus alba* - *Carya* (*alba, ovata*) - *Liriodendron tulipifera* - (*Quercus phellos*) / *Cornus florida* Forest	White Oak - (Mockernut Hickory, Shagbark Hickory) - Tuliptree - (Willow Oak) / Flowering Dogwood Forest	NA	NA	NA	NA	G4
CEGL007724 - *Quercus falcata* - *Quercus alba* - (*Quercus coccinea*) / *Oxydendrum arboreum* / *Vaccinium pallidum* Forest	Southern Red Oak - White Oak - (Scarlet Oak) / Sourwood / Hillside Blueberry Forest	NA	NA	NA	NA	G3?
CEGL007746 - *Quercus alba* - *Quercus* (*falcata, stellata*) / *Chasmanthium laxum* Forest	White Oak - (Southern Red Oak, Post Oak) / Slender Spanglegrass Forest	NA	NA	NA	NA	G3G4Q
Amphibians						
Ambystoma talpodium	Mole Salamander	NA	Yes - 1	S4	NA	G5
Hemidactylium scutatum	Four-Toed Salamander	WNM	Yes - 1	S3	NA	G5
Hyla gratiosa	Barking Treefrog	NA	Yes - 1	S3	NA	G5
*Lithobates sevosa**	Gopher Frog	NA	Yes - 1	S1	NA	G3
Pseudotriton montanus	Mud Salamander	NA	Yes - 1	S5	NA	G5
Reptiles						
Apalone spinifera	Eastern Spiny Softshell Turtle	NA	Yes - 1	S5	NA	G5
Heterodon platirhinos	Eastern Hognosed Snake	NA	Yes - 1	S4	NA	G5
Nerodia erythrogaster flavigaster	Yellowbelly Water Snake	NA	Yes - 1	HYB	NA	G5T5

Scientific Name	Common Name	State Status	GCN Species	State Rank	Federal Status	Global Rank
Ophisaurus a. longicaudus	Eastern Slender Glass Lizard	WNM	Yes - 1	S3	NA	G5T5
Pituophis m. melanoleucus	Northern Pine Snake	T	Yes - 1	S3	MC	G4T4
Birds						
Accipter striatus	Sharp-Shinned Hawk	NA	Yes - 1	S3	NA	G5
Peucaea aestivalis	Bachman's Sparrow	E	Yes - 1	S1	MC, BCC	G3
Ammodramus henslowii	Henslow's Sparrow	T	Yes - 1	S1	MC, BCC	G4
Ammodramus savannarum	Grasshopper Sparrow	NA	Yes - 1	S4	BCC, PS?	G5
Ardea alba	Great Egret	NA	Yes - 1	S2	NA	G5
Botaurus lentiginosus	American Bittern	NA	Yes - 1	S1	BCC	G4
Caprimulgus carolinensis	Chuck-Will's-Widow	NA	Yes - 1	S3S4	BCC	G5
Caprimulgus vociferus	Whip-Poor-Will	NA	Yes - 1	S3S4	BCC	G5
Chaetura pelagica	Chimney Swift	NA	Yes - 1	S5	NA	G5
Chordeiles minor	Common Nighthawk	NA	Yes - 1	S4	NA	G5
Circus cyaneus	Northern Harrier	NA	Yes - 1	S4	NA	G5
Coccyzus americanus	Yellow-Billed Cuckoo	NA	NA	S4S5	NA	G5
Colinus virginianus	Northern Bobwhite	NA	Yes - 1	S2S3	PS?	G5
Contopus virens	Eastern Wood-Pewee	NA	NA	S5	NA	G5
Dendroica cerulea	Cerulean Warbler	WNM	Yes - 1	S3	NA	G4
Dendroica discolor	Prairie Warbler	NA	Yes - 1	S3S4	NA	G5
Dendroica dominica	Yellow-Throated Warbler	NA	Yes - 1	S4	NA	G5
Egretta caerulea	Little Blue Heron	WNM	NA	S2B, S3N	NA	G5
Egretta thula	Snowy Egret	NA	NA	S2B, S3N	NA	G5
Empidonax virescens	Acadian Flycatcher	NA	NA	S5	NA	G5
*Grus americana***	Whooping Crane	NA	Yes - 3	S?	LT-experimental	G1
Haliaeetus leucocephalus	Bald Eagle	NA	Yes- 3	S3	MC	G5
Helmitheros vermivorum	Worm-Eating Warbler	NA	Yes - 1	S4	BCC	G5
Hylocichla mustelina	Wood Thrush	WNM	Yes - 1	S4	BCC	G5
Icterus virens	Yellow-Breasted Chat	NA	Yes - 1	S4	NA	G5
Icterus spurius	Orchard Oriole	NA	Yes - 1	S4	NA	G5
Lanius ludovicianus	Loggerhead Shrike	WNM	Yes - 1	S1	MC	G4
Melanerpes erythrocephalus	Red-Headed Woodpecker	NA	Yes - 1	S4	BCC	G5
Nycticoraxnycticorax	Black-Crowned Night-Heron	WNM	Yes - 1	S2S3	NA	G5
Oporornis formosus	Kentucky Warbler	NA	Yes - 1	S4	NA	G5
Passerculus sandwichensis	Savannah Sparrow	NA	NA	S1B, S4N	NA	G5

Scientific Name	Common Name	State Status	GCN Species	State Rank	Federal Status	Global Rank
Pooecetes gramineus	Vesper Sparrow	NA	NA	S1B, S4N	NA	G5
Protonotaria citrea	Prothonotary Warbler	NA	Yes - 1	S4	BCC	G5
Scolopax minor	American Woodcock	NA	Yes - 3	S4	NA	G5
Seiurus motacilla	Louisiana Waterthrush	NA	Yes - 1	S4	BCC	G5
Seiurus noveboracensis	Northern Waterthrush	NA		S4N	BCC	G5
Tyto alba	Barn Owl	NA	Yes - 1	S3	NA	G5
Vermivora pinus	Blue-Winged Warbler	NA	Yes - 1	S4	BCC	G5
Fish						
*Clinostomas funduloides**	Rosyside Dace	NA	NA	NA	NA	NA
Hemitremia flammea	Flame Chub	WNM	Yes - 1	S3	MC	G3
Notropis rubellus	Rosyface Shiner	NA	Yes - 1	S2	NA	G5
Mammals						
Myotis grisescens	Gray Bat	E	Yes - 3	S2	LE	G3
Myotis lucifugus	Little Brown Bat	T	Yes - 1	S5	NA	G5
Myotis septentrionalis	Northern Long-eared Bat	E	Yes - 1	S4	LT	G4
Myotis sodalis	Indiana Bat	E	Yes - 3	S1	LE	G2
Neotoma floridana	Eastern Wood Rat	WNM	Yes - 1	S3	MC	G5T5
Napeozapus insignis	Woodland Jumping Mouse	NA	Yes - 1	S4	NA	G5
Ochrotomys nuttalli	Golden Mouse	NA	Yes - 1	S5	NA	G5
Perimyotis subflavus	Tricolored Bat	T	Yes - 1	S5	NA	G5
Sorex cinereus	Masked (Common) Shrew	NA	Yes - 1	S4	NA	G5
Sorex fumeus	Smoky Shrew	NA	Yes - 1	S4	NA	G5
Sorex longirostris	Southeastern Shrew	NA	Yes - 1	S4	NA	G5
Zapus hudsonius	Meadow Jumping Mouse	NA	Yes - 1	S4	NA	G5
Insects						
Folsomia stella	Stellate Springtail	NA	Yes – Tier 2	S1	NA	G1
Tomocerus flavescens	Golden Springtail	NA	Yes – Tier 2	S?	NA	G5

* Taxonomic status unclear at present.

** The occurrences of whooping cranes on Arnold AFB are sporadic and transitory.

N/A – not applicable

State Status – *Plants*

State Status indicates which plants are formally listed as state **Endangered**, **Threatened**, or **Special Concern** under the authority of the Tennessee Department of Environment and Conservation. The state status is determined by the Tennessee Rare Plant Scientific Advisory Committee using the criteria listed previously. (Adapted from the Tennessee Department of Environment and Conservation Division of Natural Heritage Inventory Program website: http://www.tn.gov/environment/natural-areas/natural-heritage-inventory-program.shtml).

E – Endangered Species - any species or subspecies of plant whose continued existence as a viable component of the state's flora is determined by the commissioner [of the Department of Environment and Conservation or his/her authorized representatives] to be in jeopardy, including but not limited to all species of plants determined to be "endangered species" pursuant to the Endangered Species Act.
T – Threatened Species - any species or subspecies of plant which appears likely, within the foreseeable future, to become endangered throughout all or a significant portion of its range in Tennessee, including but not limited to all species of plants determined to be a "threatened species" pursuant to the Endangered Species Act.
LT – experimental – As applied to the whooping crane, the population is considered experimental because it is being (re)introduced into suitable habitat that is outside of the whooping crane's current range, but within its historic range. It is designated nonessential because the likelihood of survival of the whooping crane, as a species, would not be reduced if this entire population was not successful and was lost.
S – Special Concern Species - any species or subspecies of plant that is uncommon in Tennessee, or has unique or highly specific habitat requirements or scientific value and therefore requires careful monitoring of its status.
State Status – *Animals*
Species are listed under the "Tennessee Nongame and Endangered or Threatened Wildlife Species Conservation Act of 1974" as endangered (E), threatened (T), wildlife in need of management (WNM). Species can also be classified as Greatest Conservation Need (GCN) species. The designation of GCN can be used in combination with the other designations or used alone. GCN species are identified in the Tennessee State Wildlife Action Plan (SWAP). (Adapted from the Tennessee Department of Environment and Conservation Division of Natural Heritage Inventory Program website: http://www.tn.gov/environment/naturalareas/natural-heritage-inventory-program.shtml.)
E – Endangered Species - any species or subspecies of wildlife whose prospects of survival or recruitment within the state are in jeopardy or are likely within the foreseeable future to become so due to any of the following factors: (i) The destruction, drastic modification, or severe curtailment of its habitat; (ii) Its overutilization for scientific, commercial or sporting purposes; (iii) The effect on it of disease, pollution, or predation; (iv) other natural or man-made factors affecting its prospects of survival or recruitment within the state; or (v) any combination of the foregoing factors; or (B) any species or subspecies of fish or wildlife appearing on the United States' List of Endangered Native Fish and Wildlife as it appears on 5 April 1974 (Part 17 of Title 50, Code of Federal Regulations, Appendix D), as well as any species or subspecies of fish and wildlife appearing on the United States' List of Endangered Foreign Fish and Wildlife (Part 17 of Title 50 of the Code of Federal Regulations, Appendix A), as such list may be modified hereafter
T – Threatened Species- any species or subspecies of wildlife that is likely to become an endangered species within the foreseeable future
D – Wildlife in Need of Management - any species or subspecies of wildlife that needs specific management to prevent it from becoming a threatened species within the state in the foreseeable future
GCN - Greatest Conservation Need - species that are endemic to the state or a particular ecological region of the state, are especially vulnerable to extirpation, or exhibit declining trends either rangewide or within specific areas of the state
State Rank – *Animals*
A numeric rating (S1 through S5) of relative rarity based primarily on the number of occurrences of the element in the state. Other factors in addition to the number of occurrences are considered when assigning rank, so the number of occurrences suggested for each numeric rank below is not an absolute guideline. The Division of Natural Heritage (DNH) has responsibility for assigning state ranks. Those species having a state rank of S1 to S3, state endemics, and species with a limited distribution in Tennessee should be given special consideration in environmental planning. For further information contact DNH at (615) 532- 0431.
S1 – extremely rare and critically imperiled in the state with five or fewer occurrences, or very few remaining individuals, or because of some special condition where the species is particularly vulnerable to extirpation from Tennessee
S2 – very rare and imperiled within the state, 6 to 20 occurrences and less than 3,000 individuals, or few remaining individuals, or because of some factor(s) making it vulnerable to extirpation from Tennessee
S3 – rare and uncommon in the state, from 21 to 100 occurrences
S4 – widespread, abundant, and apparently secure within the state, though it may be quite rare in parts of its range, especially at the periphery, and is of long-term concern
S5 – demonstrably common, widespread, and secure in the state
SH – of historical occurrence in Tennessee, e.g., formally part of the established biota, with the expectation that it may be rediscovered

SU – possibly in peril in Tennessee but status uncertain, need more information
SX – believed extirpated from the state with little expectation of rediscovery
S#S# – denotes a range of ranks because the exact rarity of the element is uncertain (e.g., S1S2)
S? – unranked at this time or rank uncertain

Federal Status

Federally listed species are protected by the Endangered Species Act of 1973 (as amended). The list is administered and determined by the US Fish and Wildlife Service. (Modified From Federal Register, 50 Code of Federal Regulations Part 17, Feb. 28, 1996, Vol. 61, No. 40, pp. 7596 - 7613.)
LE – Listed Endangered - taxon is threatened by extinction throughout all or a significant portion of its range
LT – Listed Threatened - taxon is likely to become an endangered species in the foreseeable future
PE – Proposed Endangered - taxon is proposed for listing as endangered
PT – Proposed Threatened - taxon is proposed to be listed as threatened
C – Candidate Species - taxon for which the US Fish and Wildlife Service has sufficient information to support proposals to list the species as threatened or endangered, and for which the Service anticipates a listing proposal. The US Fish and Wildlife Service will determine the relative listing priority of these candidate species, and encourages other agencies, groups and individuals to give consideration to these taxa in environmental planning.
DM – Delisted Taxon - recovered, being monitored for first five year
MC – Management Concern - unofficial indication that this species has been brought to federal attention for review for possible future federal listing

Global Rank

Global ranks are determined by the scientific staff of NatureServe (formerly a section of The Nature Conservancy) and state natural heritage programs. Global ranks allow the best available and objective assessment of a rare plant's rarity and the level of threat to its existence. The total number of individuals, the number of populations, and the threats to the populations are considered throughout the plant's range.
G1 – extremely rare and critically imperiled, generally with five or fewer occurrences in the world, or very few remaining individuals, or because of some special condition the species is particularly vulnerable to extinction
G2 – very rare and imperiled, generally with 6 to 20 occurrences and less than 3,000 individuals, or because of some factor(s), vulnerable to extinction
G3 – very rare and local throughout its range or found locally in a restricted range, or because of other factors, vulnerable to extinction throughout its range. Generally between 21 and 100 occurrences and fewer than 10,000 individuals.
G4 – apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery (Thus, the plant is of long-term concern.)
G5 – demonstrably secure globally, though it might be quite rare in parts of its range, especially at the periphery
GH – of historical occurrence throughout its range, i.e., formally part of the established biota, with the expectation that it may be rediscovered
GU – possibly in peril rangewide but status uncertain, need more information
GX – believed to be extinct throughout range, with virtually no likelihood that it will be rediscovered
G#Q – taxonomic status is questionable, numeric rank may change with taxonomy
G#? – inexact numeric rank
T# – taxonomic subdivision (trinomial)

Global Rank Communities

(Adapted from: The Nature Conservancy. 1998. An Investigation and Assessment of the Vegetation of Arnold Air Force Base, Coffee and Franklin Counties, Tennessee. Unpublished report for Arnold Air Force Base, Tennessee.)
G1 – critically imperiled globally
G2 – imperiled globally
G3 – rare or uncommon
G4 – widespread, abundant, and apparently secure, but with cause for long–term concern
G5 – demonstrably widespread, abundant, and secure
G? – unranked
GH – historic

GX – extinct
GC – planted/cultivated vegetation
GW – ruderal vegetation, or vegetation dominated by invasive alien species
GM – vegetation resulting from the management or modification of natural vegetation, it is readily restorable by management or time, and/or the restoration of ecological processes

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Cultural Resources Report

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FINAL
CULTURAL RESOURCES REPORT FOR THE

ENVIRONMENTAL ASSESSMENT

FOR

INSTALLATION DEVELOPMENT AT
ARNOLD AIR FORCE BASE, TENNESSEE

PREPARED BY:

Department of the Air Force

Revised March 2021

ABSTRACT

The purpose of this investigation was to analyze the potential effects to historic properties from the proposed Installation Development Plan at Arnold Air Force Base (AFB) pursuant to the National Historic Preservation Act of 1966, as amended (NHPA). The undertaking proposes 357 individual projects that are broadly divided into two categories: demolition of aging facilities and infrastructure projects. The boundaries of Arnold AFB serve as the Area of Potential Effect (APE) for purposes of this analysis.

A comprehensive inventory and evaluation of historic properties was previously completed at Arnold AFB. The results of these investigations, including determinations of National Register eligibility, were reviewed and accepted by the Tennessee Historical Commission in their role as the Tennessee State Historic Preservation Officer.

The Installation Development Plan at Arnold AFB is an undertaking that has the potential to cause effects to historic properties pursuant to Section 106 of NHPA. The *Programmatic Agreement (PA) between Arnold Engineering Development Complex, Arnold Air Force Base and the Tennessee State Historic Preservation Officer Regarding Management of Historic Properties at Arnold Air Force Base, Tennessee Pursuant to 36 CFR Part 800.14* was executed in 2014 to streamline the Section 106 consultation process. The stipulations of the 2014 PA establish the standards, process for effects determination, and treatment of all historic properties affected by the 357 projects proposed in the Installation Development Plan. All effects determinations, including adverse effects to historic properties, are mitigated through the provisions of the executed agreement. Implementation of the terms and conditions of the 2014 PA with regard to proposed projects demonstrates that Arnold AFB has taken historic properties into account and satisfied NHPA Section 106 responsibilities for the individual projects proposed.

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APPENDICES

A. *Programmatic Agreement between Arnold Engineering Development Complex, Arnold Air Force Base and the Tennessee State Historic Preservation Officer Regarding Management of Historic Properties at Arnold Air Force Base, Tennessee Pursuant to 36 CFR Part 800.14* 2014 Programmatic Agreement

B. Installation Development Plan at Arnold AFB List of Proposed Projects (FY2021-FY2026)

C. Resumes of Key Personnel

LIST OF FIGURES

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ACRONYMS LIST

ac	Acre
ACHP	Advisory Council on Historic Preservation
AEDC	Arnold Engineering Development Complex
AFB	Air Force Base
AFI	Air Force Instruction
AFMAN	Air Force Manual
ANZYNO	Arnold AFB Project Code Number
APE	Area of Potential Effects
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CRM	Cultural Resources Manager/Management
DNE	Determined Not Eligible for Listing
DNR	National Register Property-Designation Rescinded
DODI	Department of Defense Instruction
DOPAA	Description of the Proposed Action and Alternatives
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
FY	Fiscal Year
HD	Historic District
ICRMP	Integrated Cultural Resources Management Plan
IDP	Installation Development Plan
NCE	Non-Contributing Element of NHL/NRL/NRE District
NEPA	National Environmental Policy Act of 1969
NEV	Not Yet Evaluated
NHPA	Historic Preservation Act of 1966
NREI	National Register Eligible-Individual
NREC	National Register Eligible-Contributing Resource
NRHP	National Register of Historic Places
NPS	National Park Service
PA	Programmatic Agreement
RCG&A	R. Christopher Goodwin & Associates, Inc.
SHPO	State Historic Preservation Officer
SOI	Secretary of the Interior
USAF	United States Air Force
USC	United States Code

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CHAPTER I

INTRODUCTION

Arnold Air Force Base (Arnold AFB), located in Coffee and Franklin counties, Tennessee, is the home of the Arnold Engineering Development Complex (AEDC), which occupies a 3,682-acre industrial aerospace test facility within Arnold AFB. AEDC is one of the largest, most diverse aerospace testing and flight simulation facilities in the world (Figures 1-1 and 1-2). The complex operates 68 aerodynamic and propulsion wind tunnels, rocket and turbine engine test cells, space environment chambers, and other specialized units. Since Arnold AFB was established in 1949, continuous installation development has occurred in support of the research and testing mission. Each year, structures are demolished, facilities are constructed, and infrastructure is upgraded (U.S. Air Force [USAF] 2020).

Arnold AFB has identified priorities for installation improvement projects to support the installation's mission for the period fiscal year (FY) 2021 to FY2026. This installation development plan is a proposed action subject to the National Environmental Policy Act (NEPA), which requires federal agencies to assess the environmental impacts of their proposed actions prior to decision making.

The current cultural resources assessment supports the requirement of an Installation Development Environmental Assessment (EA) to identify the potential environmental impacts of the proposed action in compliance with the National Environmental Policy Act of 1969 (NEPA) (42 United States Code [USC] § 4331 et seq.), the regulations of the President's Council on Environmental Quality (CEQ) implementing NEPA procedures (40 Code of Federal Regulations [CFR] §§ 1500–1508, 1515-1518), and USAF regulations for implementing NEPA (32 CFR § 989) codified in Air Force Instruction (AFI) 32-7061, *The Environmental Impact Analysis Process* (EIAP) (USAF 2020). The consideration of historic properties pursuant to the National Historic Preservation Act of 1966, as amended (NHPA) (54 USC § 306108) is part of this NEPA requirement.

Section 106 of NHPA requires federal agencies to consider the effects of their undertakings upon historic properties in the planning process in accordance with 36 CFR 800 - Protection of Historic Properties. The federal regulations governing compliance with Section 106 of NHPA authorize the negotiation and implementation of Programmatic Agreements (PA) stipulating the terms, conditions, and procedures agreed upon by consulting parties to the Section 106 process to resolve potential adverse effects to historic properties by federal agency programs [36 CFR 800.14(b)].

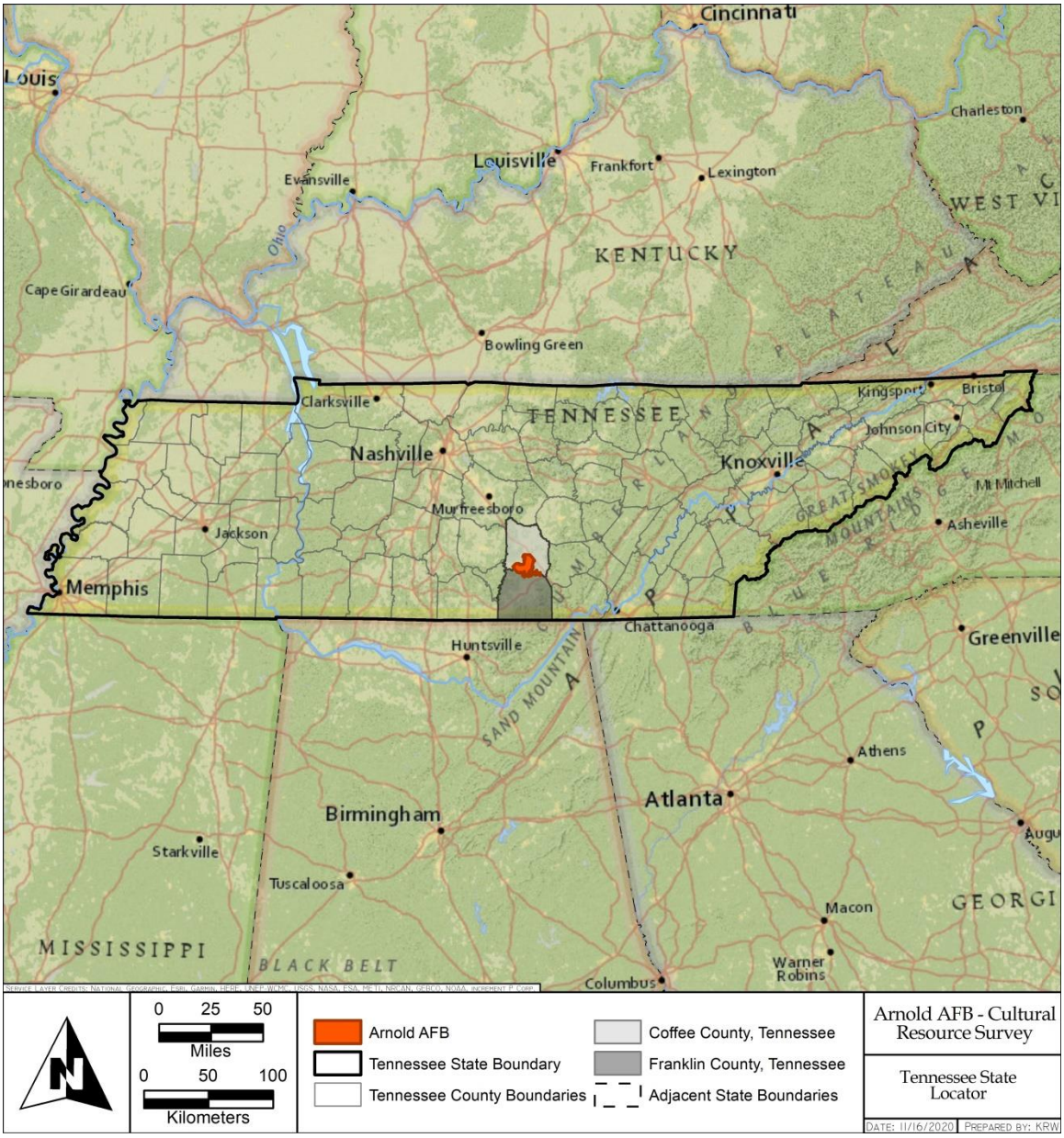

Figure 1-1. Locational Map of Arnold Air Force Base

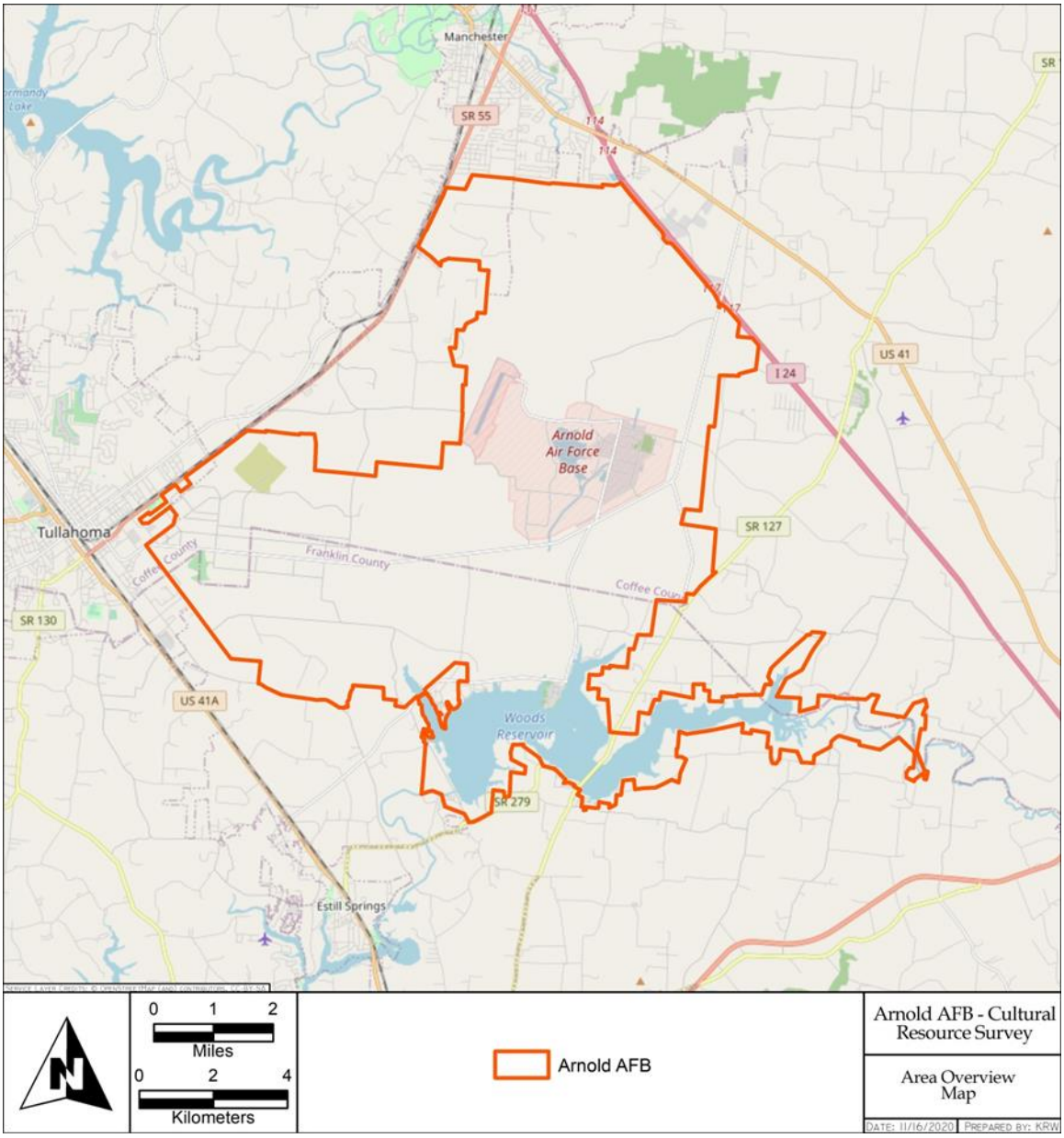

Figure 1-2. Arnold Air Force Base Installation Boundaries

Arnold AFB established and continues to maintain a cultural resource management (CRM) program in accordance with NHPA, Department of Defense Instruction (DODI) 4715.16, *Cultural Resources Management* (August 2018) and Air Force Manual (AFMAN 32-7003, *Environmental Conservation* (April 2020). In 2014, AEDC, Arnold AFB and the Tennessee State Historic Preservation Officer (SHPO) executed a *Programmatic Agreement between Arnold Engineering Development Complex, Arnold Air Force Base and the Tennessee State Historic Preservation Officer Regarding Management of Historic Properties at Arnold Air Force Base, Tennessee Pursuant to 36 CFR Part 800.14* (PA) regarding the management of historic properties at the installation (Appendix A). The PA is effective until 2024 and may be modified, terminated, or extended dependent on review by the signatories. Implementation of the PA and its terms fulfills Arnold AFB's responsibilities under Section 106 of NHPA for all individual undertakings of the program.

Proposed Projects

The undertaking defined as the Installation Development Plan at Arnold AFB (FY2021 to FY2026) comprises 357 projects that can be broadly divided into two categories: demolition and infrastructure projects.

Demolition Projects

Arnold AFB proposes six demolition projects to achieve efficiency and to support growth associated with its mission requirements. The facilities scheduled for demolition no longer support the needs of Arnold AFB; repair and/or renovation of the facilities has been assessed as cost prohibitive. The demolition of these facilities will result in available land for redevelopment within the existing developed area of the installation and reduce the potential need for the construction of new facilities on undisturbed land.

Infrastructure Projects

These encompass a wide range of projects that include new construction (n=29), facility renovations (n=186), utility upgrades (n=124), and road maintenance (n=12). Projects included this group range from exterior painting, to interior and exterior building renovations, to asbestos abatement and removal for buildings throughout the installation. Projects are planned that will address multiple building deficiencies and provide multiple building improvements (USAF 2020).

Location of the Undertaking

The installation development plan proposes 357 projects within the boundaries of Arnold AFB. For purposes of this analysis, the boundaries of Arnold AFB are the Area of Potential Effect (APE). Section 106 compliance under NHPA for projects within Arnold AFB currently is governed by the stipulations contained in the 2014 PA executed between AEDC, Arnold AFB and the Tennessee SHPO. Installation security prohibits the inclusion of installation maps in this report. Individual projects are referenced by installation building number throughout this report and in Appendix B: Installation Development Plan at Arnold AFB List of Proposed Projects (FY2021-FY2026).

Methodology

The 357 projects proposed under the installation development plan were analyzed in accordance with the measures contained in the 2014 PA. The investigations for this analysis were conducted in two steps. The first step was to identify historic properties potentially affected by the proposed projects. This was accomplished through a review of previous cultural resources investigations and cultural resources documents maintained by the Arnold AFB CRM. Arnold AFB maintains a comprehensive inventory of historic properties at the installation. Numerous studies resulted in the identification of historic properties across 100 per cent of the installation. Architectural resources constructed during the Cold War (1946-1991) have been surveyed and evaluated applying National Register Criteria for Evaluation (36 CFR 60.4[a-d]), and the results were accepted by the Tennessee SHPO. Archaeological survey of the installation also is complete and most of the sites identified were evaluated applying the National Register Criteria. No additional field survey or evaluation of built resources was undertaken for this current analysis and recommendations are based on a review of available reports and data on the properties affected by the undertaking. The review of previous investigations is presented in Chapter II.

The second step of the current analysis was to review each proposed project to determine potential impacts to historic properties. This analysis included a review of the project descriptions, locations, and assessments of potential effects to historic properties applying the measures and procedures contained in the stipulations of the PA. A more thorough discussion of the methods used for the determination of effects analysis is presented in Chapter III.

This report supports the EA for Installation Development at Arnold AFB. It is anticipated that formal consultation with the Tennessee SHPO, appropriate Native American Tribes, and the public, execution of PA stipulations, and reporting will be undertaken by the Arnold AFB CRM, as appropriate, in accordance with the executed agreement document.

Staffing

R. Christopher Goodwin & Associates, Inc. (RCG&A) prepared this analysis and report on behalf of Vernadero Group, Inc., through the U.S. Army Corps of Engineers, Mobile District Contract W19278-16D-0002 for Arnold AFB. RCG&A personnel meet and exceed the Secretary of the Interior's (SOI) Professional Standards in the fields of archaeology, architectural history, and history (36 CFR Part 61) and possess past experience with cultural resources located at military installations. Ms. Kathryn M. Kuranda, M. Arch. Hist., Senior Vice President for History and Architectural Services provided oversight for the project and conducted the review of potential effects for built resources. Mr. Jeffrey Maymon, M.A., conducted the review and data analysis for archaeological resources. Ms. Katherine Grandine, M.A., reviewed the previous investigations and supported the data analysis. Mr. Kris West, M.A., provided GIS support.

Organization of the Report

Chapter I of the report contains the introduction, description of the undertaking, and an overview of the methodology, and staffing. Chapter II of the report contains a summary of the status of the identification and evaluation archaeological sites and built resources at Arnold AFB and an overview of the documents that guide the management of historic properties at the installation. Chapter III contains the discussion of the methods and results of the assessment of effects of the undertaking on historic properties in accordance with Arnold AFB's existing PA. Chapter IV contains a summary of the findings and recommendations. The following appendices are included:

A. 2014 Programmatic Agreement;
B. Installation Development Plan at Arnold AFB List of Proposed Projects (FY2021-FY2026); and,
C. Resumes of Key Personnel.

CHAPTER II

PREVIOUS ARCHAEOLOGICAL AND ARCHITECTURAL INVESTIGATIONS AT ARNOLD AFB

This chapter provides a summary of the archaeological and architectural investigations conducted at Arnold AFB and a discussion of the inventory of the installation's historic properties. An overview of documents that guide the management and treatment of historic properties at the installation also is provided.

Previous Archaeological Investigations

Archaeological investigations at Arnold AFB have been conducted over three decades and identified a total of 187 prehistoric and historic sites bridging nearly entire span of human settlement in the region. Numerous Phase I archaeological surveys were completed at the installation, encompassing all of the land currently managed by Arnold AFB. These investigations have included several very large identification surveys, including investigations encompassing 40,000 acres (ac) (Matternes 1997) and 16,825 ac (Wampler et al. 2010a) of the installation. Many other investigations encompassed smaller areas prior to Section 106 undertakings, such as timber harvests or construction of facilities. Other studies focused on evaluating the eligibility of sites. The eligibility status of most of the archaeological sites was assessed during these studies. Of the 187 sites identified on the Base, 14 sites were determined eligible for listing on the National Register of Historic Places (NRHP), 152 sites were determined not eligible for listing, and 21 sites are considered potentially eligible. Since the archaeological inventory is complete, no additional field investigation was completed for this analysis.

Summary of Archaeological Survey and Evaluation Reports

The first investigations within current boundaries of Arnold AFB were conducted during the 1970s. Hasty (1973) conducted a limited archaeological survey along the shorelines of Tims Ford and Woods Reservoirs and recorded several sites. A second survey examined an area in anticipation the planned construction of a large aero-propulsion engine testing facility (Cobb 1977).

Several archaeological investigations were conducted in the 1990s, including a very large survey encompassing most of the installation and several studies for the timber management program and for planned construction of facilities at Arnold AFB. Cantley (1994) surveyed 250 ac in the areas of Rowland Creek and the ASTF Laydown ADJ Par Course but recorded no archaeological sites. Two archaeological surveys were completed in 1995 as part of the Hazardous Waste Remedial Actions Program. The first examined three areas on the installation, including 455 ac in Industrial Site A, 400 ac in Industrial Site B, and a 1.7 ac tract. A single archaeological site was identified. The survey determined that approximately 20 per cent of the surfaces were highly disturbed (Lanham et al. 1995a). The second was a reconnaissance survey of selected areas within the former Camp Forest World War II Military Training Base (Lanham et al. 1995b). Five sites were recorded during the survey, one of which was located outside of Arnold AFB. Two of the four on Arnold AFB were associated with Camp Forest. The other two were Native American lithic scatters. Areas selected for timber harvests were surveyed by Anderson (1996) and Johnson (1998a, 1998b). Anderson examined 25 areas totaling 468 ac, including portions of Camp Forest. Anderson (1996) identified one new historic site and conducted limited Phase II excavations at another. Approximately 212 ac scheduled for timber harvest and thinning in 1997 were surveyed in the spring of that year (Johnson 1998a). A nineteenth century farmstead was recorded and a previously recorded Native American site was tested as part of that effort. Neither site was considered eligible for listing in the NRHP. Another 460 ac scheduled for timber harvest and thinning between 1998 and 2000 also were surveyed (Johnson 1998b). No archaeological sites were identified.

The most extensive archaeological survey at Arnold AFB was conducted in 1997 (Matternes 1997). Nearly the entire installation (40,000 ac) was surveyed using pedestrian reconnaissance and shovel testing within a random sample of areas. The survey identified 71 locations with artifacts, 63 of which were identified as archaeological sites. The sites included a wide range of site types, from multicomponent Native American open habitation and mound sites, to nineteenth and twentieth century domestic, agricultural, funerary, and military sites. Additional investigation was recommended at 26 of the sites to determine their eligibility for the NRHP.

In 1998, reports of human remains eroding from an area on Elder Island within Woods Reservoir prompted investigations to identify and relocate those remains (Allen 1998). Investigators exhumed human remains and grave furnishings dating from 1840 to 1900 and reinterred them in the Elder Cemetery.

A historical study of Camp Forrest was conducted as part of the USAF Legacy Program (Bradley n.d.). Research by a historian acquired documentation on German and Italian prisoner-of-war occupation at Camp Forest. People involved in the construction and/or training activities were interviewed and photos of the installation were acquired. Archaeological Associates, Inc. (AAI) conducted two workshops at Arnold AFB to promote public awareness of cultural resources (USAF 2019). Workshops held in 1998 and 1999 included archival research, oral history, mapping, and metal detector surveys of portions of Camp Forest.

Cultural resource survey of 460 ac surrounding the airstrip at Arnold AFB was completed in 1999 (Stanyard et al. 1999). The investigations included systematic archaeological survey, historical architectural assessment of a farm west of the Arnold AFB boundary, and investigation of 17 buildings and structures within the study area. The lithic artifacts recovered were designated isolated finds and not assigned site numbers. No architectural properties were recommended as eligible for listing in the NRHP.

Archaeological studies completed during the 2000s assessed historic sites and NRHP evaluation of numerous previously recorded sites. In 2002, eight Native American sites located on the Terrace Landscape were evaluated (Hajic et al. 2002). Previous investigations indicated that this landform might contain buried and/or stratified Native American cultural deposits. Sites located on terrace landscapes near the Woods Reservoir Dam, Morris Ferry, and the confluence of Bradley Creek and Woods Reservoir were evaluated using a blend of surface survey, controlled mechanical scraping, backhoe excavation, and soil coring. Five of the eight sites (40CF056, 40FR049, 40FR142, 40FR143, and 40FR238) were judged eligible for the NRHP. An assessment of historic archaeological sites dating prior to 1941 also was completed in 2002 (Bennett et al. 2002). The study examined historic aerial photographs and maps and identified 214 potential historic features marking the locations of farms and other facilities. Field visits to those potential features found that many of those locations had been severely impacted and no cultural features were visible. A majority of the features observed on maps and aerials contained evidence of nineteenth and twentieth century activity but did not warrant identification as archaeological sites. Of the 67 locations that were registered as archaeological sites, 49 were recommended not eligible for the NRHP, 1 site [40CF56] was considered eligible for the NRHP, and 17 sites were recommended for further investigation to determine their NRHP eligibility (Bennett et al. 2002). Ten additional previously recorded historic period sites were evaluated in 2006 (Cochrane et al. 2006). These sites were all farmsteads ranging in age from the mid-nineteenth to mid-twentieth centuries. Five of the sites also include prehistoric period components, one dating from the Early to Middle Woodland period. All ten of the sites were recommended not eligible for listing in the NRHP. Five more historic period farmstead sites were evaluated in 2008 (Alexander et al. 2009). One of the sites included a light Early-to-Middle Archaic period component. Site 40CF290 was determined eligible and additional investigation to delineate and test for intact features at Site 40CF297. The remaining three sites were determined not eligible.

Several surveys completed in the first decade of the twenty-first century focused on remnants of Camp Forrest. A survey of 100 ac of the Tennessee National Guard Tullahoma Volunteer Training Site was completed in 2006 (Deter-Wolf and Karpynec 2006). The survey identified numerous features such as road beds, sewer lines and 24 structure foundations. Nineteen of those foundations are located within the 8.3 ac segregated barracks area associated with the African-American troops stationed at Camp Forrest during World War II (Deter-Wolf and Karpynec 2006). Phase II evaluation of this area was recommended. The study redefined the remains of Camp Forest as a single archaeological site (40CF310). Research on Camp Forrest and its surroundings was continued later that year. A survey of 597 ac within or adjacent to Camp Forest was surveyed (Workinger and Alexander 2007). The survey identified 10 isolated finds and revisited a previously

recorded historic still site (40CF295). The site and isolated finds were determined not eligible for the NRHP. Another 1,018 ac within or adjacent to old Camp Forrest was surveyed in 2008 (Alexander and Redwine 2009). No archaeological sites were identified.

Phase I investigations conducted in 2008 and 2009 examined all areas at Arnold AFB that remained unsurveyed (Wampler et al. 2010a). The 16,825 ac survey identified 74 new archaeological sites, 29 isolated finds, and revisited 17 previously recorded sites. The sites and isolates date as follows: forty-five of those sites contained occupations date from the prehistoric period; 27 sites date from the historic era; one site included prehistoric and historic period occupation; and one site was undetermined. The study also found that unmarked graves associated with the Haynes-Howard cemetery, which borders the Arnold AFB boundary, may extend onto Arnold AFB's property. Thirty-one of the newly identified sites warranted additional investigation to determine their eligibility for listing in the NRHP. Additional work was recommended at 12 previously recorded sites to determine their NRHP eligibility.

In 2010, archival research on the 8.3 ac African-American barracks locale at Camp Forrest (40CF310) was undertaken in an effort to evaluate the NRHP significance of the property (Schenker et al. 2010). Archival research and oral history interviews provided insight into how the camp was organized and operated. The researchers concluded that the archival data and archaeological remains of African-American barracks locale at Camp Forest were not as rich as those for other military facilities and therefore the site was not eligible for listing on the NRHP.

Geophysical investigations to delineate potential graves at the Huffar Cemetery at Arnold AFB were completed in 2010 (Simpson 2010). The goal of the study was to allow the base to more confidently use areas adjacent to the historic cemetery for potential reburial of Native American remains and NAGPRA articles.

Studies completed between 2010 and 2019 assessed the NRHP eligibility of 39 previously recorded archaeological sites. A study completed in 2010 included testing, geomorphological study, and geophysical survey was completed at four Archaic and Woodland period sites (Wampler et al. 2010b). Only one of the four sites (40FR237) was determined eligible for listing on the NRHP (Wampler et al. 2010b). Twelve additional sites were evaluated in 2016 (Bradley et al. 2016). Nine of the sites investigated are late nineteenth and/or early twentieth century farmsteads. The other three sites are prehistoric lithic scatters. Four of the sites, three farmsteads (40CF287, 40CF289, 40CF336) and one Early to Middle Archaic period site (40CF319), were determined eligible for the NRHP. Twelve more archaeological sites were evaluated in 2017 (Stallings et al. 2017). Ten of the sites are from the prehistoric period, one is a late nineteenth to early twentieth century farmstead, and one is multicomponent. One of the 12 sites, 40CF124, a multi-component prehistoric site, was determined eligible for listing on the NRHP. A group of six prehistoric sites was examined later in 2017 and 2018 (Somers et al. 2018). Four of the sites were determined not eligible and two sites could not be relocated and were therefore identified as not present. Finally, a group of five sites was evaluated the following year (Gregory et

al. 2019). Four of the sites are prehistoric and one site includes an unidentified prehistoric component and an early nineteenth century mill.

Historic Properties – Archaeology

Inventory of archaeological resources on Arnold AFB property was completed in numerous surveys between 1973 and 2009. A total of 187 sites are recorded on the base, including 95 sites that date from prior to European settlement, 78 sites that date from the nineteenth and twentieth centuries, and 14 sites with components dating from both periods. The pre-European sites range in age from the Early Archaic through the Late Woodland periods and often were characterized as lithic scatters. Some of these were camp sites with evidence of archaeological features and other intact deposits. The nineteenth and twentieth period sites include many farmsteads as well as features associated with World War II Camp Forrest. Several of the studies examined portions of the camp as well as its history as an African-American training facility.

The NRHP eligibility of most archaeological sites was assessed based on the results of surveys or more intensive Phase II investigations. Fourteen sites were determined eligible for listing on the NRHP. An additional 18 sites were assessed as potentially eligible for the NRHP. Ten of these sites date from prehistoric periods, including large stratified Early Archaic to Woodland period sites, smaller Archaic and Woodland period sites, and a Mississippian site (40CF056, 40CF124, 40FR049, 40FR142, 40FR143, 40FR210, 40FR237, 40FR238, 40FR239, 40FR319). Four sites are historic period farmsteads; three from the early twentieth century (40CF287, 40CF289, 40CF290) and one from the late nineteenth to early twentieth century (40CF336).

The NRHP eligibility of 17 additional sites has not yet been evaluated. These sites include 15 prehistoric sites (40CF273, 40CF308, 40CF321, 40CF340, 40CF346, 40CF353, 40CF354, 40CF355, 40CF358, 40CF359, 40CF360, 40CF362, 40FR229, 40FR236, 40FR578) and two historic period farmsteads (40CF297, 40CF325). Two archaeological sites and one plant species have been identified as Traditional Cultural Properties (TCPs) (USAF 2019). A small Mississippian period mound site (40FR210) is considered eligible for the NRHP and was identified as a TCP by the Seminole Nation. A small stone pile of unknown origin (40CF324) was identified as potentially eligible for the NRHP and a TCP if it is determined to be prehistoric in age. Available records indicate that the remaining sites are not eligible for listing on the NRHP and do not constitute historic properties.

Previous Architectural Investigations

Arnold AFB was established and constructed during the Cold War. The built resources constructed between 1946 and 1991 have been surveyed and evaluated in five architectural investigations. The architectural survey efforts completed in 2014 and 2017 resulted in a 100 per cent comprehensive survey and evaluation of architectural resources constructed during the Cold War era (1946 to 1991) applying the NRHP for Evaluation (36 CFR 60.4[a-d]). The results and evaluation recommendations contained in the four-volume

(2014 and 2017) Cold War Report were accepted by the Tennessee SHPO (Prybylski et al. 2014 3 Vols.; Prybylski and Edge 2017 Vol. 4).

Summary of Previous Architectural Survey Reports

In 1997, Science Applications International Corporation conducted a Phase I reconnaissance survey of 310 built resources located primarily in the industrial area of Arnold AFB. At that time, the surveyed buildings were generally less than 50 years of age and did not possess the "exceptional significance" for properties less than 50 years of age applying National Register Criteria Consideration G (USAF 2019:109).

In 2005, GeoMarine conducted an architectural survey and evaluation of built resources constructed during the Cold War era. This investigation produced an expanded historic context focused on the Cold War history of the installation. The report included the identification of a historic district comprising the testing complexes. The testing complexes met National Register Criteria A and C for significance on the national level for the "successful testing and deployment of America's missile system and space programs of the 1950s and 1960s" (USAF 2019). The GeoMarine survey, however, was not submitted for concurrence to the Tennessee SHPO (Prybylski et al. 2014:Vol 1:35).

In 2014, AMEC Environment & Infrastructure, Inc., was contracted to consolidate the data collected during all previous architectural surveys; to assess the National Register eligibility of 563 built resources both individually and collectively as historic districts, historic landscapes, or a multiple property listing; and, to submit the evaluation recommendations to the Tennessee SHPO for review and concurrence. The built resources constructed between 1946 and 1989 were evaluated within the Cold War historic context. The results of the survey were submitted in a three-volume report. Volume 1 contained the introduction, the historic context, background research and project methodology, summary of previous surveys, and findings and conclusions (Prybylski et al. 2014:Vol 1). Volume 2 contained building descriptions of all resources surveyed and recommendations of NRHP eligibility for five individual built resources, one historic district, and two historic landscapes: the Arnold AFB Test Facility Historic District with 66 contributing historic resources, the Elk River Dam-Woods Reservoir Historic Landscape with four contributing resources, and the Test Utilities Historic Landscape with 10 contributing resources. The historic district and landscapes also were mapped (Prybylski et al. 2014:Vol 2). Volume 3 contained supplemental information in two appendices (Prybylski et al. 2014:Vol 3). The three-volume report and Tennessee SHPO architectural survey forms for the surveyed buildings were submitted to the Tennessee SHPO for review and concurrence. The Tennessee SHPO accepted the survey results and evaluation recommendations in a concurrence letter dated June 3, 2016.

In 2017, Amec Foster Wheeler Environment and Infrastructure, Inc., conducted the survey and evaluation of 119 additional buildings at Arnold AFB as an addendum volume to the 2014 architectural survey. This separate contract occurred because the Department of Defense officially redefined the Cold War era as ending in 1991. The 119 buildings

included buildings and structures constructed in 1990-1991, as well as buildings and structures that were not included in the earlier report. None of the 119 buildings was evaluated as possessing NRHP significance individually or as contributing resources to the previously identified historic district or the historic landscapes (Prybylski and Edge 2017:Vol 4). Buildings surveyed in the 2017 addendum were recorded on Tennessee SHPO architectural survey forms. The Tennessee SHPO accepted the survey results in a concurrence letter dated October 18, 2017.

Historic Properties - Architectural

The results of the 2014 Cold War Report were summarized in an internal memorandum dated February 3, 2017 from the Arnold AFB CRM Shannon Allen to Arnold AFB Real Property officer. The memorandum listed the 85 historic buildings at Arnold AFB that are NRHP-eligible. The Tennessee SHPO concurred with the eligibility of these properties. The 85 buildings were coded as either "National Register Eligible – Individual" (NREI) (n=5) and "National Register Eligible District – Contributing Element" (NREC) (n=80) (Allen 2017). The historic properties tabulated in the February 2017 memorandum and the historic properties and districts mapped in the Arnold AFB GIS represent the definitive list of the historic architectural properties at Arnold AFB.

The 2014 Cold War Report also contained NRHP evaluations for selected buildings constructed after 1991. These built resources from the recent past were found to be not eligible for NRHP listing; however, re-evaluation of the resources was recommended once they reach 50 years of age (Prybylski et al. 2014:Vol 1:Table 6.1). The Tennessee SHPO concurred with the recommendations.

National Register Eligible – Individual" (NREI) Buildings

Five of the 85 historic properties at Arnold AFB are individually eligible for listing in the NRHP. These buildings are 100, the administration and engineering building, constructed in 1953; 350, the precisions measurement equipment laboratory, constructed in 1965; 451, the model shop, constructed in 1953; 1476, warehouse no. 1, constructed in 1951; and, 1478, the base civil engineering building, constructed in 1952 (Allen 2017). Building 100 is located near the front gate on the east side of installation. Buildings 350 and 451 support research activities and are located along the major entry road to the installation north of the central testing area. Buildings 1476 and 1478 are installation support buildings and are sited south of the central testing area in what became the installation support and utility area.

In 2014, Building 100 was evaluated as eligible for listing in the NRHP applying National Register Criterion A for its association with historical trends, and Criterion C for its architecture during the Cold War era (1946-1991). Under Criterion A, Building 100 is associated with "the military development of the cold war [sic]; military RDT&E [research, development, testing and evaluation], [and] the history of Arnold AFB" (Prybylski et al. 2014:Vol 2:7). Building 100 is a place "where significant program-level events occurred

regarding the origins, operation, and/or termination of the Cold War because it contains the AEDC Technical Library and the offices of many of the scientists and support staff involved in key roles in the Cold War mission for the AEDC, and, as such, represents the location where decisions and actions regarding aviation and missile technology associated with Cold War political and military aims were discussed and developed" (Prybylski et al. 2014:Vol 2:7).

Under Criterion C, Building 100 is significant as the most "distinguished" building at Arnold AFB. Building 100 is an example of the work of the Nashville architectural firm of Marr and Holman and reflects the "Mid-Century Modern/International Style" (Prybylski et al. 2014:Vol 2:7). Character-defining features of the building are its footprint; its massing, comprising a three-story central entry block and two-story wings; its exterior materials of brick sections and marble-clad entry; the treatment of the main entry; its ribbon windows on all elevations; exterior metal railings; and flat roof. In addition, the interiors retained much of their original architectural details, and finishes included the entry lobby, the library, and the cafeteria (Prybylski et al. 2014:Vol 2:2-7).

Building 350 was constructed as a laboratory for repairing, maintaining, and calibrating sensitive measuring equipment. Building 350 was evaluated as eligible for the NRHP applying National Register Criterion A for its association with historical trends, and Criteria Consideration G for exceptional significance for history and architecture during the Cold War era (1946-1991). The building "has a direct and significant association with the Cold War because it contains laboratories in which crucial tests were conducted to fulfill the mission of Arnold AFB. Additionally, the International style of the building has remained intact…" Building 350 has a connection "to Cold War policies, testing, and associated nationally- significant and tangible events, its association with the Cold War context, and Cold War activities that gives it exceptional Cold War significance" (Prybylski et al. 2014:Vol 2:10). Character-defining features of this building include a cast-concrete foundation, steel structure with brick cladding, one-story height, irregular massing even with an addition, and flat roof. The building has an original main entry and ribbon windows, despite window replacements that are "still in the International style pattern" (Prybylski et al. 2014:Vol 2:8). The interior of the building contains several laboratories, but has been remodeled with drop ceilings. Only the main hallway retains its original height (Prybylski et al. 2014:Vol 2:10).

Building 451 is the main shop for fabrication of models used in the testing programs of AEDC (Prybylski et al. 2014:Vol 2:12-16). The building also contains offices and administration space. Building 451 was evaluated as eligible for inclusion in the NRHP applying National Register Criteria A and C. The building met Criterion A for its "direct connection to the Cold War mission of AEDC and Arnold AFB during the Cold War era (1946-1991). It is distinguished as a place where significant program-level events occurred regarding the origins, operation, and termination of the Cold War" (Prybylski et al. 2014:Vol 2:15).

Applying Criterion C, Building 451 has architectural significance. "The footprint and shape of the building; the continuous [metal-frame] ribbon windows; and the materials

[concrete, red brick, tile, metal panels] used are all elements of the International style of architecture that was prevalent in institutional buildings in the 1950s" (Prybylski et al. 2014:Vol 2:16). Other character-defining features include the central entrance and the flat roof. Alterations include the stationary storm windows that encase the original windows. The interior was divided into purpose-specific areas that included offices, laboratories, and testing facilities. In 2014, "much of the interior(s)…retain their original architectural details" though office spaces have undergone renovation (Prybylski et al. 2014:Vol 2:15).

Building 1476, warehouse no. 1, functions as the shipping and receiving center (Prybylski et al. 2014:Vol 2:17-22). Building 1476 was evaluated as eligible for listing in the NRHP applying National Register Criteria A and C with the period of significance defined as the Cold War era (1946-1991). Applying Criterion A, Building 1476 was the first building completed at the installation and is associated with Arnold AFB's early establishment. "As the base's first and most essential shipping, receiving, and material repository structure, Building 1476 represents an integral part of the testing mission of the base" (Prybylski et al. 2014:Vol 2:21). For a short time period, Building 1476 served as the installation headquarters and it was the location of President Truman's speech at the dedication of AEDC (Prybylski et al. 2014:Vol 2:21).

Applying Criterion C, Building 1476 was designed by Buell-Roberts Architects and is eligible "due to its association with the original requirements of a test facility such as Arnold AFB, as well as distinctive architectural characteristics…the building represents a critical element of the AEDC's original concept, spatial organization, and operation, which contributes strongly to historical significance of the base in general" (Prybylski et al. 2014:Vol 2:21). Character-defining features of the building include the building's rectangular footprint, height and massing, the exterior brick walls, the ribbon configuration of the windows (though containing replacement windows), the exterior warehouse doors, and the low-pitch gable roof. The south elevation contains a large two-story multi-panel cantilever door system similar to hangar doors and interior large sliding fire doors that are identified particularly as character-defining features of the building. Building elements that have been replaced include replacement windows, replacement entry doors, and a new loading dock. The interior of the building is divided between an administration/office area and the large warehouse with storage areas. Interior finishes in the administration area are plaster walls, linoleum tile and carpeted floors, and drop tile ceilings. In the warehouse area, interior finishes are brick walls, concrete floors, and exposed metal beam ceiling (Prybylski et al. 2014:Vol 2:17-21).

Building 1478, the base civil engineering building, was evaluated as eligible for listing in the NRHP applying National Register Criteria A and C with the period of significance defined as the Cold War era (1946-1991) (Prybylski et al. 2014:Vol 2:23-27). Applying Criterion A, Building 1478 is eligible based on its "connection to historically-significant engineering activities established by the USAF at Arnold during the Cold War. As one of the base's main planning and engineer centers, Building 1478's key roles represent an early development of military innovations or technologies through the design and erection of mission based structures, buildings, and equipment. As part of base wide

construction projects, Building 1478 has played a fundamental part of Arnold AFB as a whole" (Prybylski et al. 2014:Vol 2:27).

Building 1478 was designed by Buell-Roberts Architects and is NRHP-eligible under Criterion C "due to its distinctive architectural characteristics" and exhibits elements that are some of the best examples of the International style on the installation (Prybylski et al. 2014:Vol 2:27). Character-defining features include the height, massing, and footprint of the building, the exterior brick veneer over concrete block, a cupola, the main entry, windows, doors, and roof configuration. Especially noted are the long bands of horizontal windows that form "an almost suspended 'wall of glass' on the east and west elevations that provide natural daylight to the interior. The Art Deco elements located on the south elevation also are character-defining features (Prybylski et al. 2014:Vol 2:27). The building interiors are divided between administration and offices and specialized shop areas in the rear. Administration areas have linoleum tile and carpeted floors, plaster walls, and drop ceilings. Shop areas have concrete floors, walls of brick and glass windows, and exposed metal beams (Prybylski et al. 2014:Vol 2:24).

National Register Eligible District – Contributing Elements to District and Landscapes (NREC)

Eighty (80) historic properties at Arnold AFB are contributing elements to the one historic district and the two historic landscapes identified at Arnold AFB (Allen 2017). Historic districts and landscapes are defined as areas with recognizable concentrations of resources united by plan and historical development. The Arnold AFB Test Facility Historic District contains 66 contributing historic resources; the Elk River Dam-Woods Reservoir Historic Landscape contains 4 contributing resources; and, the Test Utilities Historic Landscape contains 10 contributing resources (Figure 2-1).

Arnold AFB Test Facility Historic District contains 66 contributing buildings (Prybylski et al. 2014:Vol 2:29-35). The historic district was evaluated applying National Register Criteria A, B, C and Criteria Consideration G. The Arnold AFB Test Facility Historic District is the core of the installation and embodies the installation's RDT&E mission during the Cold War era (1946-1991). "It was in these buildings that the research and test missions of the installation have always been fulfilled, missions that originated from the Cold War" (Prybylski et al. 2014:Vol 2:30). The contributing resources to the historic district "have a direct and significant association with the development of the base, the Cold War, and the advancement of USAF aviation and weapon technology" (Prybylski et al. 2014:Vol 2:30). The buildings were constructed "in response to technological needs coming out of World War II as well as Cold War initiatives, strategies, politics, and needs…These buildings were unique to Arnold AFB and the AEDC" (Prybylski et al. 2014:Vol 2:31).

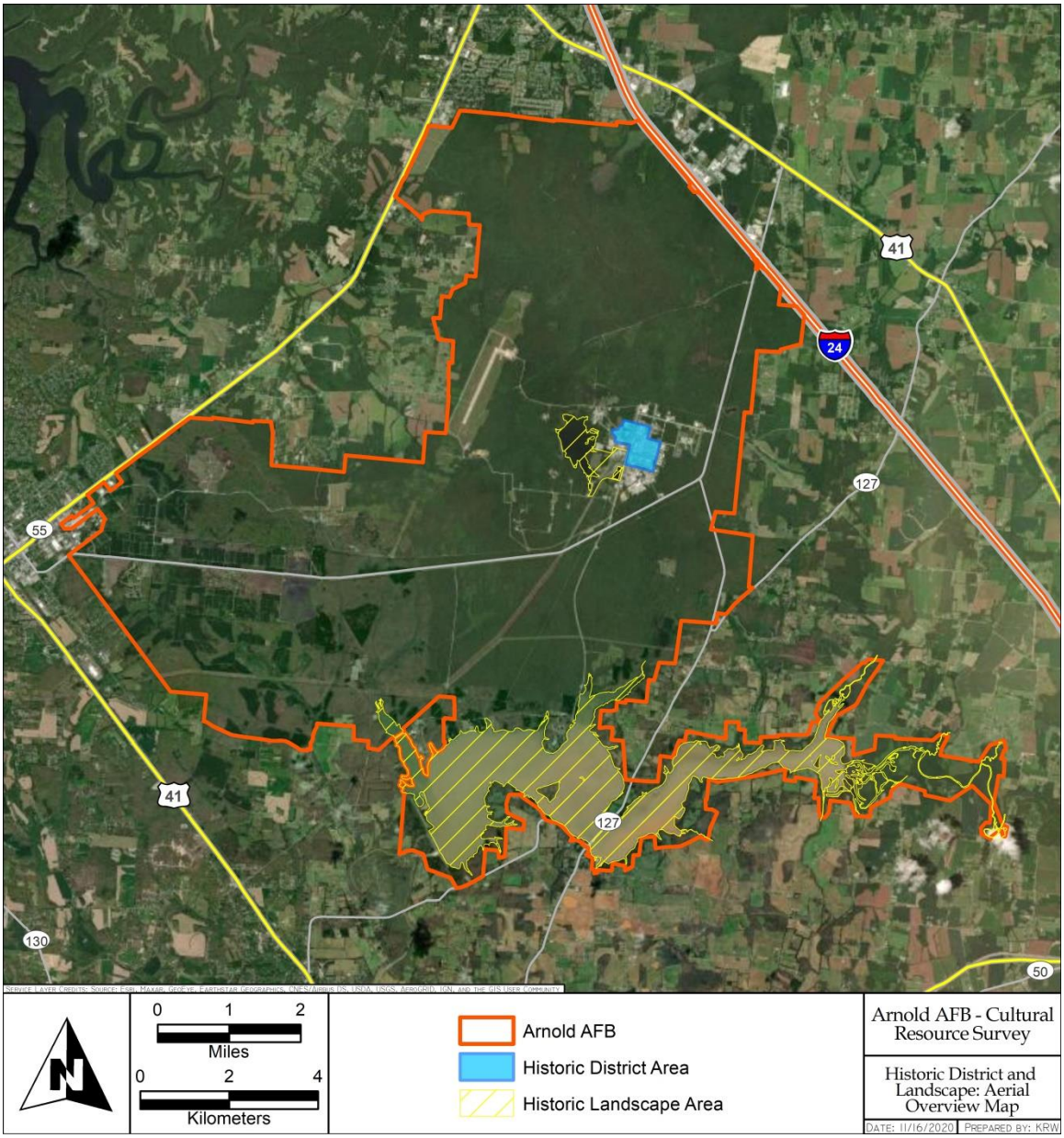

Figure 2-1 Arnold Air Force Base Historic District and Landscapes Aerial Overview Map

The historic district is eligible for listing in the NRHP applying Criterion A and Criteria Consideration G due to its association with the development and research on aircraft, spacecrafts, jet engines, and rocket propulsion as part of AEDC's missions during the Cold War era. Applying Criterion B, the historic district is eligible due to its direct "associations with historic persons, including General Hap Arnold and Dr. Theodore von Karman. Through the work of these two men in the initial proposal of the AEDC for the USAF, the development of the PWT, ETF, and VKF test facilities were realized" (Prybylski et al. 2014:Vol 2:31). Dr. Karman was associated directly with the engineering

and designs of the wind tunnels and his expertise in conducting actual testing using the wind tunnels (Prybylski et al. 2014:Vol 2:31).

According to individual building documentation, the contributing resources in the Arnold AFB Test Facility Historic District also meet National Register Criterion C for their unique design and engineering. The buildings were designed and purpose-built to fulfil "the research and test missions of the installation…missions that originated from the Cold War" (Prybylski et al. 2014:Vol 2:30). The character of the area is industrial with large buildings supported by numerous smaller support structures and equipment connected by above-ground piping and steam lines. Character-defining features of the individual contributing buildings in the historic district are their massing, height, construction materials, door and window openings, and roof shape. Interiors typically were not noted in the documentation for individual buildings (Prybylski et al. 2014:Vol 2). The boundary of the historic district is defined generally as Second Street on the north, Schriever Avenue on the east, Fifth Street on the south, and North Hap Arnold Drive and an unnamed access road on the west.

The Elk River Dam-Woods Reservoir Historic Landscape contains four contributing resources and the circulation network. The historic landscape was evaluated applying National Register Criteria A and C (Prybylski et al. 2014:Vol 2:247-276). Applying Criterion A, the Elk River Dam-Woods Reservoir Historic Landscape has a direct "connection to historically-significant cooling water established by the USAF at Arnold" and was one of the first and most vital water storage facilities constructed for the installation. The historic landscape represents "an essential element of the AEDC's original design and mission, and directly contributes to the historical significance of the air force base." The reservoir was planned in the initial stages of the development of the installation for the sole purpose of meeting the critical need water to provide sufficient cooling to the test facilities (Prybylski et al. 2014:Vol 2:274-276).

Applying Criterion C, the Elk River Dam-Woods Reservoir Historic Landscape is eligible since is it a military-engineered landscape designed to serve "the missions of Arnold AFB since its creation in 1952" (Prybylski et al. 2014:Vol 2:275). The four contributing resources to the Elk River Dam-Woods Reservoir Historic Landscape are the Elk River Dam (Facility 3101), the reservoir (Facility 20007), the pumping station (Building 3038) and its equipment (Facility 3039), and the circulation network (Prybylski et al. 2014:Vol 2:274-276). The boundary of the historic landscape is the shoreline of the Woods Reservoir and the footprint of the Elk River Dam. In addition, the Elk River Dam (Facility 3101) was recommended as an individually eligible resource based on its architectural significance as "gravity-type" barrier (Prybylski et al. 2014:Vol 2:275).

The Test Utilities Historic Landscape is an integrated military-engineered landscape that contains water features and utility buildings designed to provide cooling water and control of electrical power to support the testing mission of Arnold AFB during the Cold War era (1946-1991) (Prybylski et al. 2014:Vol 2:291-311). The Test Utilities Historic Landscape contains 10 contributing resources and the circulation network. The historic landscape was evaluated applying National Register Criteria A and C. Applying

Criterion A, the historic landscape has a direct "connection to historically-significant cooling water established by the USAF at Arnold." The landscape represents "an essential element of the AEDC's original design and mission, and directly contributes to the historical significance of the air force base" as an on-base source of water provided to cool test facilities and as the location of power control facilities that regulated and directed electrical power to operate the test facilities (Prybylski et al. 2014:Vol 2:309).

Under Criterion C, the Test Utilities Historic Landscape is eligible as a designed landscape which has served the testing mission of Arnold AFB since its establishment in 1952. Military planners consciously designed the landscape and the supporting utility facilities to provide a cooling function to the test buildings. "While these building retain a common design typical of a utilitarian building, there are design elements that differentiate them from more common utility buildings, such as building size/footprint, materials, window placements, and equipment" (Prybylski et al. 2014:Vol 2:309-310). The contributing buildings to this landscape include the embankment dam (Facility 2102), the retention reservoir (Facility 20008), the above-ground reservoir (Facility 1506), treating and pumping equipment (Facility 1502), water treatment building (Building 1504), secondary pumping station (Building 1507), the power control house (Building 1525), the oil pump house-main station (Building 1526), the Rowland cooling water ditch (Facility 1545), and the industrial waste treatment and disposal reservoir (Facility 1560). Other buildings contained within the historic district boundaries are non-contributing resources. The boundary of the historic landscape is the embankment dam and the shoreline of the retention reservoir on the west, the access trail and Fourth Street on the north, and North Hap Arnold Drive on the east.

Documents Guiding Management of Historic Properties at Arnold AFB

Two documents guide the management and treatment of historic properties at Arnold AFB: the PA and the Integrated Cultural Resources Management Plan (ICRMP).

Programmatic Agreement (PA)

The *Programmatic Agreement between Arnold Engineering Development Complex, Arnold Air Force Base and the Tennessee State Historic Preservation Officer Regarding Management of Historic Properties at Arnold Air Force Base, Tennessee Pursuant to 36 CFR Part 800.14* (PA) was negotiated in 2014 and remains in effect until 2024. The PA establishes alternative procedures to implement Section 106 in accordance with 36 CFR 800.14(b). The PA is a document that guides the installation's management responsibilities for historic properties while balancing the need of the military mission. The PA was negotiated among AEDC, Arnold AFB; the Tennessee SHPO; the City of Tullahoma; and, the Center for Historic Preservation at Middle Tennessee State University. Arnold AFB also invited the following tribes to consult on the PA concerning places of religious and cultural significance to them that may be affected by undertakings:

- Absentee Shawnee Tribe of Oklahoma,
- Alabama-Coushatta Tribe of Texas,
- Alabama-Quassarte Tribal Town of Oklahoma,
- Cherokee Nation,
- Chickasaw Nation of Oklahoma,
- Coushatta Tribe of Louisiana,
- Eastern Band of Cherokee Indians,
- Eastern Shawnee Tribe of Oklahoma,
- Kialegee Tribal Town,
- Muscogee (Creek) Nation of Oklahoma,
- Poarch Band of Creek Indians,
- Seminole Nation of Oklahoma,
- Shawnee Tribe of Oklahoma,
- Thlopthlocco Tribal Town, and the
- United Keetoowah Band of Cherokee Indians in Oklahoma.

The United Keetoowah Band of Cherokee Indians accepted Arnold AFB's invitation to consult on the PA and was included as a concurring party to the document. In summary, Arnold AFB and the Tennessee SHPO agreed that the undertakings at Arnold AFB shall be administered in accordance with the stipulations in the PA and the ICRMP in order to satisfy Arnold AFB's responsibility for compliance with Section 106 of the NHPA. A copy of the PA is contained in Appendix A.

The PA establishes standards and procedures for the management and treatment of historic properties in Stipulation I. The standards include the ACHP's 1991 report to Congress entitled *Balancing Historic Preservation Needs with Operation of Highly Technical or Scientific Facilities*; *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings*; the Secretary of the Interior's *Standards and Guidelines for Archaeology and Historic Preservation* (Federal Register, Vol. 48, page 44716, September 29, 1983); *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Historic Landscapes* (Secretary of the Interior [SOI] 2017); and, the Tennessee SHPO reporting standards for archaeological and architectural resource identification studies.

The PA provides a procedural approach in the identification and evaluation of historic resources in Stipulations III and IV. Historic properties are defined in Stipulation IV as resources that have been evaluated in accordance with the National Register Criteria for Evaluation (36 CFR 60.4[a-d]) with concurrence by the Tennessee SHPO (IV.E.1). Any resource with an undetermined status will be considered NRHP-eligible until such a time as it can be evaluated in consultation with the Tennessee SHPO (IV.E.2). Any resource determined to be not eligible for listing in the NRHP by consensus with the Tennessee SHPO is not a historic property and will not require protection under this PA or further consultation with the Tennessee SHPO under 36 CFR Part 800 (IV.E.3).

The management procedures outlined in the PA apply to all historic properties identified at Arnold AFB. Stipulation II of the PA discusses two classes of projects exempted from further review: projects that are included in the categories outlined in Appendix B and mission critical projects. Stipulation II.A of the PA states that certain undertakings are exempted from further review by the Tennessee SHPO. Appendix B includes the list of negotiated work exemptions organized by categories. If a potential project is classified as an exempted undertaking, then no further consultation with the Tennessee SHPO is required.

Stipulation II.C states that "undertakings that result in changes to test cell configuration, ongoing maintenance, or upgrades to National Register eligible buildings, structures, and equipment that Arnold AFB determines are critical to its ongoing test/evaluation mission (mission critical) are exempt from further consultation." Projects affecting historic properties that Arnold AFB classifies as mission critical will need to be documented prior to the start of the project. Documentation requirements are detailed in Stipulation VIII.

When projects cannot be classified as exempt undertakings, the projects are reviewed following the procedures for determining effects outlined in Stipulation V of the PA. Stipulation V defines three categories of effects determinations: no historic properties affected (V.1), no adverse effect (V.2), and adverse effect (V.3). The PA details reporting requirements for each finding of effect. A procedure for resolving adverse effects is detailed in Stipulation VI. Under this stipulation, tribes also are consulted whenever a proposed undertaking may adversely affect National Register eligible prehistoric archaeological sites. Standardized treatments and procedures for demolition of historic properties and new construction in the historic district or the historic landscapes are detailed in Stipulation VII.

Documentation and monitoring requirements are contained in Stipulation VIII. The Arnold AFB CRM is required to provide an annual report summarizing the projects undertaken during the previous year. Stipulation VIII.D specifies the information required for inclusion in the annual report, such as project number, title, and description; purpose and need; cultural resources project comments; further work needed; cultural resources affected; and, consultation efforts. The PA also includes procedures for emergency situations (Stipulation IX), for inadvertent discoveries (Stipulation X), and for dispute resolution (Stipulation XI).

Integrated Cultural Resources Management Plan (ICRMP)

The Air Force requires the development of integrated cultural resources management plans (ICRMP) for their facilities in accordance with AFMAN 32-7003, *Environmental Conservation*, and DoDI 4715.16, *Cultural Resources Management*. The purpose of the ICRMP is to plan for the effective management and protection of cultural resources. The ICRMP for Arnold AFB (USAF 2019) provides information on the installation's mission, a brief overview of the installation's history, legal requirements, and goals and objectives for the cultural resources program. In addition, the ICRMP contains a

review of previous cultural resources investigations that have occurred at the installation and lists detailing the evaluation status of cultural resources located at the installation. Standard operating procedures for directing cultural resources activities also are provided in the ICRMP, as well as guidance for integrating CRM with installation planning procedures (USAF 2019).

CHAPTER III

ANALYSIS OF PROPOSED PROJECTS IN ACCORDANCE WITH PA

Introduction

The current undertaking is defined as the Installation Development Plan at Arnold AFB (FY2021 to FY2026). Three-hundred-fifty-seven (357) individual projects are proposed under this undertaking. These projects are identified in the 2017 Arnold AFB Installation Development Plan (IDP) (USAF 2020) and will provide improvements necessary to support the mission of the installation and tenant units. For the purposes of this analysis, the boundaries of Arnold AFB were adopted as the APE.

The purpose of this chapter is to present the analysis of 357 proposed projects in accordance with the measures contained in the 2014 PA. A copy of the 2014 PA is included in Appendix A. A complete table of the individual projects proposed under the undertaking is contained in Appendix B (USAF 2020). This table identifies the historic properties potentially affected by each action and the appropriate conditions, treatment and/or mitigation measures defined in the 2014 PA.

Methods of Analysis

Of the 357 projects, 212 projects include work to historic properties, while 30 projects are planned for non-contributing, non-historic resources within historic districts. The remaining 115 projects involve proposed work to non-historic properties. Of these 57 projects are planned for buildings located in non-historic areas, while 58 projects are planned for buildings and areas adjacent to historic properties. The individual projects in the undertaking were analyzed applying the following:

1. Installation Development at Arnold AFB is an undertaking that has the potential to cause effects to historic properties pursuant to Section 106 of NHPA. The undertaking is defined as Installation Development at Arnold AFB (FY2021 to FY2026) and includes demolition, renovations, and new construction projects that meet the needs and priorities of the installation.

2. The *Programmatic Agreement between Arnold Engineering Development Complex, Arnold Air Force Base and the Tennessee State Historic Preservation*

Officer Regarding Management of Historic Properties at Arnold Air Force Base, Tennessee Pursuant to 36 CFR Part 800.14 was executed in 2014 to streamline the Section 106 consultation process. Implementation of the terms and conditions of 2014 PA with regard to the 357 proposed projects will evidence that Arnold AFB has taken historic properties into account and satisfied NHPA Section 106 responsibilities for the individual projects proposed.

3. Arnold AFB has classified 70 of the 357 projects as mission critical. Of the 70 mission critical projects, 47 projects are planned for historic properties, while seven projects are planned for non-historic properties in historic districts. The remaining 16 mission critical projects are planned for non-historic properties. Of the 16, one project is located adjacent to the Arnold AFB Test Facility Historic District, while the remaining 15 are located in non-historic areas.

4. It is anticipated that a number of the proposed projects will be developed integrating the criteria identified for projects exempted from Tennessee SHPO review and/or in compliance with the *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Buildings* (2017). It is further anticipated that final plans and specifications for projects that cannot accommodate the conditions required for exempted work or cannot comply with the SOI's standards, will be reclassified and treated in accordance with the relevant provisions of the 2014 PA. Federal responsibilities under NHPA Section 106 for all of the 357 projects proposed under the Installation Development Plan will be satisfied through the terms and conditions of the PA.

Each project proposed under the Installation Development Plan was reviewed to identify historic properties affected, to identify the qualifies of significance and integrity contributing to their National Register eligibility, and to assess project effects and appropriate treatments and/or mitigation measures applying the conditions of the PA.

The PA and Arnold AFB GIS data were utilized in this analysis, as well as the current Arnold AFB ICRMP and reports on previous cultural resource investigations. The GIS data included installation infrastructure mapping, project locations, brief project summaries, and cultural resources layers identifying historic properties, archaeological sites, cemeteries, the historic district, and the two historic landscapes.

As discussed in Chapter II, the comprehensive inventory of historic architectural properties at Arnold AFB comprises five individually eligible historic buildings (NREI) and eighty contributing resources (NREC) to either the Arnold AFB Test Facility Historic District, or the two historic landscapes, i.e., Test Utilities Historic Landscape and the Elk River Dam-Woods Reservoir Historic Landscape. No NRHP eligible archaeological sites are located within proposed project areas.

The current study also identified Buildings 436 and 1757 that have not been previously documented or evaluated for NRHP eligibility. These buildings are treated as

historic properties for the purposes of the current analysis pursuant to Stipulation IV.E.2 of the 2014 PA, which requires buildings with undetermined NRHP eligibility status to be treated as historic properties for the purposes of the PA. Four archaeological sites also were affected by the proposed work, none of which is eligible for the NRHP. The undertaking will have no effect to archaeological historic properties.

Non-historic properties at Arnold AFB include:

- Non-contributing buildings located within the boundaries of the one historic district and two historic landscapes;
- buildings constructed between 1946 and 1991 evaluated as not eligible for NRHP listing in the 2014 and 2017 Cold War Reports;
- buildings constructed post-1991 evaluated in the 2014 Cold War Report as not NRHP eligible, but recommended for re-evaluation when those buildings turn 50 years of age (Pybylski et al. 2014:Vol 1:Table 6.1; Prybylski and Edge 2017:Vol IV:Table 1.1); and,
- archaeological sites determined not eligible for listing on the NRHP. The four sites affected by the proposed work that are not eligible include 40CF293 (Cochrane et al. 2006), 40CF334 (Wampler et al. 2010a), and 40FR502, and 40CF310 (Wampler et al. 2010a; Schenker et al. 2010).

The following discussion summarizes the assessment of effects on historic properties for the projects proposed under the Installation Development Plan at Arnold AFB and the treatment and/or mitigation measures defined in the governing agreement document (PA). This discussion generally is organized to correspond to the organization of 2014 PA. A project-by-project analysis is contained in Appendix B.

Exempted from Tennessee SHPO Review under Appendix B of the 2014 PA

Stipulation II of the PA identifies two categories of projects exempted from further Tennessee SHPO review. These categories are projects that are included in the exempted work categories outlined in Appendix B (Stipulation II.A) and mission critical projects (Stipulation II.C).

Appendix B identifies exempted work in eight categories: (1) *Structural elements, support systems, and heavy equipment;* (2) *Building exteriors*; (3) *Building interiors*; (4) *Infrastructure*; (5) *Landscapes*; (6) *Erosion control;* (7) *Waste control;* and, (8) *Public health and safety*. Projects within these exempted categories completed in accordance with the conditions for the category are exempted from Tennessee SHPO review.

Selected projects in the five-year cycle include scopes of work containing work that is eligible for exemption and work outside the exemption categories. These multi-task projects were assessed holistically under the current analysis to determine the project's overall potential to affect historic properties and to determine the applicable measures of the 2014 PA.

A total of 103 projects contained in the Installation Development Plan are exempt from further Tennessee SHPO review applying Appendix B. The majority of the exempted projects fall under the category *Structural elements, support systems, and heavy equipment*. Fifty-seven projects are exempted under Appendix B.1.b subcategory, *Installation, maintenance, repair, or replacement of ancillary systems or components.* This subcategory includes installation and repair of heating, ventilation and cooling systems (HVAC); electrical systems; fire alarm and suppression systems; security alarm systems; and, lighting systems. Projects identified as limited to HVAC, plumbing, fire suppression, and lighting systems qualify as exempt from further review.

The second highest number of potentially exempted projects (n=19) qualify under Appendix B.1.a *Maintenance, repair, or replacement of doors, windows, gutters, down spouts, flashing, roofing, siding, foundation, and entryways when done in kind to match existing materials and design.* These projects will maintain the historical integrity of the buildings design and materials. Exterior painting projects (n=6) are classified as exempt under Appendix B.2.a with the condition that new paint will match the existing or original color and that abrasive methods of cleaning will be avoided.

Mission Critical Projects

Arnold AFB identified 70 mission critical projects in the Installation Development Plan. Forty-seven of these projects are planned for historic properties, while seven projects are planned for non-historic properties in historic districts. One mission critical project is new construction planned adjacent to the Arnold AFB Test Facility Historic District. The remaining 15 mission critical projects are planned for non-historic properties in non-historic areas. Mission critical projects require no further review by the Tennessee SHPO, but historic properties need to be documented prior to the start of each project. Documentation requirements are detailed in Stipulations II.C and VIII and comprise photographs, and historical information, such as documents and diagrams. This documentation will "serve as sufficient record of changes to these historic properties as well as sufficient mitigation of any project-related adverse effects."

Effects Determination Applying the 2014 PA

Forty-two projects are planned for non-historic buildings located in non-historic areas of the installation. Projects planned for these non-historic resources are eliminated from further analysis in accordance with the 2014 PA Stipulation IV.E.3.

The remaining 142 proposed projects that are not mission critical, do not qualify for exemptions applying Appendix B of the 2014 PA, or are non-historic buildings in non-historic areas were classified according to the three possible effects determinations defined in Stipulation V of the 2014 PA. The effects determinations are "no historic properties affected" (V.A.1), "no adverse effect" (V.A.2), and "adverse effect" (V.A.3). The PA details reporting requirements for each effect determination, as well as standardized

treatments for addressing adverse effects (Stipulation VI), including the demolition of historic properties and the addition of new construction in the historic district or historic landscapes (Stipulation VII).

Determination of No Historic Properties Affected

Seventy-seven projects meet the requirements for a "no historic properties affected" determination applying the PA. Stipulation V.A.1 defines the finding of "no historic properties affected" as

1. no historic properties are located within the undertaking's area of potential effects (APE), or

2. the undertaking will have no effect on identified historic properties within the project APE.

Twenty projects are planned for non-contributing buildings (NCE) within the boundaries of the historic district and/or historic landscapes. These projects are confined primarily to interior work, systems maintenance, and building envelopes and will result in no effects to historic properties. Projects proposed for building envelopes of non-contributing resources to the historic district and historic landscapes include window and door replacements, and envelope insulation. No effects to historic properties are anticipated since these projects will not impact the overall architectural character of the historic areas.

Fifty-seven projects are proposed for non-historic buildings that are located adjacent to individual historic properties, adjacent to the boundaries of the Arnold AFB Test Facility Historic District, or adjacent to the two historic landscapes identified on the installation. These projects were reviewed to extrapolate possible effects to the adjacent historic properties in accordance with provision 2 of the definition for a finding of no historic properties affected. These projects are identified by an asterisk (*) under the Property Status column in the comprehensive project table included in Appendix B.

The boundaries of the Arnold AFB Test Facility Historic District historic district are defined by streets encompassing the historic area. All projects proposed to buildings located north, east, and south of the historic district boundaries are separated from the district by boundary streets and involve buildings located on the opposite sides of the streets from the district. These buildings frequently are set back from the street approximately 90 to 100 ft. Due to this distance, the non-historic buildings outside the historic district do not have strong visual connection to the buildings located within the historic district. Projects planned for this group of non-historic buildings are limited to improvement to the building envelopes, such as changes to exterior cladding, replacement doors and windows, and interior renovations. These projects have no potential to affect the character-defining features of the Arnold AFB Test Facility Historic District.

Similar analysis was conducted for projects proposed for buildings located near the boundaries of the Test Utilities Historic Landscape, the Elk River Dam-Woods Reservoir Historic Landscape, and the five individually eligible properties. Most projects were confined to improvements to the building envelopes or within building footprints. Proposed projects planned for these non-historic properties have no potential to affect historic properties in their vicinity.

Projects classified as "no historic properties affected," require inclusion in the annual report to the Tennessee SHPO required in Stipulation VIII.D. The annual report summarizes projects undertaken in the previous year and contains information about the project number, title, and description; project purpose and need; cultural resources project comments; further work needed; cultural resources affected; and, consultation efforts.

Determination of No Adverse Effect

Stipulation V.A.2 of the 2014 PA, defines determinations of "no adverse effect" to historic properties. A finding of "no adverse effect" is appropriate when a project will not alter the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish its integrity of location, design, setting, materials, workmanship, feeling, or association (36 CFR 8.5(a), (b)).

Sixty-four proposed projects are classified as having "no adverse effect" to historic properties. These projects represent a wide range of proposed actions including both exterior and interior work. In many cases, interior work is proposed for historic buildings where interior elements are not documented as significant character-defining features in the 2014 Cold War Report (Prybylski et al. 2014:Vol 2). Examples include upgrading restrooms, renovating storage areas, interior painting, and repairing interior finishes. Other examples include repairs to or replacement of exterior roofing cladding on flat roofs where the existing roof profile will not be altered. Minor alterations to buildings, such as small awning additions and the installation of removable roofs over equipment, also were classified as having no adverse effects.

Selected examples of more complex projects in this group include:

Project ANZY080132 for Building 100 (NREI) proposes renovation to the building windows and to the interior of the technical library, elements identified in the 2014 Cold War Report as significant character-defining features (Prybylski et al. 2014:Vol 2:2-7). The project will have no adverse effect to the historic property provided that the historic character of the building is maintained in accordance with the SOI Standards for Rehabilitation with concurrence by the Tennessee SHPO.

Project ANZY050024 proposes the construction of an exterior elevator on a secondary elevation of Building 100 (NREI). This project is classified as "no adverse effect" provided that the design is compatible in architectural character with the historic

property in accordance with the 2014 PA and the SOI Standards for Rehabilitation for new construction with concurrence by the Tennessee SHPO.

Project ANZY080100 proposes extensive renovation to interior systems of Building 100, as well as construction of a new interior elevator and roof membrane replacement. The existing interior elevator is not identified as a significant character-defining feature and the replacement of the roofing material will maintain the profile of the roof with concurrence by the Tennessee SHPO. Other projects proposing extensive renovations to historic buildings 1478 (NREI) and 785 (NREC) also are assigned to the "no adverse effects" classification.

The finding of no adverse effect also is assigned to projects that propose major exterior renovations to non-contributing resources located in historic districts and/or historic landscapes. For example, project ANZY89067 planned for Building 939, a large non-contributing building located in the southeast corner of the Arnold AFB Test Facility Historic District, includes replacement windows and doors, new envelope insulation, and interior work. This building is spatially separated from contributing buildings to the historic district. This project would have no adverse effect to surrounding historic properties and to the architectural character of the district.

Thirteen exterior painting projects will have no adverse effect to historic properties. These projects included both exterior painting of painted surfaces and cleaning and sealing of brick and concrete surfaces. Typically, exterior painting is exempt under Appendix B.2.a when new paint matches the existing or original color and non-abrasive cleaning methods are used. However, cleaning and sealing of brick is not exempted under Appendix B. Therefore, these projects were determined to have "no adverse effect" to the historic property with application of the appropriate the SOI standards for treatment.

Project ANZY900190 proposes repainting historic property Building 451 using a new color scheme proposed for the installation. The introduction of a new color scheme does not meet the condition for exemption under Appendix B.2.a. The introduction of this new color scheme will be a "no adverse effect" with concurrence by the Tennessee SHPO.

Projects involving new construction to historic buildings and within historic districts also are assigned a "no adverse effects" determination. In these cases, new construction will be compatible with the character of the historic property of the historic district.

Stipulation V.A.2 in the 2014 PA outlines the process for consultation with the Tennessee SHPO regarding findings of no adverse effects. In this process, the Arnold AFB CRM provides a Decision Letter Report to the Tennessee SHPO documenting projects found to have no adverse effect on case-by-case basis. The letter report contains a description of the proposed project, a description of each affected property and its significance, an explanation of how alternatives considered, justification for the preferred alternative, an explanation of why the Criteria of Adverse Effect are not applicable, supporting documentation (i.e., maps, plans, photographs, etc.), and a description of any

additional actions that Arnold AFB will take to ensure no adverse effect will occur to the historic property. If the Tennessee SHPO disagrees with the determination, then Arnold AFB and the Tennessee SHPO will enter into consultation to resolve the dispute. If consultation does not resolve the dispute, then the dispute is resolved in accordance with Stipulation XI of the 2014 PA.

Projects with no adverse effects determinations also are included in the annual reporting requirement in Stipulation VIII.D. The annual report summarizes projects undertaken in the previous year and contains information about the project number, title, and description; project purpose and need; cultural resources project comments; further work needed; cultural resources affected; and, consultation efforts.

Determination of Adverse Effect

The 2014 PA defines an adverse effect to historic properties in accordance with the Federal regulations governing Section 106 compliance - 36 CFR 800.5(a) (Stipulation V.A.3). Adverse effects occur when a project alters, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that diminishes the integrity of the property's location, design, setting, materials, workmanship, feeling, or association" (36 CFR 8.5(a)). Examples of adverse effects include physical destruction of or damage to a property, alterations that affect character-defining features, and/or changes of the character of a property's use or of physical features within the property's setting. Projects involving demolition of historic properties, major new construction within an historic district or the historic landscapes, new additions to historic and non-historic buildings located within an historic district or historic landscapes, and substantial alterations to historic properties generally are classified as adverse effects.

One project proposed under the Installation Development Plan meets the criteria for an adverse effect. Project ANZY139052 is planned for Building 721, a historic property in the Arnold AFB Test Facility Historic District. This project proposes either extensive roof alterations or building demolition, dependent upon further investigation and project development.

Stipulation V.A.3 in the PA defines the process for case-by-case consultation with the Tennessee SHPO on adverse effects. Under Stipulation V.A.3, the Arnold AFB CRM provides a Decision Full Report to the Tennessee SHPO that contains a description of the proposed undertaking; a description of each affected property and its significance; an explanation of how alternatives were considered and why the preferred alternative was selected; supporting documentation (i.e., maps, plans, photographs, etc.); and, a treatment plan describing the steps Arnold AFB will take to resolve the adverse effects of the undertaking to the historic property or properties. The CRM submits the documentation to the Tennessee SHPO for review and response. If the Tennessee SHPO and the Arnold AFB CRM disagree about the finding, then resolution of the dispute is carried out in accordance with Stipulation VI of the 2014 PA.

Stipulation VII of the PA establishes standardized treatment measures for the demolition of historic properties. Historic properties proposed for removal are documented in a Decision Full Report as outlined in Stipulation V.A.3 augmented by exterior and interior photography; copies of historic drawings, elevations, photographs, and narrative descriptions; and, a report that summarizes the historic significance of the affected property and the manner in which documentation is conducted.

Stipulation VII.C of the 2014 PA establishes a process for new construction proposed within the historic district and the historic landscapes. Under this provision, "Arnold AFB shall ensure that any replacement building or structure, including additions to existing buildings or structures, will be compatible with the character of the historic district." Construction plans are submitted to the Tennessee SHPO for review regarding the potential effects of replacement construction.

Projects that adversely affect historic properties also are included in the annual report required in Stipulation VIII.D. The annual report summarizes projects undertaken in the previous year and contains information about the project number, title, and description; project purpose and need; cultural resources project comments; further work needed; cultural resources affected; and, consultation efforts. Documentation compiled as mitigation for adverse effects is retained permanently by Arnold AFB (Stipulation VIII).

In summation, the 2014 PA provides effective guidance to streamline the Section 106 consultation process at Arnold AFB. The 357 projects are covered by the terms and conditions of 2014 PA. Implementation of the PA with regard to the 357 proposed projects will demonstrate that Arnold AFB has taken historic properties into account and satisfied NHPA Section 106 responsibilities for the individual projects proposed.

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CHAPTER IV

SUMMARY AND CONCLUSION

The purpose of this investigation was to analyze the potential effects to historic properties from the proposed Installation Development Plan at Arnold AFB pursuant to the NHPA. The undertaking proposes 357 individual projects that are broadly divided into two categories: demolition of aging facilities and infrastructure projects.

A comprehensive inventory and evaluation of historic properties has been completed at Arnold AFB. The results of these investigations, including determinations of NRHP eligibility, were reviewed and accepted by the Tennessee Historical Commission in their role as the Tennessee State Historic Preservation Officer. Historic properties at Arnold AFB comprise five individual historic buildings (NREI) and 80 contributing buildings within Arnold AFB Test Facility Historic District, the Test Utilities Historic Landscape, and the Elk River Dam-Woods Reservoir Historic Landscape (NREC). Numerous archaeological surveys conducted at Arnold AFB have identified 14 sites determined eligible for NRHP listing and 18 sites as potentially eligible for the NRHP.

The Installation Development Plan at Arnold AFB is an undertaking that has the potential to cause effects to historic properties pursuant to Section 106 of NHPA. The *Programmatic Agreement (PA) between Arnold Engineering Development Complex, Arnold Air Force Base and the Tennessee State Historic Preservation Officer Regarding Management of Historic Properties at Arnold Air Force Base, Tennessee Pursuant to 36 CFR Part 800.14* was executed in 2014 to streamline the Section 106 consultation process. Implementation of the terms and conditions of 2014 PA with regard to proposed projects evidences that Arnold AFB has taken historic properties into account and satisfied NHPA Section 106 responsibilities for the individual projects proposed.

The stipulations of the 2014 PA establish the standards, process for effects determination, and treatment of all historic properties affected by the proposed 357 projects projected in the Installation Development Plan. All effects determinations, including adverse effects to historic properties, are mitigated through the provisions of the executed agreement.

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APPENDIX A

PROGRAMMATIC AGREEMENT

Programmatic Agreement
between
Arnold Engineering Development Complex, Arnold Air Force Base
and
the Tennessee State Historic Preservation Officer
Regarding
Management of Historic Properties at Arnold Air Force Base, Tennessee
Pursuant to 36 CFR §800.14(b)

WHEREAS, the Arnold Engineering Development Complex, Arnold Air Force Base (hereafter Arnold AFB), was established in the 1950s to conduct ongoing research, test, development, and evaluation (RDT&E) of weapon systems, an evolving mission, critical to the United States aeronautical and aerospace superiority and national security (see vicinity map in Appendix A). Many of the original facilities associated with these activities are still in existence; and

WHEREAS, Arnold AFB in carrying out its mission engages in ongoing operation, maintenance, research, development, waste management, and restoration activities (hereafter undertakings) and has determined that these undertakings may adversely affect historic properties eligible for inclusion in the National Register of Historic Places (hereafter "National Register"); and

WHEREAS, Arnold AFB's Integrated Cultural Resources Management Plan (ICRMP), incorporated herein by reference, establishes policies, responsibilities, and procedures for the protection of historic and cultural resources within Arnold AFB and reflects the intent of the Department of the Air Force (AF) to provide conscientious stewardship of historic and cultural resources located on properties owned or controlled by the AF; and

WHEREAS, Arnold AFB has identified multiple National Register eligible historic buildings and archaeological sites through numerous cultural resource inventories, as reported in the Arnold AFB ICRMP; and

WHEREAS, Arnold AFB has consulted with the Tennessee State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP) pursuant to 36 CFR Part 800, the regulations implementing Section 106 of the *National Historic Preservation Act* (NHPA) (16 U.S.C. § 470f), regarding the potential adverse effects of future undertakings to historic properties; and

WHEREAS, Arnold AFB wishes to meet its management responsibilities in a manner that balances its regulatory obligations with its need for operational flexibility and seeks, therefore, to enter into a Programmatic Agreement (PA) with the SHPO and other consulting parties as provided under 36 CFR §800.14 (b); and

WHEREAS, Arnold AFB, in accordance with 36 CFR §800.6 (a), has invited the ACHP to participate in consultations to develop this PA and the ACHP has formally declined the invitation; and

WHEREAS, Arnold AFB has consulted with the Absentee Shawnee Tribe of Oklahoma, Alabama-Coushatta Tribe of Texas, Alabama-Quassarte Tribal Town of Oklahoma, Cherokee Nation, Chickasaw Nation of Oklahoma, Coushatta Tribe of Louisiana, Eastern Band of Cherokee Indians, Eastern Shawnee Tribe of Oklahoma, Kialegee Tribal Town, Muscogee (Creek) Nation of Oklahoma, Poarch Band of Creek Indians, Seminole Nation of Oklahoma, Shawnee Tribe of Oklahoma, Thlopthlocco Tribal Town, and the United Keetoowah Band of Cherokee Indians in Oklahoma (hereafter "the tribes") concerning places of religious and cultural significance to them that may be affected by the undertakings and has invited these federally recognized tribes to participate as concurring parties to this agreement; and the United Keetoowah Band of Cherokee Indians has accepted Arnold AFB's invitation to consult and will be included as a concurring party to this PA; and

WHEREAS, Arnold AFB has consulted with Franklin County Tennessee, City of Tullahoma, City of Winchester, Coffee County Tennessee, City of Manchester, concerning the potential adverse effects of the undertakings to historic properties and has invited these local governments to be concurring parties to this PA; and the City of Tullahoma has accepted Arnold AFB's invitation to consult and will be included as a concurring party to this PA; and

WHEREAS, Arnold AFB has consulted with the Association for the Preservation of Tennessee Antiquities, Tennessee Preservation Trust, and the Center for Historic Preservation at Middle Tennessee State University concerning the potential adverse effects of the undertakings to historic properties and has invited these organizations to be concurring parties to this PA; and Middle Tennessee State University has accepted Arnold AFB's invitation to consult and will be included as a concurring party to this PA; and

WHEREAS, the definitions in 36 CFR §800.16 and Air Force Instruction (AFI) 32-7065, *Cultural Resources Management Program*, apply throughout this PA.

NOW, THEREFORE, Arnold AFB and the Tennessee SHPO agree that the undertakings at Arnold AFB shall be administered in accordance with the ICRMP, of which applicable sections are made a part of this agreement document by reference, and the following stipulations in order to satisfy Arnold AFB's responsibility for compliance with Section 106 of the *National Historic Preservation Act*.

STIPULATIONS

Arnold AFB shall ensure that the following measures are carried out:

I. STANDARDS AND PROCEDURES

A. In keeping with the ACHP's 1991 report to Congress, "Balancing Historic Preservation Needs with the Operation of Highly Technical or Scientific Facilities," Arnold AFB will manage its historic properties in a manner that is consistent with the needs of national defense related activities.

B. The base Cultural Resources Manager (CRM), located in the Civil Engineering Branch, shall be Arnold AFB's certified staff and point of contact on all matters relating to management of historic properties at Arnold AFB pursuant to this PA. The CRM shall meet the requirements and qualifications set forth in AFI 32-7065, paragraph 4.17.

C. The CRM shall ensure that any contractor performing cultural resource investigations at Arnold AFB, including but not limited to field work, research, documentation, and preparation of treatment plans and reports, meets or exceeds the standards set forth in the Secretary of the Interior's Historic Preservation Professional Qualification Standards in history, architecture, architectural history, historic architecture or archaeology, as applicable (Federal Register, Vol. 48, page 44716, September 29, 1983).

D. In carrying out the terms of this PA, with respect to identified historic properties, Arnold AFB shall follow all applicable procedures presented in the ICRMP. In addition, all work conducted at Arnold AFB in compliance with the terms of this PA shall follow the standards and guidelines listed below:

1. *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings* (Department of the Interior, National Park Service, 1995).

2. *The Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation* (Federal Register, Vol. 48, page 44716, September 29, 1983).

3. *The Secretary of the Interiors Standards for the Treatment of Historic Properties with Guidelines for the Treatment of Cultural Landscapes* (Department of the Interior, National Park Service, 1996).

4. AFI 32-7065 *Cultural Resources Management Program* (June 1, 2004).

5. Department of Defense Instruction (DODI) 4715.16, *Cultural Resources Management* (September 18, 2008).

6. Tennessee Historical Commission, Review and Compliance Section, Reporting Standards, Archaeological and Architectural Resource Identification Studies (Survey Reports).

II. UNDERTAKINGS EXEMPTED FROM REVIEW

A. The CRM shall review each undertaking to determine whether it is listed in Appendix B, *Undertakings Exempted from SHPO Review by Category*. If the CRM determines that an undertaking (including routine maintenance and repair) listed in Appendix B will have no effect or no adverse effect, then no further consultation with the SHPO is required. If the CRM determines that an undertaking listed in Appendix B will have an adverse effect, the CRM shall consult with the SHPO to resolve the adverse effect.

B. Arnold AFB, in consultation with the SHPO, may add to the list of exemptions in Appendix B, identifying other types of undertakings that the parties mutually agree will be exempted from further SHPO review. Arnold AFB shall amend the list of exemptions in accordance with Stipulation XII.

C. Undertakings that result in changes to test cell configuration, ongoing maintenance, or upgrades to National Register eligible buildings, structures, and equipment that Arnold AFB determines are critical to its ongoing test/evaluation mission (mission critical) are exempt from further consultation. Prior to the commencement of any such undertaking, Arnold AFB shall document each of the affected historic properties in accordance with Stipulation VIII. These documents, diagrams, and photos will serve as sufficient record of changes to these historic properties as well as sufficient mitigation of any project-related adverse effects.

III. IDENTIFICATION OF HISTORIC PROPERTIES

A. Arnold AFB has conducted multiple cultural resources surveys (cultural resources management investigations) to identify and evaluate archaeological sites and historic buildings and structures in compliance with Sections 106 and 110 of the NHPA. While not anticipated at this time, Arnold AFB may need to conduct additional surveys of this kind during the period covered by this PA.

B. Any surveys that Arnold AFB determines are needed shall be conducted in accordance with the applicable standards and procedures in Stipulation I.

C. Arnold AFB shall include in the ICRMP and annually update a summary of all cultural resources management investigations conducted.

IV. NATIONAL REGISTER ELIGIBILITY

A. Cultural resources identified either through previous surveys or new surveys, if warranted, shall be evaluated by the CRM in accordance with National Register eligibility criteria set forth in 36 CFR §60.4. The CRM shall consult with the SHPO requesting concurrence with Arnold AFB's determination of National Register eligibility. The SHPO shall review and comment (concur or non-concur) on all eligibility determinations formally submitted by Arnold AFB, whether made during Section 110 surveys or Section 106 consultations. Evaluation may require additional investigation, such as archaeological testing. If further investigations are warranted to evaluate National Register eligibility, Arnold AFB shall ensure that the investigation is conducted by a professional, meeting the requirements of Stipulation I.C.

B. If Arnold AFB and the SHPO do not agree on National Register eligibility for any particular property located at Arnold AFB, or if the ACHP or the National Park Service so request, Arnold AFB shall request a formal determination of eligibility from the Keeper of the National Register, in accordance with 36 CFR §63. The Keeper's determination shall be final.

C. Arnold AFB shall include current National Register eligibility determinations for all cultural resources at Arnold AFB whenever it updates the ICRMP and shall maintain current records of eligibility determinations on all historic properties.

D. Arnold AFB shall develop and maintain a mapped classification system for above and below ground cultural resources, based on current records, using the following categories:

1. Areas determined by Arnold AFB, in consultation with the SHPO, to be available for mission use absent any additional Section 106 review for the following reasons: a) the area has been previously surveyed for National Register eligible architectural and archaeological sites and none have been found; or b) the area has been previously disturbed and there is little or no chance intact archaeological deposits still exist.

2. Areas determined by Arnold AFB, in consultation with the SHPO, to contain identified properties (individual prehistoric and historic archaeological sites, historic buildings, structures, or objects) whose National Register eligibility status (eligible, not eligible) has been agreed to by Arnold AFB and the SHPO.

3. Areas determined by Arnold AFB, in consultation with the SHPO, to contain identified properties within a historic district, either listed or proposed, whose National Register eligibility status (contributing, non-contributing) has been agreed to by Arnold AFB and the SHPO.

4. Areas for which Arnold AFB and the SHPO have not reached a consensus on presence of historic properties.

E. Arnold AFB shall manage its cultural resources (any site, building, structure, or object made or used by human beings) depending on their National Register status as follows:

1. Any cultural resource listed in or eligible for listing in the National Register is a historic property, as defined in 36 CFR §800.16 (l), and will be managed according to the terms of this PA.

2. Any cultural resource whose National Register eligibility status is undetermined will be considered National Register eligible until such a time as it can be evaluated in consultation with the SHPO.

3. Any cultural resource determined to be ineligible for listing in the National Register by consensus with the SHPO is not a historic property and will not require protection under this PA or further consultation under 36 CFR Part 800.

V. EFFECT DETERMINATIONS

A. The design and specification of any proposed undertaking not exempted under Stipulation II shall be reviewed by the CRM, who will determine whether the undertaking

will have no effect, no adverse effect, or adverse effect to historic properties in accordance with 36 CFR §800.4 and 36 CFR §800.5, as applicable. Consultation with SHPO on the effect of proposed undertakings shall be carried out depending on CRM's effect determination, as follows:

1. No historic properties affected: Under 36 CFR §800.4(d), the CRM may determine there are no historic properties within the undertaking's Area of Potential Effects (APE) to be affected or the undertaking under review will have no effect on identified historic properties within the project APE. The CRM will not consult with the SHPO on "no historic properties affected" determinations; however, Arnold AFB shall provide the SHPO with documentation annually of all such undertakings determined under this heading. See Stipulation VIII, paragraph E, concerning annual reports.

2. No Adverse Effect: Under 36 CFR §800.5(b), the CRM may find the undertaking will have no adverse effect to historic properties located within the undertaking's APE. Arnold AFB shall provide the SHPO with a Decision Letter Report documenting any undertaking found to have no adverse effect on a case-by-case basis. The SHPO shall review and respond to the Decision Letter Report within 15 calendar days of receipt. The Decision Letter Report shall contain the following items:

    a. Description of the proposed undertaking.

    b. Description of each affected historic property and its significance.

    c. An explanation of why the Criteria of Adverse Effect were not applicable.

    d. Supporting documentation including appropriate maps, plans, photographs, etc.

    e. Description of any additional actions that Arnold AFB will take to ensure no adverse effect will occur to the historic property resulting from the proposed undertaking.

3. Adverse Effect: Under 36 CFR §800.5(a), the CRM may find the undertaking will have an adverse effect to historic properties located within the undertaking's APE. Arnold AFB shall provide the SHPO with a Decision Full Report documenting any undertaking determined to have an adverse effect on a case-by-case basis. The SHPO shall review and respond to the Decision Full Report within 30 calendar days of receipt. The Decision Full Report shall contain the following items:

    a. Description of the proposed undertaking.

    b. Description of each affected historic property and its significance.

    c. An explanation of how alternatives were considered and why the preferred alternative was selected.

d. Supporting documentation including appropriate maps, plans, photographs, etc.

e. A treatment plan describing the steps that Arnold AFB will take to resolve the adverse effects of the proposed undertaking to the historic property or properties.

B. Should SHPO disagree with Arnold AFB's determination of no adverse effect or adverse effect, SHPO shall inform Arnold AFB of the disagreement within the applicable review period, as indicated in Stipulation V.A.2 and V.A.3. Arnold AFB and SHPO will attempt to resolve the dispute through consultation. Should the dispute not be resolved in this manner, Arnold AFB shall resolve the dispute in accordance with Stipulation XI.

VI. TREATMENT OF ADVERSE EFFECTS

A. Arnold AFB, in consultation with SHPO and other parties as specified below, shall resolve the adverse effects to historic properties of any undertaking that is not exempted under Stipulation II. Under these limited circumstances, Arnold AFB shall prepare a treatment plan as required under Stipulation V.A.3.e. Treatment will be implemented to accommodate rapid configuration changes inherent to weapons system development and testing.

B. Arnold AFB shall submit for review a draft of the treatment plan to the SHPO whenever a proposed undertaking may adversely affect historic properties.

C. Arnold AFB shall submit for concurrent review a draft of the treatment plan to the SHPO and The United Keetoowah Band of Cherokee Indians, and the other affiliated tribes upon request, whenever a proposed undertaking may adversely affect National Register eligible prehistoric archaeological sites.

D. Upon submittal, the reviewing parties will have 30 calendar days from the date of receipt to provide comments to Arnold AFB. Arnold AFB will take any comments it receives within the comment period into account when making final edits to the treatment plan prior to plan approval. If any party does not submit comments within the 30-day comment period, Arnold AFB will assume that party has no objection to the treatment plan as proposed. Once Arnold AFB, in consultation with SHPO and the tribes as appropriate, approves the treatment plan, treatment may commence.

E. Arnold AFB shall ensure that copies of any unclassified reports or other documents prepared in compliance with a treatment plan are submitted to the SHPO and made available to the consulting parties upon request.

F. Arnold AFB shall ensure that all archaeological collections, including artifacts, notes, photographs, and maps resulting from treatment, are curated in a repository that meets the requirements of 36 CFR §79, *Curation of Federally-Owned and Administered Archeological Collections*.

G. Should any party to this PA object to the proposed treatment, Arnold AFB shall resolve the objection in accordance with Stipulation XI.

VII. STANDARDIZED TREATMENT FOR DEMOLITION

A. Should Arnold AFB determine that it is necessary to demolish a National Register eligible historic building or structure or a contributing element of a historic district to carry out its mission, the CRM shall notify the SHPO and request consultation. Arnold AFB shall submit to SHPO for 30-day review a Decision Full Report, as required in Stipulation V.A.3; however, a treatment plan will not be required. Instead, treatment may be carried out according to the standardized treatment measures listed below:

1. Provide black and white 35mm photographs of the current exterior and interior elevations of the affected historic property. In addition, black and white 35mm photographs of the property's character defining features, interior and exterior, as applicable. Photographs may be made with a digital camera as long as the quality of the image is equivalent to one taken with a 35mm film camera and the prints are on acid free paper.

2. Provide any historic drawings, elevations, photographs, narrative descriptions, plans, or other documentation describing the historic property.

3. Provide a report that includes, but is not limited to, a summary of the historical significance of each affected property and the manner in which documentation is conducted. A copy of this report will be submitted to the SHPO.

B. The SHPO will have 30 calendar days to concur with the standard treatments, suggest additional treatment measures, or object. If the SHPO objects, Arnold AFB and the SHPO will continue to consult in order to resolve the objection. If the objection cannot be resolved, then Arnold AFB shall forward all documentation relevant to the dispute to the ACHP in accordance with Stipulation XI.

C. Should Arnold AFB propose new construction within a historic district following demolition as provided for in Stipulation VII, Arnold AFB shall ensure that any replacement building or structure, including additions to existing buildings or structures, will be compatible with the character of the historic district. Arnold AFB shall submit construction plans to the SHPO for review regarding the potential effects of replacement construction. SHPO will have 30 calendar days from the date of receipt to respond.

VIII. DOCUMENTATION AND MONITORING

Arnold AFB shall retain documentation for all operation, maintenance, and development undertakings covered by this PA for a minimum period of two (2) years after completion. Documentation compiled as mitigation of adverse effects shall be retained permanently.

A. This documentation shall include black and white photographs showing conditions prior to project start and diagrams showing original and final configurations. Photographs may be made with a digital camera as long as the quality of the image is equivalent to one taken with a 35mm film camera and the prints are on acid free paper.

B. The SHPO may perform on-site reviews of documentation on completed projects to ensure compliance with this PA. Arnold AFB shall be notified 30 calendar days prior to an on-site review and the review time shall not exceed one (1) day.

C. In some cases, documentation of historic properties may result in the creation of a "classified" document that may not be released or made available in its entirety to the SHPO. Arnold AFB shall make available portions of such documents that are unclassified.

D. The CRM shall provide to the SHPO and the AF Civil Engineer Center (AFCEC) copies of an annual report summarizing projects undertaken in the previous year pursuant to this PA. The annual report shall be due each year during the term of this agreement document within 30 calendar days of the anniversary date of this PA. At a minimum, the annual report shall contain, but is not limited to, the following items:

1. Project number, title and description

2. Purpose and need

3. Cultural resources project comments

4. Further work needed

5. Cultural resources affected

6. SHPO, Tribal consultation dates

7. SHPO, Tribal consultation responses

IX. EMERGENCY SITUATIONS

A. In the event of an emergency declared by the President of the United States or the Governor of the State of Tennessee, pursuant to 36 CFR §800.12, the following emergency actions are exempted from further consideration under this PA:

1. Protection of human health and/or the environment from harm by hydrocarbon or hazardous waste.

2. Prevention of imminent damage resulting from the threat of a hurricane, tornado, or other natural disaster.

3. Stabilization necessitated by the threat of imminent structural failure (e.g., repair of or replacement of building footings).

4. Immediate rescue and salvage operations conducted to preserve life or property.

B. Following an emergency declared pursuant to Stipulation IX, should Arnold AFB determine that effects to historic properties might have occurred as a result of the emergency, the CRM shall consult with the SHPO regarding appropriate measure to address those effects.

X. INADVERTENT DISCOVERIES

A. Arnold AFB shall ensure that, in the event of an inadvertent discovery of archaeological resources during a project, ground disturbance associated with the project will cease immediately and the SHPO and other appropriate consulting parties will be contacted by the Air Force for further guidance.

B. Arnold AFB shall ensure that, if Native American human remains, funerary objects, sacred objects, or objects of cultural patrimony are inadvertently discovered during an undertaking, or during an approved archaeological investigation, the discovery will be resolved in accordance with the procedures for *Native American Graves Protection and Repatriation Act* compliance contained in the Arnold AFB ICRMP.

XI. DISPUTE RESOLUTION

Should any signatory object to any actions proposed or undertaken pursuant to this PA, and these objections cannot be resolved through consultation, Arnold AFB shall request comments from the ACHP in accordance with the applicable provisions of 36 CFR §800.7. Any ACHP comment provided in response to such a request shall be taken into account by Arnold AFB in accordance with 36 CFR §800.7 (c) (4) with reference only to the subject of the dispute. Arnold AFB's responsibility to carry out all actions under this PA that are not the subject of the dispute shall remain unchanged.

XII. AMENDMENTS

If any of the signatories to this PA believe that an amendment to the terms of the PA is required, that signatory shall immediately notify the other signatory and request consultation to amend this PA. The process of amending the PA shall be the same as that exercised in creating the original PA.

XIII. TERMINATION

Any signatory to this agreement document may revoke it upon written notification to the other signatory by providing 30 days' notice, provided that the parties will consult during the period prior to termination to seek agreement on amendments or other actions that

would avoid termination. In the event of termination, Arnold AFB shall comply with 36 CFR §800.3 through §800.6 for all undertakings covered by this agreement.

XIV. TRIENNIAL REVIEW

Every three years, within 30 calendar days of the anniversary date of this PA, the CRM and other representatives of Arnold AFB as necessary shall meet with the SHPO to review the performance of this agreement and determine if amendments are needed to improve its effectiveness. If amendments are agreed to, the PA shall be amended in accordance with Stipulation XII. Where there is no agreement, the PA shall remain in its present form.

XV. SUNSET PROVISIONS

This PA shall remain in effect for ten (10) years from the date of its execution, which is the date of signature by the SHPO. Arnold AFB and the Tennessee SHPO shall review the PA before the end of the tenth (10th) year for possible modifications, termination, or extension. At the request of any signatory or consulting party, this PA may be reviewed for possible modifications, termination, or extension at any time.

XVI. *ANTI-DEFICIENCY ACT*

Nothing in this PA shall be interpreted to require any obligation or payment of funds in violation of the *Anti-Deficiency Act* (31 U.S.C. 1341). If for that reason Arnold AFB is unable to carry out the terms of this PA, Arnold AFB shall advise the Tennessee SHPO and shall comply with all requirements of 36 CFR Part 800.

Execution and implementation of this PA and its terms evidence that Arnold AFB has taken historic properties into account and has satisfied its NHPA Section 106 responsibilities for all individual undertakings of the program addressed herein.

SIGNATORIES

ARNOLD ENGINEERING DEVELOPMENT COMPLEX, ARNOLD AIR FORCE BASE

By: _____ Date: 3 Feb 14
RAYMOND G. TOTH, Colonel, USAF
Commander

TENNESSEE STATE HISTORIC PRESERVATION OFFICER

By: _____ Date: February 11, 2014
Mr. Patrick McIntyre, Executive Director
Tennessee Historical Commission

Signature page for:

PROGRAMMATIC AGREEMENT BETWEEN ARNOLD ENGINEERING DEVELOPMENT COMPLEX, ARNOLD AIR FORCE BASE, AND THE TENNESSEE STATE HISTORIC PRESERVATION OFFICER CONCERNING MANAGEMENT OF HISTORIC PROPERTIES AT ARNOLD AIR FORCE BASE, TENNESSEE

Concurring party:

THE UNITED KEETOOWAH BAND OF CHEROKEE INDIANS

By:_____ Date: _____
Mr. George Wickliffe, Chief
United Keetoowah Band of Cherokee Indians

Signature page for:

PROGRAMMATIC AGREEMENT BETWEEN ARNOLD ENGINEERING DEVELOPMENT COMPLEX, ARNOLD AIR FORCE BASE, AND THE TENNESSEE STATE HISTORIC PRESERVATION OFFICER CONCERNING MANAGEMENT OF HISTORIC PROPERTIES AT ARNOLD AIR FORCE BASE, TENNESSEE

Concurring party:

THE CITY OF TULLAHOMA

By: _____ Date: 2-25-14

Mr. Lane Curlee, Mayor
City of Tullahoma, Tennessee

Signature page for:

PROGRAMMATIC AGREEMENT BETWEEN ARNOLD ENGINEERING DEVELOPMENT COMPLEX, ARNOLD AIR FORCE BASE, AND THE TENNESSEE STATE HISTORIC PRESERVATION OFFICER CONCERNING MANAGEMENT OF HISTORIC PROPERTIES AT ARNOLD AIR FORCE BASE, TENNESSEE

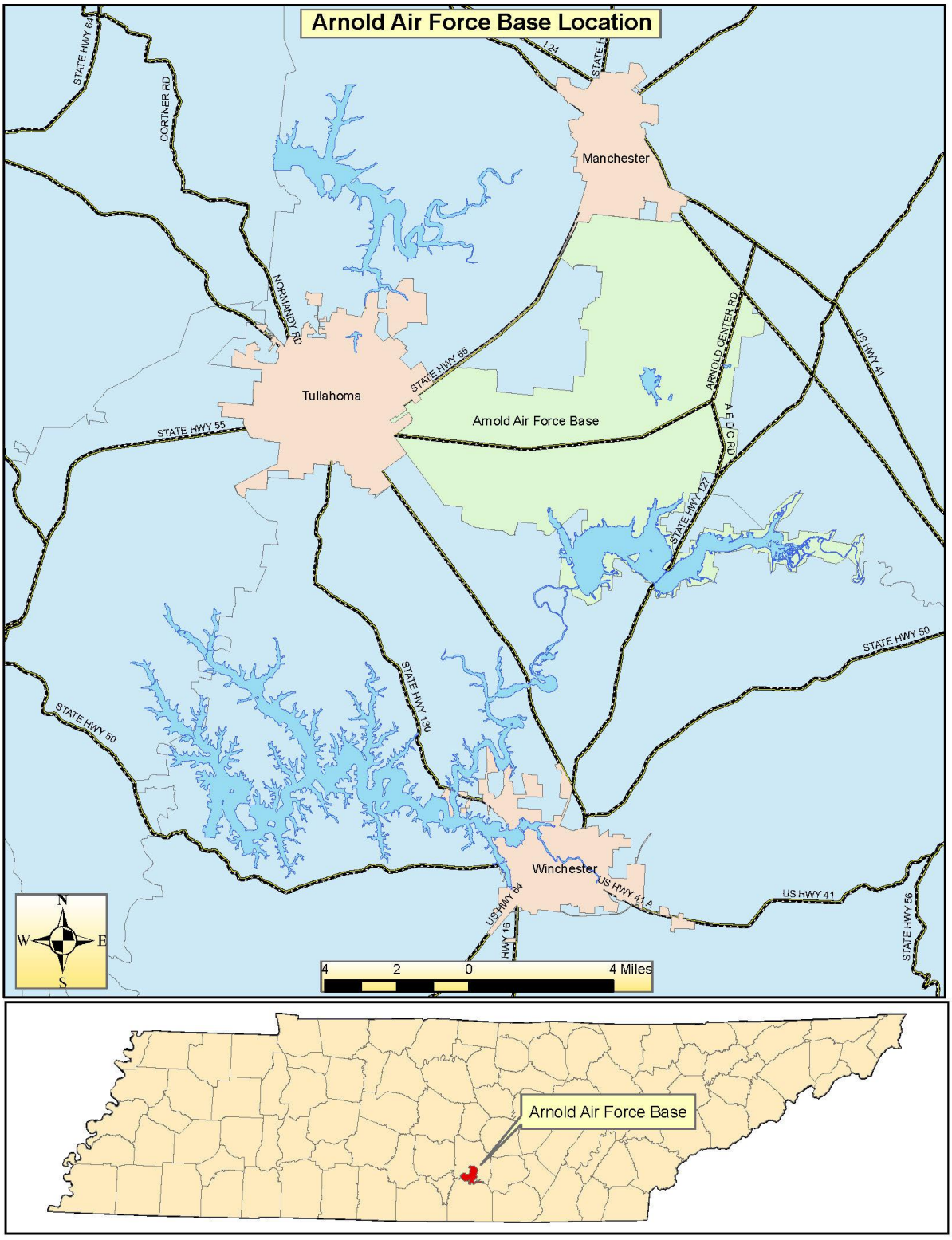
Concurring party:

THE MIDDLE TENNESSEE STATE UNIVERSITY

By: _____ Date: 3/26/14

Dr. Carroll Van West, Director
Center for Historic Preservation
Middle Tennessee State University

Appendix A: Vicinity map of Arnold Air Force Base



Appendix B: Undertakings Exempted from SHPO Review by Category

1. Structural Elements, Support Systems, and Heavy Equipment

a. Maintenance, repair, or replacement of doors, windows, gutters, down spouts, flashing, roofing, siding, foundations, and entryways when done in kind to match existing materials and design.

b. Installation, maintenance, repair, or replacement of ancillary systems or components:

- heating, ventilation and cooling (HVAC);
- plumbing systems including pipes and valves;
- electrical systems including outlets, switches, cables, and conduits;
- communications and computer systems including equipment and cables;
- fire alarm and suppression systems;
- chemical treatment systems;
- security alarm systems;
- lighting systems including lights and switches;
- environmental monitoring systems; and
- energy management systems.

c. Installation, repair or replacement of motors, engines, winches, cranes, track ways, and other heavy equipment needed for testing.

2. Building Exteriors

a. Painting and repainting exterior surfaces when the new paint matches the existing or original color. Abrasive cleaning methods used, such as sandblasting and water blasting are an adverse effect and will require SHPO consultation.

b. Patching and resurfacing exterior surfaces, such as brick and masonry, when the new surface material matches the existing material in consistency, texture, and color.

c. Repointing exterior brick surfaces when new mortar matches the original in color.

d. Replacement or installation of caulking and weather stripping around windows, doors, walls, and roofs.

3. Building Interiors

Repair or remodeling of building or structure interiors provided that such alterations do not adversely affect any interior character-defining elements.

4. Infrastructure

a. Maintenance, repair, or replacement of existing parking lots/spaces, streets, curbs, gutters, sidewalks, fencing.

b. Maintenance, repair, or replacement of in-ground water lines, sewer lines, gas lines, and electrical lines provided these are not within the boundaries of a National Register eligible archaeological site.

c. Minor relocation of access roads and curbs.

d. Maintenance, repair, or replacement of signs.

5. Landscapes

a. Maintenance of existing landscapes through seeding, watering, grubbing, pruning, and replacement of lawns, shrubs and bushes, flower beds, trees, and hardscape features (sidewalks, benches, picnic tables, restroom facilities). Replacement of trees and vegetation within the limits of a National Register eligible historic landscape must be consistent with any character-defining qualities of the property.

b. Maintenance and repair of athletics fields.

6. Erosion Control

a. Maintenance and repair of ditches.

b. Seeding or planting of vegetation within repaired areas to prevent further erosion.

7. Waste Control

a. Maintenance, repair, or replacement of waste storage facilities, liquid retention tanks, dikes, piping, small basins, and landfills.

b. Remediation of spills.

8. Public health and Safety

a. Removal of asbestos contaminated items; removal of Polychlorinated Biphenyl (PCB) contaminated items; removal of lead-based paint.

b. Maintenance, repair, or replacement of safety railings, machine guards, hand rails, guard rails, ladders, frames, and safety fences, nonskid surfaces, and anchoring floor mats; grounding of structures and equipment; and the remediation of health safety emergencies.

c. Environmental Site Investigations or Restoration Activities conducted to address releases of hazardous substances.

APPENDIX B

INSTALLATION DEVELOPMENT PLAN AT ARNOLD AFB
LIST OF PROPOSED PROJECTS
(FY2021-FY2026)

Project ID	Project Name	Project Type	Description of the Proposed Action (5Nov2020)	Resources Associated with Projects	Analysis of Resources Potentially Affected by Projects	Mission Critical?	Property Status	Applicable PA Stipulations	PA Treatment Requirements
ANZY069029	Construct Sun Covers for GN2 Conversion Plant, J4	New Construction	This project would construct self-supported sun covers for five dewars at the east and west GN2 Conversion Plants at J4. This project would comply with current regulations in AFI 23-201 2.6.12 and 6.17.1.2.	533 [NCE], Arnold AFB Test Facility Historic District	Project is mapped near Bulding 533, 2000, which is a non-contributing resource to the Arnold AFB Test Facility Historic District. Project is to construct sun covers and is located near edge of historic district with no contributing resources immediately adjacent to it. Construction of covers will have no potential to affect surrounding historic properties.	No	Non-historic property in HD	No historic properties affected	
ANZY139006	Add Stairway and Roof Railing to PWT Atmospheric Air Dryer 1	New Construction	This project would construct a new stairway, access doors to the different floor levels, and a new safety railing on the roof of the PWT Atmospheric Air Dryer 1. This project would comply with current USAF guidance and safety requirements.	784 [NREC], Arnold AFB Test Facility Historic District	Building 784 is a historic property. Project entails addition of a new stairway. Installation of a new exterior stairway will have no adverse effect if its design and materials are compatible to the existing historic building with SHPO concurrence.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY099024	Construct htl High-Pressure Air Valve Awning	New Construction	This project would construct a small awning/roof/cover over the existing HTL high-pressure air valve area at the northwest corner of Building 722. This project would provide cover over an approximately 700 SF area.	722 [NREC], Arnold AFB Test Facility Historic District	Building 722 is a historic property. The project is to construct a small awning on the exterior of the building. The small nature of the construction will have no adverse effect on the historic district provided that the awning is compatible with the historic character of the district.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY199007	Construct DC Rectifiers, Facility. 579	New construction	This project would provide adequate coverage for existing twelve DC rectifiers at APTU by constructing a removable roof to cover area where DC rectifiers are located and adding lighting to the coverage to support night operations.	579 [NREC], Arnold AFB Test Facility Historic District	Project area is adjacent to Building 579, a historic property within the Arnold AFB Test Facility Historic District. Project entails building a removable roof to cover for 12 existing DC rectifiers and adding lighting. Building a roof over existing equipment in an idustrial area will have no adverse effect to the historic district.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY040060N	Add AT/FP Upgrades, Fitness Center, Facility 1358	New Construction	The purpose of this project to meet UFC 4-10-01 for AT/FP compliance.	1358 [DNE]	Building 1358 is not a historic property nor located near any historic district or landscape.	No	Non-historic property		
ANZY140029	Repair Steam Facility-Reduction, Multi	New Construction	This project would replace the current steam-using equipment in Facilities 2124, 2123, 2132, and 563 with natural gas and hot- water equipment.	563 [DNE-NEV], 1504 [NREC], 1507 [NREC], 579 [NREC], 2124 [DNE-NEV], 2123 [DNE-NEV], Arnold AFB Test Facility Historic District, Arnold AFB Test Utilities Historic Landscape [NREI]	Project entails work on historic buildings 1504 [NREC], 1507 [NREC], 579 [NREC], 2124 [DNE-NEV], 2123 [DNE-NEV]. Project entails removal of steam lines and installation of gas lines. Gas equipment will remain outside the facilities. Work of on steam heating is exempt under Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY105007	Construct Privacy Fence by Arnold Golf Course Clubhouse	New Construction	This project would construct an 8 ft high vinyl-coated chain-link fence from the back of kitchen by patio and across the driveway at the Arnold Golf Course clubhouse. This project would prevent unauthorized parking behind the clubhouse.	40CF310 [DNE]	Construction site of a privacy fence near the Arnold Golf Course Clubhouse is not located near any historic built resources. Site 40CF310 (Camp Forest) is not an NR eligible property.	No	Non-historic property		
ANZY029454	Install Catwalk for c1 Cable Trays, Facility 912	New Construction	This project would install a catwalk that will provide safe and efficient access to C1 elevated cable trays.	912 [NREC], Arnold AFB Test Facility Historic District	Building 912 is a historic property. Work entails interior construction. Interiors are not identified as character-defining features in 2014 Cold War Report Vol 2:222-224. Interior work will have no adverse effect on historic property.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY199005	Repair/Modify Platforms to Access ETF Plant Eqpt, Facility 911	New Construction	This project would add a number of new platforms and permanent scaffolding to access currently inaccessible areas and to provide grating to elevate the walking surfaces above discharge and runoff water.	911 [NREC], Arnold AFB Test Facility Historic District	Building 911 is a contributing element to the Arnold AFB Test Facility Historic District. The project entails design, fabrication and installation of new platforms and scaffolding to gain access to inaccessible areas of structure. Project will be a no adverse effect if project is compatible in design and materials to existing historic building with SHPO concurrence.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY189043	Construct Manholes and Repair Valve/Actuator, Facility 20009	New Construction	The purpose of this project to modernize the current manholes, valves, and actuator, which were originally constructed in the early 1980s.	Between 903 [NREC] and 912 [NREC], Arnold AFB Test Facility Historic District	Project is located in Arnold AFB Test Facility Historic and entails construction of manholes around direct buried valves in location of cooling water supply mains. Project is exempt under 2014 PA Appendix B.4.b.	No	Historic property	Exempt under 2014 PA Appendix B.4.b	
ANZY100028	Repave Gossick Road	Road Maintenance	The purpose of this project to increase vehicle safety along Gossick Road (Airfield Road) by repaving it from the model shop to the airfield gate.	40CF293 [DNE]; west of 451 [NREI]	Road starts west of Building 451 [NREI] and proceeds west to airfield gate. No historic properties are located along this path.	No	Non-historic property		
ANZY020010B	Pave Famcamp Roads	Road Maintenance	The purpose of this project to improve the appearance and desirability of using the campground by paving the existing dirt road.	Family Camp	Family camp is not a historic property and is located outside the boundaries of the Elk River Dam-Woods Reservoir Historic Landscape. Paving an existing road in the camp area has no potential to affect the nearby historic landscape.	No	Non-historic property	No historic properties affected*	
ANZY100006	Repave Sections of Avenue B from 3rd Street	Road Maintenance	The purpose of this project is to increase vehicle safety and the stability of the road by repaving the asphalt section of Avenue B from 3rd Street to the end of the Building 1103 parking lot near the walking trail entrance and the section of 3rd Street from Avenue B, around Building 1103 to parking lot.	Road near 1103 [DNE]	No historic properties present in project area.	No	Non-historic property		

Project ID	Project Name	Project Type	Description of the Proposed Action (5Nov2020)	Resources Associated with Projects	Analysis of Resources Potentially Affected by Projects	Mission Critical?	Property Status	Applicable PA Stipulations	PA Treatment Requirements
ANZY139051	Renovate ETF Office Building, Facility 877	Facility Renovations	This project would bring the existing facility components up to code.	877 [NREC], Arnold AFB Test Facility Historic District	Building 877 is a historic property. Project includes renovation of HVAC, lighting, and sprinkler systems, renovate restrooms, interior painting, and replacement of all windows except for those already replaced. The lighting, HVAC and sprinkler systems are exempt under 2014 PA Appendix B.1.b. Interiors are not identified as character-defining features in 2014 Cold War Report Vol 2:177-179. Windows are character-defining features, but replacement windows will be exempt under 2014 PA Appendix B.1.a when windows are replaced in kind to match existing materials and design.	No	Historic property	Exempt under 2014 PA Appendix B.1.a and B.1.b if conditions are met	
ANZY129017	Repair G-Range Tunnel Structure, Facility 678	Facility Renovations	This project would ensure adequate load-bearing capacity for heavy equipment using the G Range tunnel structure at 1st Street.	678 [NREC]	Building 678 is a historic property. Project entails repairing concrete in existing tunnel structure at 1st Street. Repair of tunnel will have no potential to affect to historic properties. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY149049	Repair J6 Dehumidification Chamber Elevator, Building 2127	Facility Renovations	This project would modernize the six-stop traction freight elevator for the J6 Dehumidification Chamber Elevator at Building 2127 in accordance with current codes and standards.	2127 [DNE-NEV] 1992	Building 2127 is not a historic property and is located approximately 430 ft outside the northeast corner of Test Utilities Historic Landscape. Building 2127 was evaluated as not eligible in 2014 and recommended for re-evaluation in 2043. Modernization of an existing elevator has no potential to affect historic landscape.	No	Non-historic property	No historic properties affected*	
ANZY179023	Replace Overhead Crane 20-220 in Building 760	Facility Renovations	This project would modernize the existing overhead crane and associated components.	760 [NREC], Arnold AFB Test Facility Historic District	Building 760 is a historic property. Project is mission critical and work on cranes and equipment is exempt under 2014 PA Appendix B.1.c.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY120017	Replace Office Bay Roof of Building 451	Facility Renovations	This project would provide a reliable roof over the older office area on the south side of building.	451 [NREI]	Building 451 is a historic property. Project is to replace built up roof installed in 1989. Roofing is exempt under 2014 PA Appendix B.1.a when done to match existing materials and design.	No	Historic property	Exempt under 2014 PA Appendix B.1.a if conditions are met	
ANZY109040	Upgrade Utilities Area Buildings for Battery Code Compliance	Facility Renovations	This project would bring the existing battery areas up to code.	1092 [DNE], 1507 [NREC], 1525 [NREC], 1546 [NEV], 3038 [NREC], 3039 [NREC], Arnold AFB Elk River Dam-Woods Reservoir Historic Landscape [NREI], Arnold AFB Test Utilities Historic Landscape [NREI]	Buildings 1507, 1525, 3038, and 3039 are historic properties. Project includes renovation of battery storage areas in selected buildings. Project work will renovate interior storage spaces of contributing buildings. Interior renovations of storage spaces to contributing buildings will have no adverse effect on historic properties.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY079076	Replace Roof, rc-3 Cooler, Building 916	Facility Renovations	This project would provide a reliable roof over the older office area on the south side of building.	916 [NREC], Arnold AFB Test Facility Historic District	Building 916 is a historic property. Project is to replace existing built-up roof installed in 1984 with single-ply roof system. Roof is flat and not visible from ground. Replacement of roof with single-ply roofing will have no adverse effect to historic properties provided that roof type and profile are maintained.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY079028	Renovate Interior, PWT Rotor Erection,	Facility Renovations	This project would modernize the interior of Facility 786 and bring the facility up to current USAF standards.	786 [NREC], Arnold AFB Test Facility Historic District	Building 786 is a historic property. Most of work is interior except for upgrading exterior doors and locks. Project is exempt under 2014 PA Appendix B.1.a if doors are replaced in kind to match existing materials and design.	No	Historic property	Exempt under 2014 PA Appendix B.1.a if conditions are met	
ANZY900190	Paint Exterior, Model Shop,	Facility Renovations	This project would paint all metal and nonbrick areas of the facility and clean and seal the brick exterior of the administrative addition. This project would ensure the highly visible facility, which is located at the intersection of the Installation's two major traffic arteries, reflects the AFMC's and AEDC's continuing efforts to upgrade base appearance and to ensure continuity in the appearance of the facilities along First Street.	451 [NREI]	Building 451 is a historic property. Project entails exterior painting all metal and non-brick areas and cleaning and sealing exterior brick. Work will have no adverse effect to historic property if SOI Standards for Treatment of Historic Properties for cleaning are followed with SHPO concurrence. The introduction of a new painting scheme will be a no adverse effect with SHPO concurrence.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY119017	Replace Roof of Building 921, ETF-c Heater Control Building	Facility Renovations	This project would provide a reliable roof at the ETF-C Heater Control Building 921.	921 [NREC], Arnold AFB Test Facility Historic District	Building 921 is a historic property. The project entails replacing the existing built-up roof with a single-ply thermoplastic membrane roof. The flat roof is a character-defining feature, but is not visible from the ground. Replacement of roof will have no adverse effect to historic property provided that roof type and profile are maintained.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY090009	Reseal Containment Area, Operational Fuel Room	Facility Renovations	This project would coat the floor and walls of the Operational Fuel Room with an impermeable coating to prevent fuel from being absorbed into the concrete.	870 [NCE], Arnold AFB Test Facility Historic District	Building 870 and nearby fuel tanks are non-contributing resources to the Arnold AFB Test Facility Historic District. The project entails sealing the concrete floor and walls of the Operational Fuel Farm. This project has no potential to affect nearby historic properties or the historic district.	No	Non-historic property in HD	No historic properties affected	
ANZY069012	Replace Mark J Dewatering System, Building 1075	Facility Renovations	This project would modernize the dewatering system at Building 1075 and bring the facility up to current USAF standards.	1075 [DNE]	Building 1075 is not a historic property, and located outside the eastern boundary of the Arnold AFB Test Facility Historic District. The dewatering system will replace an existing system around the building exterior. The construction of the system around the base of the building has no potential to affect the nearby historic district.	Yes	Non-historic property		

Project ID	Project Name	Project Type	Description of the Proposed Action (5Nov2020)	Resources Associated with Projects	Analysis of Resources Potentially Affected by Projects	Mission Critical?	Property Status	Applicable PA Stipulations	PA Treatment Requirements
ANZY080023	Replace Windows, Ops Building 1099	Facility Renovations	This project would modernize the windows at Building 1099 and bring the facility up to current USAF standards.	1099 [DNE]	Building 1099 is not a historic property, but located outside the southeast corner of the Arnold AFB Test Facility Historic District. Project entails installation of new energy-efficient windows and hardening of south side of building (front). NCE buildings are located with the southeast corner of the district. So the installation of new windows in a non-historic building has no potential to affect the nearby historic property.	No	Non-historic property	No historic properties affected*	
ANZY109053	Lifecycle Upgrade , Restrooms, Building 912	Facility Renovations	This project would modernize the restrooms at Building 912 and bring the facility up to current USAF standards. This building is inhabited by customers who come to Arnold AFB and is not currently representative of the AFMC's and AEDC's continuing efforts to upgrade base appearance.	912 [NREC], Arnold AFB Test Facility Historic District	Building 912 is a historic property. Project is interior work. The interior is not identified as a character-defining feature in 2014 Cold War Report Vol 2:222-224. Interior work will have no adverse effect on historic property.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY079014	Maintain/Upgrade Interior, ETF-a Airside	Facility Renovations	This project would modernize the interior of Building 881 to provide cover for the exterior staircase to prevent slipping during bad weather and to bring the facility up to current USAF standards.	881 [NREC], Arnold AFB Test Facility Historic District	Building 881 is a historic property. Project includes providing a cover for the stairway on the exterior of the building, as well as interior upgrades to toilets, control room, lab, and offices. Upgrades will be to ceilings, flooring, lighting and interior wall finishes. Interiors are not identified as character-defining features in 2014 Cold War Report Vol 2:189-191. Roofing over an exterior stairway will have no adverse effect to historic property provided that the proposed roof will be compatible in materials and design with existing building.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY099001	Upgrade Model Shop Passenger Elevator Building 451	Facility Renovations	This project would modernize the passenger elevator at Model Shop Building 451 in the west addition on the west wall and would bring the facility up to current USAF standards.	451 [NREI]	Building 451 is a historic property. Project entails replacement of existing interior elevator located in the west addition. Elevator is not identified as a character-defining feature in 2014 Cold War Report Vol 2:12-16. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY139005	Repair Overhead Doors, Model Shop Building 451	Facility Renovations	This project would modernize 10 overhead doors at the Model Shop Building 451 and would bring the facility up to current USAF standards.	451 [NREI]	Building 451 is a historic property. Project entails repair of overhead doors, which are character-defining features. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY009106	Paint Exterior VFK, MT&L, Facility 676	Facility Renovations	This project would perform general life-cycle maintenance at Facility 676.	676 [NREC], Arnold AFB Test Facility Historic District	Building 676 is a historic property. Project entails exterior painting and cleaning and sealing of concrete and brick walls. Work will have no adverse effect to historic property if SOI Standards for Treatment of Historic Properties for cleaning are followed with SHPO concurrence.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY180014	Repair by Replace Built-Up Roof of Photo Lab, Facility 430	Facility Renovations	This project would modernize the high bay and east mid-bay roofs on Building 430 and would bring the facility up to current USAF standards.	430 [DNE]	Building 430 is not a historic property. It is located outside the north boundary of the Arnold AFB Test Facility Historic District. Project entails replacing/repairing existing built-up roof. This project has no potential to affect nearby historic district.	No	Non-historic property	No historic properties affected*	
ANZY089002	Replace Raised Floor, Building 912 DCR	Facility Renovations	This project would modernize the raised floor and associated components at the DCR to prevent injury and to bring the facility up to current USAF standards.	912 [NREC], Arnold AFB Test Facility Historic District	Building 912 is a historic property. The interior is not identified as a character-defining feature in 2014 Cold War Report Vol 2:222-224. Interior work will have no adverse effect on historic property.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY049236	Maintain Interior, J4/J5 Control Rooms	Facility Renovations	This project would modernize the interior of Building 520, J4, J5, and J6 Control rooms, restrooms, offices, showers, and locker areas and would bring the facility up to current USAF standards.	520 [NREC], Arnold AFB Test Facility Historic District	Building 520 is a historic property. Project entails only interior work. The interior is not identified as a character-defining feature in 2014 Cold War Report Vol 2:43-45. Interior work will have no adverse effect on historic properties.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY099092	Repair/Upgrade Mark 1 Test Building 1075	Facility Renovations	This project would modernize various interior components and interior/exterior lighting at Building 1075 and would bring the facility up to current USAF standards.	1075 [DNE]	Building 1075 is not a historic property, but is located outside the east boundary of the Arnold AFB Test Facility Historic District. Project includes replacement of interior finishes, exterior windows, personnel doors, new envelope insulation , replacement of water, steam/condensate piping. Building 1075 is located across the road from Building 711 [NREC], a large testing tunnel, and support structures that contribute to the historic district. Changes to Building 1075 located on the opposite side of the road will have no potential to affect the nearby historic district.	No	Non-historic property	No historic properties affected*	
ANZY080034	Repair Lighting, Secondary Pump Station, Facility 1507	Facility Renovations	This project would modernize the interior/exterior/lighting throughout the facility with energy-efficient lighting and lighting control to meet requirements of the National Defense Authorization Act (NDAA 2008 according to Section 2863), and ASHRAE 90.1-2010.	1507 [NREC], Arnold AFB Test Utilities Historic Landscape [NREI]	Building 1507 is a historic property. Work is replacing/upgrading lighting systems which is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY119005	Paint PWT Desiccant Drier Building 784	Facility Renovations	This project would perform general life-cycle maintenance at Facility 784.	784 [NREC], Arnold AFB Test Facility Historic District	Building 784 is a historic property. Project entails exterior painting, which is exempt under 2014 PA Appendix B.2.a when paint matches the existing or original color.	No	Historic property	Exempt under 2014 PA Appendix B.2.a if conditions are met	

Project ID	Project Name	Project Type	Description of the Proposed Action (5Nov2020)	Resources Associated with Projects	Analysis of Resources Potentially Affected by Projects	Mission Critical?	Property Status	Applicable PA Stipulations	PA Treatment Requirements
ANZY110023	Replace Roof of Building 1526, Oil Pump House-Main Substation	Facility Renovations	This project would modernize the existing built-up roof at the Oil Pump House Building 1526 in the Power Control Building switchyard and would bring the facility up to current USAF standards.	1526 [NREC], Arnold AFB Test Utilities Historic Landscape [NREI]	Building 1526 is a historic property. Work entails replacement of built-up roof with a single-ply thermoplastic membrane roof, new gutters, downspouts, and metal edge flashing. Roof, gutters, downspouts, etc. are character-defining features. Replacement roofing, gutters, downspouts and flashing will be exempt under 2014 PA Appendix B.1.a if these elements are replaced in kind to match existing materials and design.	No	Historic property	Exempt under 2014 PA Appendix B.1.a if conditions are met	
ANZY149003	Repair Raised Floor, Room 113, PWT Control Facility 745	Facility Renovations	This project would modernize the raised floor and rubber base in Room 113, Building 745, to prevent injury and to bring the facility up to current USAF standards.	745 [NREC], Arnold AFB Test Facility Historic District	Building 745 is a historic property. Project entails interior work. Interiors are not identified as character-defining features in the 2014 Cold War Report Vol 2:120-122. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY119018	Replace the Northwest Metal Roof of Building 350, Pmel	Facility Renovations	This project would modernize the existing roof to a standing seam roof on the northwest corner of Building 350 and would bring the facility up to current USAF standards.	350 [NREI]	Building 350 is a historic property. Project calls for replacing northwest corner corrugated metal roof with new standing seam metal. The northwest corner of the building may be a later addition. This project will be exempt under 2014 PA Appendix B.1.a If the new roof matches the existing in materials and design.	No	Historic property	Exempt under 2014 PA Appendix B.1.a if conditions are met	
ANZY080156	Repair Sewage Treatment Plant, B 1552	Facility Renovations	This project would modernize various components of the sewage treatment plant, Building 1552, including windows, interior and exterior seal and paint, restrooms, interior/exterior lighting, generators and associated switches and panels, transformers, pumps, piping, valves, and plant controls, and would bring the facility up to USAF standards.	1552 [NCE], Arnold AFB Test Utilities Historic Landscape [NREI]	Building 1552 is a non-contributing resource in the Test Utilities Historic Landscape. Alterations to the existing utility complex will have no potential to affect the historic landscape. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Non-historic property in HD	Mission Critical	Follow Stipulations II.C and VIII
ANZY179009	Replace Roof Building 1088	Facility Renovations	This project would modernize the high bay, south bay, and east bay roof on Building 1088 and would bring the facility up to current USAF standards.	1088 [DNE-NEV] 1995	Building 1088 is not a historic property, but is located outside the east boundary of the Arnold AFB Test Facility Historic District. The building was evaluated as not eligible in 2014 and recommended for re-evaluation in 2045. Project entails replacement of roof cladding. Building 1088 is located across the road from several small non-contributing buildings and Building 711, a large testing tunnel with support buildings. Replacing the roof cladding on Building 1088 located on the opposite side of the road to the historic district has no potential to affect the historic district.	No	Non-historic property	No historic properties affected*	
ANZY089006	Replace Roof, APTU Test Cell Valve Building 576	Facility Renovations	This project would modernize the existing built-up roof at the APTU Test Valve Building 576 and would bring the facility up to current USAF standards	576 [NCE], Arnold AFB Test Facility Historic District	Building 576 is a non-contributing resource to Arnold AFB Test Facility Historic District. Project entails replacement of existing built-up roof with single-ply thermoplastic membrane, gutters, downspouts, and flashing. These alterations on this small non-contributing building will have no potential to affect historic properties.	No	Non-historic property in HD	No historic properties affected	
ANZY090070	Replace Security Gate AE Loading Dock	Facility Renovations	This project would replace the existing antiterrorism gate with a more modern gate designed for high-volume use that allows for both automatic and manual operation.	rear of 100 [NREI]	Project is located at the rear of Building 100 [NREI] between the building and a parking lot. Replacement of the existing anti-terrorism gate has no potential to affect the nearby historic property.	No	Non-historic property	No historic properties affected*	
ANZY059041	Renovate Interior Model Shop Building 451	Facility Renovations	This project would modernize various interior areas currently occupied at the model shop, including carpet additions and removal to various rooms, interior paint, new permanent walls to screen shop restroom entrances, new walls and ceilings to provide an air-conditioned main breakroom/timecard area, floor cleaning and sealing, and door replacement, as needed, and would bring the facility up to USAF standards.	451 [NREI]	Building 451 is a historic property. Project entails interior work including painting, carpet replacement, permanent walls to screen shop restrooms, permanent walls to establish break room, demolition and removal of former timecard office. Interior may have character-defining features per 2014 Cold War Report Vol 2:12-16. The project is classified as mission critical and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY100032	Lifecycle Upgrades, Building 1402	Facility Renovations	This project would modernize various interior components, including walls, floors, ceilings, doors and trim, electrical system, and painting at Building 1402 and would bring the facility up to USAF standards.	1402 [DNE]	Building 1402 is not a historic property. It is located south of Building 1400, opposite a group of non-contributing buildings within the boundaries of the Arnold AFB Test Facility Historic District. Upgrades to exterior and interior of Building 1402 have no potential to affect the historic district.	No	Non-historic property	No historic properties affected*	
ANZY119004	Paint Exterior of Building 868, I&C Staging Lab	Facility Renovations	This project would repaint the exterior of Building 868 to include the corrugated metal roof, canopies, and the stucco walls. This project would ensure Building 868 reflects the AFMC's and AEDC's continuing efforts to upgrade base appearance.	868 [NREC], Arnold AFB Test Facility Historic District	Building 868 is a historic property. Project entails exterior painting, which is exempt under 2014 PA Appendix B.2.a when paint matches the existing or original color.	No	Historic property	Exempt under 2014 PA Appendix B.2.a if conditions are met	
ANZY149005	Repair Raised Floor, Third Floor w. Computer Room Facility 651	Facility Renovations	This project would modernize the existing raised floor and base in the third-floor west computer room in Building 651 and would bring the facility up to USAF standards.	651 [NREC], Arnold AFB Test Facility Historic District	Building 651 is a historic property. Project is interior work. The interiors are not identified as character-defining features in the 2014 Cold War Report Vol 2:77-79. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII

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ANZY129002	Repair by Replace Windows and Doors ETF Shop Facility 876	Facility Renovations	This project would modernize all windows and doors at Facility 876 and would bring the facility up to USAF standards.	876 [NREC], Arnold AFB Test Facility Historic District	Building 876 is a historic property. Proposed project is to replace all windows with new tinted, double pane, blast resistant ones. Exterior personnel doors also will be replaced. Windows and doors are character-defining features. Replacement of windows and doors are exempt under 2014 PA Appendix B.1.a if windows and doors are replaced in kind to match existing materials and design. Replacement of historic untinted windows with tinted units would pose an adverse effect to the historic property.	No	Historic property	Exempt under 2014 PA Appendix B.1.a if conditions are met	
ANZY129001	Repair/Maintain Men's Restroom 102, Building 722	Facility Renovations	This project would modernize the interior of the Men's Restroom 102 at Building 722 and would bring the restrooms up to USAF standards and in accordance with ADA handicapped requirements.	722 [NREC], Arnold AFB Test Facility Historic District	Building 722 is a historic property. The project is to renovate restrooms. Interiors are not identified as character-defining features in 2014 Cold War Report Vol 2:114-116. Interior work will have no adverse effect on historic property.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY999132A	Repair Interior Lighting, ETF a Test	Facility Renovations	This project would modernize the interior lighting throughout the ETF-A Test Building, Facility 880, and would bring the lighting up to USAF standards.	880 [NREC], Arnold AFB Test Facility Historic District	Building 880 is a historic property. Project entails replacing and upgrading interior lighting throughout building, which is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY179017	Maintain/Paint Exterior Facility 607	Facility Renovations	This project would perform general life-cycle maintenance at Facility 607 by painting the exterior.	607 [NREC], Arnold AFB Test Facility Historic District	Building 607 is a historic property. Project is to paint exterior of the building, which is exempt under 2014 PA Appendix B.2.a when new paint matches the existing of original color.	No	Historic property	Exempt under 2014 PA Appendix B.2.a if conditions are met	
ANZY149008	Repair Raised Floor Room 108, Facility 740	Facility Renovations	This project would modernize the raised floor in Room 108, Computer Room, Building 740, and bring the facility up to USAF standards.	740 [NREC], Arnold AFB Test Facility Historic District	Building 740 is a historic property. Interior is not identified as a character-defining feature in the 2014 Cold War Report Vol 2:117-119. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY079017	Upgrade Restrooms, AMSC Building 939	Facility Renovations	This project would modernize the restrooms at Building 939 and bring the facility up to USAF standards.	939 [DNE-NEV] 1992, Arnold AFB Test Facility Historic District	Building 939 is a non-contributing resource within the Arnold AFB Test Facility Historic District. It was evaluated as not eligible in 2014 Cold War Report, but recommended for re-evaluation in 2042. Work is Interior work and has no potential to affect the surrounding historic district.	No	Non-historic property in HD	No historic properties affected	
ANZY009109	Renovate Restrooms/Repair Interior, J-6 Field Office, Facility 591	Facility Renovations	This project would modernize the restrooms and to implement life-cycle sustainment repairs to interior components at Facility 591 and bring the facility up to USAF standards.	591 [DNE]	Building 591 is not a historic property nor located near any historic district or historic landscape.	No	Non-historic property		
ANZY119045	Repair Lighting, J6 DC Cooler Facility 2127	Facility Renovations	This project would modernize the J6 DC Cooler Facility lighting at Building 2127 and bring the facility up to USAF standards. Proper, modern lighting will reduce risk of personal injury and improve conditions to perform daily tasks and equipment preventive maintenance.	2127 [DNE-NEV] 1993	Building 2127 is not a historic property, but is located outside the northeast corner of Test Utilities Historic Landscape. The building was evaluated as not eligible in 2014 and recommended for re-evaluation in 2043. Trees are located between the landscape boundary and this building. Alterations to interior and exterior lighting have no potential to affect historic landscape.	Yes	Non-historic property		
ANZY079005	Renovate Interior, s-1/s-3 Impact Range Building 320	Facility Renovations	This project would modernize the restrooms and implement life-cycle sustainment repairs to interior components at Facility 320 and bring the facility up to USAF standards.	320 [DNE]	Building 320 is not a historic and not located near historic properties.	No	Non-historic property		
ANZY080110	Sustainment Upgrades, Primary Pumping Station	Facility Renovations	This project would modernize the primary pumping station and implement life-cycle sustainment repairs to interior and exterior components of the facility and bring the facility up to USAF standards.	3038 [NREC], Arnold AFB Elk River Dam-Woods Reservoir Historic Landscape [NREI]	Building 3038 is a historic property. Project entails replacement of all exterior windows and overhead and personnel doors, cleaning and sealing brick, building insulation, as well as replacing lighting and installing a new fire alarm system. Interiors are not identified as character-defining features in the 2014 Cold War Report Vol 2:277-283. Windows, doors, and cladding are character-defining features. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY980061	Construct Personnel/Freight Elevator, PWT Supersonic Control Building	Facility Renovations	This project would provide personnel and freight elevator access to multiple floors at the PWT Supersonic Control Building and bring the facility into compliance with current codes and standards for freight and ADA personnel access.	745 [NREC], Arnold AFB Test Facility Historic District	Building 745 is a historic property. Project entails construction of an interior elevator from the basement to the 2nd story. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY089061	Lifecycle Upgrade Lighting, Building 876, ETF Shop	Facility Renovations	This project would modernize the lighting at Facility 876 and would bring the facility up to USAF standards.	876 [NREC], Arnold AFB Test Facility Historic District	Building 876 is a historic property. Lighting upgrades and replacements are exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY080154	Repair Exterior, Force, Flow and Dynamics Building 390	Facility Renovations	This project would seal and paint all holes, openings, and cracks in the exterior shell (stucco) of Building 390. This project would control the humidity level inside the building.	390 [DNE], next to 350 [NREI]	Building 390 is not a historic property, but is located directly north of Building 350 [NREI]. Repairs of existing exterior stucco to Building 390 will have no potential to affect historic property.	No	Non-historic property	No historic properties affected*	

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ANZY109057	Replace Building Insulation for AMSC Building 939	Facility Renovations	This project would replace the insulation for the entire Building 939 to include the addition of insulated ceiling tiles where needed. This project would control condensation inside the building.	939 [DNE-NEV] 1992, Arnold AFB Test Facility Historic District	Building 939 is a non-contributing building within the Arnold AFB Test Facility Historic District. The building was evaluated in 2014 as not eligible and recommended for re-evaluation in 2042. Project entails replacing interior insulation for the entire building. Interior work has no potential to affect surrounding historic district.	No	Non-historic property in HD	No historic properties affected	
ANZY059021	Renovate the Photo Lab at G-Range	Facility Renovations	This project would modernize the photography lab at the G-Range and bring the facility up to USAF standards.	678 [NREC]	Building 678 is a historic property. Project entails renovation of photo lab inside building, including piping, painting, ceiling replacements, and HVAC. No interior character-defining features are identified in the 2014 Cold War Report Vol 2:92-94. Interior work will have no adverse effect on historic property.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY990053	Construct Freight Elevator, PWT Transonic Control Building 785	Facility Renovations	This project would provide freight elevator access and transport at the PWT Transonic Control Building and would bring the facility into compliance with current codes and standards for freight movement/transport.	785 [NREC], Arnold AFB Test Facility Historic District	Building 785 is a historic property. Project entails the construction of a new elevator placed on the exterior wall on the east side of the building. The elevator exterior wall will be housed in a solid wall shaft. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY139020	Paint Exterior of vkf Compressor Building 651	Facility Renovations	This project would perform general life-cycle maintenance and to prevent further deterioration at Building 651.	651 [NREC], Arnold AFB Test Facility Historic District	Building 651 is a historic property. Project entails exterior painting and cleaning and sealing of brick. Work will have no adverse effect to historic property if SOI Standards for Treatment of Historic Properties for cleaning are followed with SHPO concurrence.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY099072	Replace Windows, HTL Building 718	Facility Renovations	This project would modernize all windows in Facility 718 and would bring the facility up to USAF standards.	718 [NCE], Arnold AFB Test Facility Historic District	Building 718 is a non-contributing building in the Arnold AFB Test Facility Historic District. Project entails replacing all windows with blast resistant windows. Work is confined to building footprint of a non-contributing element to a historic district. No adverse effect to the surrounding historic district is anticipated provided that the color and reflective quality of the replacement windows are compatible with the architectural character of the surrounding district.	No	Non-historic property in HD	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY109045	Repair ETF Shop Building 876 for Break Area	Facility Renovations	This project would furnish a breakroom to accommodate FA64E and FA64M personnel by utilizing space in the area currently being used as storage.	876 [NREC], Arnold AFB Test Facility Historic District	Building 876 is a historic property. Proposed project is interior work. The building interior is not identified as a character-defining feature in 2014 Cold War Report Vol 2:174-176. Interior work will have no adverse effect on historic property.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY089050	Life-Cycle Upgrades, VKF G-range	Facility Renovations	This project would modernize the facility, including the replacement of eight personnel doors; two equipment room doors; one overhead door; transformers, panels and associated conduit, wire, etc. as well as installation of a sprinkler system; cleaning and sealing exterior walls; and installing new insulation to bring the facility up to USAF standards.	678 [NREC]	Building 678 is a historic property. Project includes exterior door replacements, new envelope of insulation, sprinklers, and electrical work. Exterior doors are character-defining features. Replacement of windows, doors, and cladding will be exempt under 2014 PA Appendix B.1.a when done in kind to match existing materials and design.	No	Historic property	Exempt under 2014 PA Appendix B.1.a if conditions are met	
ANZY029105	Interior Upgrades, ETF Shop Building 876	Facility Renovations	This project would modernize numerous interior components of the facility, and would bring the facility up to USAF standards.	876 [NREC], Arnold AFB Test Facility Historic District	Building 876 is a historic property. Proposed project is only interior work. The building interior is not identified as a character-defining feature of building in 2014 Cold War Report Vol 2:174-176. Interior work will have no adverse effect on historic property.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY089060	Life-Cycle Upgrades, Building 780, PWT Motor Drive	Facility Renovations	This project would perform general life-cycle maintenance to the building's interior components and would bring the facility up to USAF standards.	780 [NREC], Arnold AFB Test Facility Historic District	Building 780 is a historic property. Project entails cleaning and sealing exterior walls, new envelope insulation, and interior upgrades of computer controls room, restroom, ceilings on 1st and 2nd floors, replacement of exterior doors, and replace emergency generator. Interiors are not identified as character-defining features in 2014 Cold War Report Vol 2:132-134. Replacement of doors and cladding will be exempt under 2014 PA Appendix B.1.a if these elements are replaced in kind to match existing materials and design.	No	Historic property	Exempt under 2014 PA Appendix B.1.a if conditions are met	
ANZY089059	Construct Elevator for MT&L Building 676	Facility Renovations	This project would modernize and streamline the movement of equipment of test hardware between flows at the MT&L Building in accordance with ANSI A17.1 and ANSI A117.1 codes and standards for freight and for personnel access.	676 [NREC], Arnold AFB Test Facility Historic District	Building 676 is a historic property. Installation of elevator will be interior work only. No interior character-defining features are identified in the 2014 Cold War Report Vol 2:89-91. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY139018	Replace Roof of ETF-a Refrigeration Building 884	Facility Renovations	This project would modernize the roof on Building 884 and bring the facility up to current USAF standards.	884 [NREC], Arnold AFB Test Facility Historic District	Building 884 is a historic property. Project entails replacement of existing built-up roof. Roof is flat and not visible from ground. Replacement of roof will no adverse effect to on historic properties provided that roof type and profile are maintained and compatible to the existing historic building.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY139002	Life-Cycle Upgrade Windows Power Control Building 1525	Facility Renovations	This project would modernize the windows in Building 1525 with new energy-efficient and blast-resistant windows and bring the facility up to current USAF standards.	1525 [NREC], Arnold AFB Test Utilities Historic Landscape [NREI]	Building 1525 is a historic property. Windows are character-defining feature. Replacement of existing windows with energy efficient units will be exempt under 2014 PA Appendix B.1.a if windows are replaced in kind to match existing materials and design.	No	Historic property	Exempt under 2014 PA Appendix B.1.a if conditions are met	

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ANZY129027	Upgrade Office/Breakroom, ETF shop 876	Facility Renovations	This project would consulate and improve the office breakroom areas and working conditions at Building 876.	876 [NREC], Arnold AFB Test Facility Historic District	Building 876 is a historic property. Proposed project is interior work. The building interior was not identified as a character-defining feature in the 2014 Cold War Report Vol 2:174-176. Interior work will have no adverse effect on historic property.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY089067	Life-Cycle Upgrades, Building 939, Plume Data Diagnostics Lab	Facility Renovations	This project would perform general life-cycle maintenance to the building's interior components and would bring the facility up to USAF standards.	939 [DNE-NEV] 1992, Arnold AFB Test Facility Historic District	Building 939 is a non-contributing building within the Arnold AFB Test Facility Historic District. It was evaluated in 2014 as not eligible and is recommended for re-evaluation in 2042. Project includes replacement windows, new envelope insulation, lighting, fire alarm system, 1 door replacement. Work contained within current building footprint will have no adverse effect to the surrounding historic property.	No	Non-historic property in HD	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY110044	Construct Elevator System, Wingo Inn, Facility 3027	Facility Renovations	This project would update the Wingo Inn (Facility 3027) through installation of an elevator system.	3027 [DNE]	Building 3027 is not a historic property, but is located north of the boundary of the Elk River Dam-Woods Reservoir Historic Landscape. Building is located approximately 160 ft from shoreline. Shoreline is treed. Construction of an elevator has no potential to affect historic landscape.	No	Non-historic property	No historic properties affected*	
ANZY179008	Repair by Replacement High Bay Roof of Building 2108	Facility Renovations	This project would modernize the roof on Building 2108 and would bring the facility up to current USAF standards.	2108 [DNE]	Building 2108 is not a historic property. It is an isolated building located 0.16 mile south of the Test Utilities Historic Landscape. Vegetation buffer separates building from historic landscape. Interior renovations have no potential to affect the historic landscape.	No	Non-historic property		
ANZY050042	Repr Raised Flooring, Building 1103, Base NCC	Facility Renovations	This project would improve the reliability and maintainability of the raised flooring in Building 1103 and to ensure the flooring meets current codes and requirements.	1103 [DNE]	Building 1103 is not a historic property. It is located 0.16 mile SW of Building 100 [NREI]. This project is interior work.	No	Non-historic property		
ANZY119008	Replace Windows at Building 1411, Steam Plant a	Facility Renovations	This project would replace all single-pane windows and wall louvers at steam plant with more energy-efficient windows.	1411 [DNE]	Building 1411 is not a historic property, but is located southeast of Building 1478 [NREI] and oustide the south boundary of the Arnold AFB Test Facility Historic District. The project entails replacement of all single pane windows with energy efficient windows. The work will be contained within the footprint of the current building and will have no potential to affect nearby historic properties.	No	Non-historic property	No historic properties affected*	
ANZY100051	Life-cycle Upgrade , Restroom, Building 1525	Facility Renovations	This project would modernize the restrooms in Building 1525 and bring the facility up to current USAF standards.	1525 [NREC], Arnold AFB Test Utilities Historic Landscape [NREI]	Building 1525 is a historic property. Work is interior to renovate all restrooms. The restrooms are not identified as character-defining features in the 2014 Cold War Report Vol 2:325-329. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY089062	Life-Cycle Upgrades, Building 903, ETF-c Exhauster	Facility Renovations	This project would perform general life-cycle maintenance to the building's interior components and would bring the facility up to USAF standards.	903 [NREC], Arnold AFB Test Facility Historic District	Building 903 is a historic property. Project includes new envelope insulation, replacement of 4 personnel doors, ceiling upgrades in stairwells, lighting replacement, and heater replacements. Exterior cladding and exterior doors are character-defining features. Replacement of windows, doors, and cladding could be exempt under 2014 PA Appendix B.1.a when done in kind to match existing materials and design. Interiors are not identified as character-defining features in 2014 Cold War Report Vol 2:216-218.	No	Historic property	Exempt under 2014 PA Appendix B.1.a if conditions are met	
ANZY139053	Repair by Replace Interior Lighting Primary Pump Stn Facility 3038	Facility Renovations	This project would install proper lighting that would reduce risk of personal injury and eliminate an existing personnel safety hazard, meet energy requirements, and improve conditions to perform daily tasks and equipment preventive maintenance.	3038 [NREC], Arnold AFB Elk River Dam-Woods Reservoir Historic Landscape [NREI]	Building 3038 is a historic property. The project entails installation of new lighting, which is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY179007	Repair by Replacement Roof of Facility 2123	Facility Renovations	This project would modernize the roof on Building 2123 and bring the facility up to current USAF standards.	2123 [DNE-NEV] 1992	Building 2123 is not a historic property nor located near historic district or historic landscapes. Building 2123 was evaluated as not eligible in 2014 and recommended for re-evaluation in 2042.	No	Non-historic property		
ANZY079010	Repair Interior, ETF Special Projects Building 899	Facility Renovations	This project would renovate the interior of Building 899, first and second floors; replace water-damaged red/brown carpet in all rooms; repair water-damaged ceiling tile and replace missing panels; and paint all interior walls, doors, and frames as needed.	899 [NREC], Arnold AFB Test Facility Historic District	Building 899 is a historic property. Project entails interior work to replace carpet, repair flooring ceiling tiles and other panels, and repaint. Interiors are not identified as character-defining features in the 2014 Cold War Report Vol 2:213-215. Interior work will have no adverse effect on historic property.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY9700983	Renovate Model Shop/1st Floor	Facility Renovations	This project would renovate the interior administration area on the first floor of the model shop to bring the facility up to current standards.	451 [NREI]	Building 451 is a historic property. Project entails renovation of 1st floor and provide new air conditioning. Interior finishes are not identified as character-defining features in 2014 Cold War Report Vol 2:12-16. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY139055	Repair/Replace Interior Lighting PWT Supersnic Cmpr Facility 702	Facility Renovations	This project would replace the interior lighting throughout the PWT Supersonic Compressor Equipment Building, Facility 702, including foot-candle levels, preventive maintenance, emergency lighting, and lighting controls.	702 [NCE], Arnold AFB Test Facility Historic District	Building 702 is a non-contributing building in the Arnold AFB Test Facility Historic District. Replacement of lighting in a non-contributing building has no potential to affect the historic district.	No	Non-historic property in HD	No historic properties affected	

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ANZY139019	Paint Exterior of PWT Rotor Building 786	Facility Renovations	This project would prevent further exterior paint deterioration by performing maintenance painting of the building exterior including walls, doors, frames, rollup doors, louvers, bollards, and trim.	786 [NREC], Arnold AFB Test Facility Historic District	Building 786 is a historic property. Project entails exterior painting. Exterior painting is exempt under the 2014 PA Appendix B.2.a if new paint matches the existing or original color and no abrasive cleaning methods are used.	No	Historic property	Exempt under 2014 PA Appendix B.1.a if conditions are met	
ANZY150008	Repair by Replace Roof Services Marina Storage, Facility 3058	Facility Renovations	This project would modernize the roof on Building 3058 and would bring the facility up to current USAF standards. This project is in a floodplain.	3058 [NCE], 20007 [NREC], Arnold AFB Elk River Dam-Woods Reservoir Historic Landscape [NREI]	Building 3058 comprises two structures: a marine storage building adjacent to Woods Reservoir and a dock sitting in the Woods Reservoir. Building 3058 is not a historic property and the dock is a non-contributing element to to the Elk River Dam-Woods Reservoir Historic Landscape. Project entails replacement of a roof on the marine storage building. The project is confined to the footprint of the non-historic building and has no potential to affect the nearby historic landscape.	No	Non-historic property	No historic properties affected*	
ANZY089073	Repair Fire Exit Stairs, Mark 1, Building 1075	Facility Renovations	This project would widen and reduce the exit stair slope as required to comply with current life safety codes.	1075 [DNE]	Building 1075 is not a historic property, but is located outside the east boundary of the Arnold AFB Test Facility Historic District. Work conducted on this building has no potential to affect the nearby historic district.	No	Non-historic property	No historic properties affected*	
ANZY119036	Life-Cycle Upgrade Building 646	Facility Renovations	This project would renovate the interior of Building 646, including replacing asbestos floor covering, patching/painting drywall, removing strip heaters hanging from the ceiling, installing gaskets/weatherstripping at all exterior doors, and upgrading restroom walls, floors, ceiling, fixtures, and accessories.	646 [NREC], Arnold AFB Test Facility Historic District	Building 646 is a historic property. Project is interior work and the interior is not identified as a character-defining feature in the 2014 Cold War Report Vol 2:70-74. Interior work will have no adverse effect on historic property.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY9700984	Renovate Model Shop/2nd Floor	Facility Renovations	This project would renovate the interior second floor of the model shop to bring the facility up to current standards.	451 [NREI]	Building 451 is a historic property. Project entails renovation of 2nd floor and provide new air conditioning. Interior finishes are not identified as character-defining features in 2014 Cold War Report Vol 2:12-16. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY119002	Repair Work Lights in j6 Test Cell Bld 2124	Facility Renovations	This project would replace work lights with equivalent illumination and distribution or replace existing fluorescent fixture oil-filled ballasts with electronic ballasts and locate electronic ballasts outside the vacuum system.	2124 [DNE-NEV] 1993	Building 2124 is not a historic property nor located near historic district or historic landscapes. The building was evaluated as not eligible in 2014 and recommended for re-evaluation in 2043.	No	Non-historic property		
ANZY170010	Replace Roof on BCE Building, Facility 1478	Facility Renovations	This project would replace the existing built-up roof with a new single-ply roof, replace the existing skylights with new watertight panels, and replace the existing roof access fixed ladders.	1478 [NREI]	Building 1478 is a historic property. Project includes replacing existing built-up roof with new single-ply roof, replacing skylights with new water tight panels, and replacing existing roof access fixed ladders. The building has a flat built-up roof and is not visible from the ground. The skylights are not identified as character-defining features in 2014 Cold War Report Vol 2:23-27. Replacement of built up roofing with single ply roof that maintains the current roof profile will have no adverse effect to the historic property. Replacement of skylights in kind to match existing materials and design will be exempt under 2014 PA Appendix B.1.a.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY119024	Replace Windows at Secondary Pumping Station, Building 1507	Facility Renovations	This project would replace existing windows with new energy-efficient windows.	1507 [NREC], Arnold AFB Test Utilities Historic Landscape [NREI]	Building 1507 is a historic property. Project entails window replacements. Windows are character-defining features per 2024 Cold War Report Vol 2:322-324. Replacement of windows will be exempt under 2014 PA Appendix B.1.a if windows are replaced in kind to match existing materials and design.	No	Historic property	Exempt under 2014 PA Appendix B.1.a if conditions are met	
ANZY129011	Life-Cycle Upgrade PWT Supersonic Control Building 745	Facility Renovations	This project would maintain the interior of Facility 745, including the following items: repair janitor's closet after steam leak is repaired to include painting, door replacement, shelving, and concrete block repair as needed; replace ceiling tile and paint office near men's first-floor restroom; paint men's first-floor restroom, replace partitions, fixtures, and accessories as needed; upgrade to ADA standards as feasible; paint interior of 113 Plant Computer room and repair wall/paint adjacent hallway drywall east wall; repair moisture problems on east wall and paint wall in the 16S Nozzle Room; paint interior, replace ceiling tile, and replace carpet in 115, 4T User Office; paint and replace damaged asbestos floor tile in 117 and 117A; replace ceiling tile in 117A; replace high bay west double doors with roll-up door and personnel door; and repair same interior exit by removing unused electrical cabinets and painting interior.	745 [NREC], Arnold AFB Test Facility Historic District	Building 745 is a historic property. Project mainly entails interior work, but also includes replacing high bay west double doors, with roll-up door and personnel door. Interior is not identified as a character-defining feature in 2014 Cold War Report Vol 2:120-122. Exterior doors are character-defining features. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY109009	Life-Cycle Upgrade - Rowland Creek ps Building 1547	Facility Renovations	This project would paint walls damaged by a steam leak in the high bay.	1547 [NCE] 2000, Arnold AFB Test Utilities Historic Landscape	Building 1547 [2000) is a non-contributing resource to the Test Utilities Historic Landscape. Building was evaluated as not eligible in 2014 and recommended for re-evaluation in 2050. Project calls for painting which has no potential to affect the historic landscape.	No	Non-historic property in HD	No historic properties affected	

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ANZY110021	Renovate Exterior of Building 1422	Facility Renovations	This project would renovate Building 1422, which includes replacing the exterior metal roof and siding, along with new insulation, new roll-up doors, and new personnel doors.	1422 [DNE]	Building 1422 is not a historic property, nor located near any historic district or landscape.	No	Non-historic property		
ANZY079037	Repair Interior, ETF-C Heater Control Building. 921	Facility Renovations	This project would maintain Facility 921, ETF-C Heater Control Building, by completing interior repair of peeling paint; interior painting of walls, doors, and trim; exterior painting of doors and frames; installation of new trash can in restroom; repair of water-damaged 12x12 vinyl floor tile; cleaning and relamping of existing light fixtures; repair of ballast in restroom light fixture; and replacement of vestibule ceiling tile.	921 [NREC], Arnold AFB Test Facility Historic District	Building 921 is a historic property. The project is mostly interior work with painting of exterior doors and frames. Interiors are not identified as character-defining features in 2014 Cold War Report Vol 2:234-236. Exterior painting is exempt under 2014 PA Appendix B.2.a if new paint matches the existing or original color.	No	Historic property	Exempt under 2014 PA Appendix B.2.a if conditions are met	
ANZY109010	Life-Cycle Upgrade - Flammable Storage Building 1543	Facility Renovations	This project would maintain the flammable storage area at Building 1542 by painting exterior walls, installing new envelope insulation, replacing an overhead door on the south side of building, replacing exterior lights and installing weatherproof receptacles with associated conduit/wiring, and replacing all lighting fixtures with more energy-efficient light and lighting controls such as motion sensor.	1543 [NCE], Arnold AFB Test Utilities Historic Landscape	Building 1543 is a non-contributing resource to the Test Utilities Historic Landscape. Alterations confined to the footprint of building have no potential to affect the historic landscape.	No	Non-historic property in HD	No historic properties affected	
ANZY169006	Repair Lighting in Control Room Facility, Facility 878	Facility Renovations	This project would replace the interior lighting in the control room and bathroom area of Facility 878. This project requires replacing the ceiling tiles and feeder wires; the existing interior lighting fixtures with new induction, or LED lighting fixtures; and the existing lighting panel with a new lighting control panel.	878 [NREC], Arnold AFB Test Facility Historic District	Building 878 is a historic property. Work on lighting systems is exempt under 2014 PA Appendix B.1.b	NO	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY139030	Paint PWT 4T Building 707	Facility Renovations	This project would perform maintenance painting of the H Building exterior to include walls, doors, frames, roll-up doors, louvers, ladders, bollards, and trim.	707 [NREC], Arnold AFB Test Facility Historic District	Building 707 is a historic property. Project entails exterior painting and cleaning and sealing of brick and concrete walls.Work will have no adverse effect to historic property if SOI Standards for Treatment of Historic Properties for cleaning are followed with SHPO concurrence.	NO	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY050024	Construct/Repair Elevator System, A&E Building, Facility 100	Facility Renovations	This project would construct the passenger elevator on northwest side of the A&E Building (B-Wing) and would bring the facility up to current USAF standards.	100 [NREI]	Building 100 is a historic property. Project entails installation of a new elevator on an exterior wall on the northwest side of the building. This is a secondary elevation. Project is also to renovate the original interior elevator, including replacement of the elevator cab. Interior elevator is not identified as a character-defining feature in 2014 Cold War Report Vol 2:2-7. Addition of a new exterior elevator on the NW side of the building will be a no adverse effect to the historic property with SHPO concurrence if the design is compatible in architectural character in accordance with the 2014 PA and the SOI Standards for Rehabilitation regarding new construction.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY189005	Repair Metal Pump Room Roof, Facility 579	Facility Renovations	This project would replace the metal roof with a new metal roof, install a new roof hatch so that the pumps and other equipment can be easily moved in and out of the building, replace the insulation inside the building that is located on the underside of the roof decking, and provide safe access to the roof hatch and valves on the roof.	579 [NREC], Arnold AFB Test Facility Historic District	Building 579 is a historic property. Project entails roof replacement and installation of a new roof hatch. Roof replacement will be exempt under 2014 PA Appendix B.1.a if roof is replaced in kind to match existing materials and design.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY119019	Replace Metal Roof of Building 712, PWT 16s Nozzle Pump House	Facility Renovations	This project would modernize the existing corrugated metal roof to a standing seam roof on Building 712 and bring the facility up to current USAF standards.	712 [NCE], Arnold AFB Test Facility Historic District	Building 712 is a non-contributing building to the Arnold AFB Test Facility Historic District. Project calls for replacing existing corrugated metal roof with new standing seam metal. Building 712 is a small metal clad building. Replacement of the roof with metal while retaining the roof profile will have no potential to affect nearby historic properties.	No	Non-historic property in HD	No historic properties affected	
ANZY079016	Maintain Interior, ETF Exhauster, Building 882	Facility Renovations	This project would upgrade the Interior of Building 882, including control room floors and walls, the toilet and janitor's closet, and interior doors and hardware as needed, and paint.	882 [NREC], Arnold AFB Test Facility Historic District	Building 882 is a historic property. Work is interior. Interiors are not identified as character-defining features in 2014 Cold War Report Vol 2:192-194. Interior work will have no adverse effect on historic property.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY080129	Repair/Maintain HAZMAT Pharmacy Building 1459	Facility Renovations	This project would maintain Building 1459 by replacing the current low-voltage power distribution, transformers, power panels, and associated wiring; replacing two personnel doors; painting walls, doors and trim; replacing floor tile and base; sealing any water penetrations in walls; and installing an exhaust fan at east end to ensure it is explosion proof.	1459 [DNE-NEV] 1993	Building 1459 is not a historic property, but is located approximately 278 ft from southeast corner of secondary reservoir 1506 [NREC] and the Test Utilities Historic Landscape. Building 1459 was evaluated as not eligible in 2014, but recommended for re-evaluation in 2043. Project is primarily interior, but includes replacement of two personnel doors. Alterations to Building 1459 will have no potential to affect the nearby historic district.	NO	Non-historic property	No historic properties affected*	
ANZY090080	Upgrade Lighting, Commissary/ BX Building 125	Facility Renovations	This project would modernize the existing lighting system at Building 125 and bring the facility up to current USAF standards.	125 [DNE]	Building 125 is not a historic property nor located near any historic properties.	NO	Non-historic property		

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ANZY139037	Paint Exterior of PWT Pes Control Building 710	Facility Renovations	This project would maintain Building 710 by painting exterior walls, doors, frames, roll-up doors, louvers, ladders, bollards, and trim and cleaning and sealing concrete and brick walls.	710 [NREC], Arnold AFB Test Facility Historic District	Building 710 is a historic property. Project entails exterior painting and cleaning and sealing of brick and concrete walls. Work will have no adverse effect to historic property if SOI Standards for Treatment of Historic Properties for cleaning are followed with SHPO concurrence.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY076008	Repair H1 Bank 1 Roof, Facility 921	Facility Renovations	This project would modernize the existing flat roof to a standing seam roof on the C Plant H1 Bank 1a Facility 921 and bring the facility up to current USAF standards.	921 [NREC], Arnold AFB Test Facility Historic District	Building 921 is a historic property. Current roof is documented as steel and will be replaced with metal. Roof is flat and not visible from the ground. Replacement of roof will will have no adverse effect to historic property provided that roof type and profile are maintained.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY089042	Repair/Maintain PWT Model Installation Building 760	Facility Renovations	This project would maintain Building 760 by replacing any discolored, missing, or water-damaged ceiling tile and grid; painting walls damaged by a steam leak in the high bay and all of the interior walls and ceilings except offices on the first floor; and replacing low-voltage power panels.	760 [NREC], Arnold AFB Test Facility Historic District	Building 760 is a historic property. Project entails interior work and the interior is not identified as a character-defining feature of building in 2014 Cold War Report Vo. 2:126-128. Interior work will have no adverse effect on historic property.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY090010	Modernize Gossick Leadership Center, Facility 2912	Facility Renovations	This project would modernize Facility 2912 and bring it up to USAF standards.	2912 [DNE]	Building 2912 is not a historic property, but is located adjacent to Elk River Dam-Woods Reservoir Historic Landscape. Work is interior and has no potential to affect nearby historic properties.	No	Non-historic property	No historic properties affected*	
ANZY099079	Install Lighting Controls, Customer Service Building 1306	Facility Renovations	This project would modernize the lighting system at Building 1306 and bring it up to USAF standards.	1306 [DNE]	Building 1306 is not a historic property nor is it adjacent to the Arnold AFB Test Facility Historic District or the historic landscapes.	No	Non-historic property		
ANZY139052	Modify Roof or Replace PWT HTL Reactor Facility 721	Facility Renovations	This project would raise the existing roof of Building 721 or replace Building 721 altogether to allow for the use of the top coils of the C reactors.	721 [NREC], Arnold AFB Test Facility Historic District	Building 721 is a historic property. Project entails either roof modifications or building replacement. Building 721 is a one-story metal building with a shallow gable metal roof. Substantial roof modification or building demolition will have an adverse effect to the historic property.	No	Historic property	Adverse effect	Follow Stipulations V.A.3 and VII. Standardized Treatment for Demolition in 2014 PA
ANZY190005	AD/AL Installation Gate Access Control Point, Arnold Village	Facility Renovations	This project would modernize the access control point at Arnold Village and bring it up to USAF standards.	Arnold Village gate	Arnold gate access control area is not historic. Arnold Village is located outside Elk River Dam-Woods Reservoir Historic Landscape. Modifications to the access control point have no potential to affect historic properties.	Yes	Non-historic property		
ANZY129012	Life-Cycle Upgrade PWT Transonic Control Building 785	Facility Renovations	This project would upgrade the interior of Building 785 to include the following: paint interior of the second floor as needed, replace east double door with new roll-up door and canopy, repair the forklift-damaged north drywall wall inside the double doors and cover wall with metal to prevent further damage in the tight space, paint interior and replace lighting to energy-efficient lights in the basement work areas, replace lighting in the equipment room, replace the damaged men's restroom door in the first-floor lobby area to match existing door style and color, and reinsulate any damaged piping in the basement work areas.	785 [NREC], Arnold AFB Test Facility Historic District	Building 785 is a historic property. Project entails interior work, replacement of exterior door and installation of a canopy. Interior is not identified as a character-defining feature in 2014 Cold War Report Vol 2:138-140. Exterior doors are character-defining features. Replacement of doors will be exempt under 2014 PA Appendix B.1.a if doors are replaced in kind to match existing in materials and design. The canopy will have no adverse effect if its materials and design are compatible to the existing building.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY139038	Paint Exterior of ETF-A EXHauster Building 882	Facility Renovations	This project would maintain Building 882 by painting exterior walls, doors, frames, roll-up doors, louvers, ladders, bollards, and trim and cleaning and sealing concrete and brick walls.	882 [NREC], Arnold AFB Test Facility Historic District	Building 882 is a historic property. Project entails exterior painting and cleaning and sealing brick and concrete walls. Work will have no adverse effect to historic property if SOI Standards for Treatment of Historic Properties for cleaning are followed with SHPO concurrence.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY070012	Maintain/Upgrade Restroom, Secondary Pump Station	Facility Renovations	This project would modernize the restroom at Facility 1507, Secondary Pumping Station, and bring it up to USAF standards.	1507 [NREC], Arnold AFB Test Utilities Historic Landscape	Building 1507 is a historic property. Work is interior. The interior is not identified as a character-defining feature in 2014 Cold War Report Vol 2:322-324. Interior work will have no adverse effect on historic property.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY099018	Repair Mark I High Bay Lighting	Facility Renovations	The purpose of the is project is to relamp Mark I (1075) High Bay and Mark I Refrigeration Shop with sufficient high bay lighting.	1075 [DNE]	Building 1075 is not a historic property, but is located outside the east boundary of the Arnold AFB Test Facility Historic District. Work is interior and will have no affect on the nearby historic district.	No	Non-historic property	No historic properties affected*	
ANZY139029	Paint ETF-C Air Supply Building 929	Facility Renovations	This project would maintain Building 929 by painting exterior walls, doors, frames, roll-up doors, louvers, ladders, bollards, and trim and cleaning and sealing concrete and brick walls.	929 [NREC], Arnold AFB Test Facility Historic District	Building 929 is a historic property. Project entails exterior painting and cleaning and sealing of brick and concrete walls. Work will have no adverse effect to historic property if SOI Standards for Treatment of Historic Properties for cleaning are followed with SHPO concurrence.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY079030	Repair Interior, PWT Blade Repair Building 794	Facility Renovations	This project would improve the workplace for users and bring the facility up to USAF standards by renovating the interior of Facility 794.	794 [NCE], Arnold AFB Test Facility Historic District	Building 794 is located in Arnold AFB Test Facility Historic District, but is non-contributing resource. Project entails interior work to paint walls, clean floors, replace lighting, replace entry door, and insulate facility. Interior renovations have no potential to affect historic district.	No	Non-historic property in HD	No historic properties affected	

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ANZY099019	Repair Mark I Test Control Areas Lighting	Facility Renovations	This project would improve the workplace for users and bring the facility up to USAF standards by relamping the test control areas of the Mark I Facility (1075).	1075 [DNE]	Building 1075 is not a historic property, but is located outside the east boundary of the Arnold AFB Test Facility Historic District. Work is interior and will have no potential to affect the nearby historic district.	No	Non-historic property	No historic properties affected*	
ANZY139022	Paint Exterior of t-3 Test Cell Building 898	Facility Renovations	This project would maintain Building 898 by painting exterior walls, doors, frames, roll-up doors, louvers, ladders, bollards, and trim and cleaning and sealing concrete and brick walls.	898 [NREC], Arnold AFB Test Facility Historic District	Building 898 is a historic property. Project entails exterior painting and cleaning and sealing brick and concrete walls. Work will have no adverse effect to historic property if SOI Standards for Treatment of Historic Properties for cleaning are followed with SHPO concurrence.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY080048	Renovate Auto Repair Shop, Facility 1400	Facility Renovations	This project would improve the quality of life for the occupants, provide modern workspaces for occupants, and bring the facility up to USAF standards by renovating the interior of Facility 1400.	1400 [DNE] located south of Arnold AFB Test Facility Historic District	Building 1400 is not a historic property, but is located approximately 100 ft outside the south boundary of the Arnold AFB Test Facility Historic District. The southeast corner has non-contributing resources to district. Project is mostly interior work with window replacements, but project has no potential to affect nearby historic district.	No	Non-historic property	No historic properties affected*	
ANZY079011	Renovate Interior, X-Ray Building	Facility Renovations	This project would improve the workplace for users and bring the facility up to USAF standards by renovating the interior of Facility 2108.	2108 [DNE]	Building 2108 is not a historic property and is located 0.16 mile south of Test Utilities Historic Landscape. Vegetation buffer separates building from historic landscape.	No	Non-historic property		
ANZY090012	Modernize Arnold Community Center	Facility Renovations	This project would modernize the Arnold Community Center and bring the facility up to USAF standards.	3055 [DNE]	Building 3055 is not a historic property nor located near historic district or historic landscapes.	No	Non-historic property		
ANZY189037	Maintain/Paint Exterior of vkf g-Range, Facility. 678	Facility Renovations	This project would maintain Facility 678 as a weathertight building.	678 [NREC]	Building 678 is a historic property. Exterior painting is exempt under the 2014 PA Appendix B.2.a provided that new paint matches the existing or original color and abrasive cleaning methods are avoided.	No	Historic property	Exempt under 2014 PA Appendix B.2.a if conditions are met	
ANZY090006	Repair Heavy Equipment Repair Shop Facility 1401	Facility Renovations	This project would modernize Facility 1401 and bring the facility up to USAF standards.	1401 [DNE]	Building 1401 is not a historic property nor located near the historic district or landscapes.	No	Non-historic property		
ANZY079007	Repair Restroom, Explosive/Rocket Motor Storage Building 2228	Facility Renovations	This project would improve the workplace for users and bring the facility up to USAF standards by renovating the restroom Facility 2228.	2228 [DNE]	Building 2228 is not historic and not located near historic properties.	No	Non-historic property		
ANZY199021	Renovate vkf htl Shop, Facility 718	Facility Renovations	This project would improve the workplace for users and bring the facility up to USAF standards by modifying the existing 718 Facility, including adding new office spaces, a new conference room, new supervisor offices, and a breakroom; increasing restroom capacity; installing a new fire detection and suppression system; and replacing exterior doors and windows.	718 [NCE], Arnold AFB Test Facility Historic District	Building 718 is a non-contributing building in the Arnold AFB Test Facility Historic District. Project entails extensive interior renovatons, a new fire suppression system, and replacement of existing exterior doors and windows. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Non-historic property in HD	Mission Critical	Follow Stipulations II.C and VIII
ANZY070074	Replace Task Lights, Carroll Building	Facility Renovations	This project would create a more energy-efficient building and bring the facility up to USAF standards.	1103 [DNE]	Building 1103 is not a historic property. It is located 0.16 mile SW of Building 100 [NREI]. This project is interior work with no potential to affect nearby historic properties.	No	Non-historic property		
ANZY139003	Seal Exterior of Power Control Building 1525	Facility Renovations	This project would seal the brick and repair the mortar, clean and seal concrete steps and landings, and paint metal handrails and guardrails at Building 1525.	1525 [NREC], Arnold AFB Test Utilities Historic Landscape	Building 1525 is a historic property. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY0491133	SSTF Renovations	Facility Renovations	This project would modernize the facility and bring it up to USAF standards.	1077 [DNE]	Building 1077 is not a historic property, but is located outside the east boundary of the Arnold AFB Test Facility Historic District. Renovation work is interior. Exterior work includes replacing windows and doors with insulated glass units, insulate exterior office walls, install elevator, rework exterior stairs. Building 1077 is located across road from northeast corner of Arnold AFB Test Facility Historic District, but only NCE buildings are located in this corner. Project has no potential to affect nearby historic properties.	No	Non-historic property	No historic properties affected*	
ANZY099078	Install Lighting Controls, Customer Service Building 1307	Facility Renovations	This project would modernize the lighting system at Building 1307 and bring it up to USAF standards.	1307 [DNE]	Building 1307 is not a historic property nor is it adjacent to the Arnold AFB Test Facility Historic District or the historic landscapes.	No	Non-historic property		
ANZY139025	Paint J6 Local Electronics Building 2123	Facility Renovations	This project would maintain Building 2123 by painting exterior walls, doors, frames, roll-up doors, louvers, ladders, bollards, and trim and cleaning and sealing concrete and brick walls.	2123 [DNE-NEV] 1992	Building 2123 is not a historic property nor located near historic district or historic landscapes. Building 2123 was evaluated as not eligible in 2014 and recommended for re-evaluation in 2042.	No	Non-historic property		

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ANZY140025	Repair/Renovate Shop Areas BCE Facility 1478	Facility Renovations	This project would modernize Facility 1478 and bring it up to USAF standards.	1478 [NREI]	Building 1478 is a historic property. Project includes replacing skylights with either new skylights or new roofing, upgrading existing restrooms with new finishes, and replacing plumbing, heating, lighting. Also included are installing fire detection and sprinkler systems, upgrading interior offices, upgrading communications systems, and resealing concrete floors. The interior finishes are identified as character-defining features in the 2014 Cold War Rept Vol 2:23-27. Interior work will be exempt under Appendix B.3 if alterations do not adversely affect any interior defining characteristics. The 2014 Cold War Rept Vol 2:23-27 identifies the roof profile as a character-defining feature, but not the skylights or roof material. The building has a flat built-up roof that is not visible from the ground. Replacement of built up roofing with a single ply roof that will maintain the current roof profile will have no adverse effect to the historic property. Replacement of skylights in kind to match existing materials and design will be exempt under 2014 PA Appendix B.1.a.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY139033	Paint ETF AC&T Building 878	Facility Renovations	This project would maintain Building 878 by painting exterior walls, doors, frames, roll-up doors, louvers, ladders, bollards, and trim and cleaning and sealing concrete and brick walls.	878 [NREC], Arnold AFB Test Facility Historic District	Building 878 is a historic property. Project entails exterior painting and cleaning and sealing brick and concrete walls. Work will have no adverse effect to historic property if SOI Standards for Treatment of Historic Properties for cleaning are followed with SHPO concurrence.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY139034	Paint ETF B-Side Exhauster Building 879	Facility Renovations	This project would maintain Building 879 by painting exterior walls, doors, frames, roll-up doors, louvers, ladders, bollards, and trim and cleaning and sealing concrete and brick walls.	879 [NREC], Arnold AFB Test Facility Historic District	Building 879 is a historic property. Project entails exterior painting and cleaning and sealing brick and concrete walls. Work will have no adverse effect to historic property if SOI Standards for Treatment of Historic Properties for cleaning are followed with SHPO concurrence.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY130008	Paint Exterior of PWT Office Building 740	Facility Renovations	This project would maintain Building 740 by painting exterior walls, doors, frames, roll-up doors, louvers, ladders, bollards, and trim and cleaning and sealing concrete and brick walls.	740 [NREC], Arnold AFB Test Facility Historic District	Building 740 is historic property. Project entails exterior painting, and cleaning and sealing of brick walls. Work will have no adverse effect to historic property if SOI Standards for Treatment of Historic Properties for cleaning are followed with SHPO concurrence.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY099087	Life-Cycle Upgrades, Cooling Tower Control Building 1092	Facility Renovations	This project would improve the workplace for users and bring the facility up to USAF standards by renovating the restroom in Building 1092.	1092 [DNE]	Building 1092 is not a historic property, but is located outside the east boundary of the Arnold AFB Test Facility Historic District. Project is all interior work, so has no potential to affect the nearby historic district.	No	Non-historic property	No historic properties affected*	
ANZY100042	Repair Waste Oil Minimization Facility-Building 1461	Facility Renovations	This project would modernize the lighting system at Building 1461 and bring it up to USAF standards.	1461 [DNE]	Building 1461 is not a historic property. It is located 485 ft outside the south boundary of the Arnold AFB Test Facility Historic District. No contributing resources are located in the historic district opposite Building 1461. Project includes sealing exterior walls and exterior painting and has no potential to affect historic properties.	No	Non-historic property	No historic properties affected*	
ANZY139024	Paint PWT Transonic Control Building 785	Facility Renovations	This project would maintain Building 785 by painting exterior walls, doors, frames, roll-up doors, louvers, ladders, bollards, and trim and cleaning and sealing concrete and brick walls.	785 [NREC], Arnold AFB Test Facility Historic District	Building 785 is a historic property. Project entails exterior painting and cleaning of brick and concrete walls. Work will have no adverse effect to historic property if SOI Standards for Treatment of Historic Properties for cleaning are followed with SHPO concurrence.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY089003	Repair Raised Floor, ETF-a Test, Building 880	Facility Renovations	This project would modernize the flooring at Building 880 and bring it up to USAF standards.	880 [NREC], Arnold AFB Test Facility Historic District	Building 880 is a historic property. Project entails replacement of raised flooring in J1 and J2 control rooms. The interior is not identified as a character-defining feature of building per 2014 Cold War Report Vol 2:186-188. Replacement of interior flooring will have no adverse effect on the historic property.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY149007	Repair Raised Floors sl2/sl3, Facility 541	Facility Renovations	This project would modernize the flooring at Facility 541 and bring it up to USAF standards.	541 [DNE-NEV] 1998	Building 541 is not a historic property. The building was evaluated in 2014 as not eligible and recommended for re-evaluation in 2048. It is located between the boundaries of Arnold AFB Test Facility Historic District and Test Utilities Historic Landscape. Interior work has no potential to affect historic properties.	No	Non-historic property	No historic properties affected*	
ANZY139023	Paint Exterior of the j-4 Data Conditioning Building 534	Facility Renovations	This project would maintain Building 534 by painting exterior walls, doors, frames, roll-up doors, louvers, ladders, bollards, and trim and cleaning and sealing concrete and brick walls.	534 [NCE], Arnold AFB Test Facility Historic District	Building 534 is a non-contributing resource to the Arnold AFB Test Facility Historic District. Project entails exterior painting and has no potential to affect historic properties.	No	Non-historic property in HD	No historic properties affected	
ANZY100061	Replace Floor Covering Building 922	Facility Renovations	This project would modernize the flooring at Building 922 and bring it up to USAF standards.	922 [NREC], Arnold AFB Test Facility Historic District	Building 922 is a historic property. Project includes replacement of interior finishes. Interiors are not identified as character-defining features in 2014 Cold War Report Vol 2:237-239. Replacement of interior flooring will have no adverse effect on the historic property.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY050053	Maintain Interior, Primary Pumping Station	Facility Renovations	This project would maintain the interior of Building 3038 and bring it up to USAF standards by painting interior walls, window frames, and ceiling and by upgrading the restrooms.	3038 [NREC], Arnold AFB Elk River Dam-Woods Reservoir Historic Landscape [NREI]	Building 3038 is a historic property. Project entails interior work including painting and upgrading restrooms. Interior finishes are not identified as character-defining features of the building in the 2014 Cold War Report Vol 2:277-283. Interior work will have no adverse effect on historic property.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA

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ANZY080087	Sustain Precision Measurement Lab	Facility Renovations	This project would modernize the laboratory and bring it up to USAF standards by replacing two personnel doors, replacing the exterior lighting system, installing new installation, and replacing a crane.	350 [NREI]	Building 350 is a historic property. Project calls for replacing 2 personnel doors and repair/install new envelope of insulation, and replace crane. The 2014 Cold War Rtp Vol 2:8-11 identifies Building 350 as a brick building. The doors and cladding are character-defining features. Replacement doors and maintenance to existing cladding are exempt if done in kind to match existing materials and design under 2014 PA Appendix B.1.a.	No	Historic property	Exempt under 2014 PA Appendix B.1.a if conditions are met	
ANZY139028	Paint J4 Power Distribution Building 569	Facility Renovations	This project would maintain Building 569 by painting exterior walls, doors, frames, roll-up doors, louvers, ladders, bollards, and trim and cleaning and sealing concrete and brick walls.	569 [NCE], Arnold AFB Test Facility Historic District	Building 569 is a historic property. Project entails exterior painting and cleaning of brick and concrete walls. Work will have no adverse effect to historic property if SOI Standards for Treatment of Historic Properties for cleaning are followed with SHPO concurrence.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY149009	Repair Raised Floor and Paint PWT Facility 722	Facility Renovations	This project would modernize the flooring at Facility 722 and bring it up to USAF standards.	722 [NREC], Arnold AFB Test Facility Historic District	Building 722 is a historic property. Work is interior. Interior is not identified as a character-defining feature in the 2014 Cold War Report Vol 2:114-116. Interior work will have no adverse effect on historic property.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY079069	Repair Interior, Post Office/ICC, Building 685	Facility Renovations	This project would modernize the interior of Building 685 and bring it up to USAF standards by replacing damaged ceiling tiles; painting all walls, doors, and trim; replacing the restroom floor; cleaning interior and exterior windows; and adding a lock to Vestibule 106 for fire department access.	685 [NREC], Arnold AFB Test Facility Historic District	Building 685 is a historic property. Work is interior. Interiors are not identified as character-defining features in 2014 Cold War Report Vol 2:95-97. Interior work will have no adverse effect on historic property.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY080088	Sustain Chem Lab, Facility 445	Facility Renovations	This project would modernize the laboratory and bring it up to USAF standards by replacing two personnel doors, replacing exterior lighting system, and installing a new fire sprinkler system.	445 [DNE]	Building 445 is not a historic property, but is located just east of Building 451 [NREI]. Work includes interior and replacement of 2 personnel doors. Replacement of 2 personnel doors on a non-historic building will have no potential to affect nearby historic properties.	No	Non-historic property	No historic properties affected*	
ANZY169002	Replace Raised Floor, Third-Floor Corridor, Facility 912	Facility Renovations	This project would modernize the flooring at Facility 912 and bring it up to USAF standards.	912 [NREC], Arnold AFB Test Facility Historic District	Building 912 is a historic property. Project is interior work. Interior is not identified as a character-defining feature in the 2014 Cold War Report Vol 2:222-224. Interior work will have no adverse effect on historic property.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY079031	Interior Repairs, Riggers, Maintenance Building 441	Facility Renovations	This project would improve the workplace for users and bring Building 441 up to USAF standards.	441 [DNE]	Building 441 is not a historic property and is located approximately 265 ft north of Building 451 [NREI]. Project is interior work and has no potential to affect nearby historic properties.	No	Non-historic property	No historic properties affected*	
ANZY080099	Repair/Maintain Warehouse 1, Facility 1476	Facility Renovations	This project would modernize Facility 1476 and bring it up to USAF standards by replacing existing partial divider walls, carpet, and ceiling system; upgrading electrical and communications wiring to current code; installing new lighting; installing new HVAC ducting; replacing the low-voltage power system and associated components; replacing exterior doors and hardware; and painting the building's interior.	1476 [NREI]	Building 1476 is a historic property. Project includes replacing existing partial divider walls, carpet, ceiling system, replace 6 personnel doors, construct permanent walls, and rearrange interior layout. Exterior doors and interior layout and finishes are character-defining features per 2014 Cold War Report Vol 2:17-22. Work will be no adverse effect if done in accordance with SOI Treatment Standards and with SHPO concurrence.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY099005	Paint High Bay, VKF MT&L	Facility Renovations	This project would maintain high bay area by cleaning and painting it.	676 [NREC], Arnold AFB Test Facility Historic District	Building 676 is a historic property. Project entails interior work to clean and paint high bay area. No interiors are identified as character-defining features in 2014 Cold War Report Vol 2:89-91. Interior work will have no adverse effect on historic property.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY149010	Repair Shop Office Flooring Model Shop Facility 451	Facility Renovations	This project would modernize the flooring at Facility 451 and bring it up to USAF standards.	451 [NREI]	Builidng 451 is a historic property. Project is interior work. Interior flooring is not identified as a character-defining feature in the 2014 Cold War Report Vol 2:12-16. Interior work will have no adverse effect on historic property.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY100059	Replace Floor Covering on the Fifth Floor of Building 1075	Facility Renovations	This project would modernize the flooring on the fifth floor of Building 1075 and bring it up to USAF standards.	1075 [DNE]	Building 1075 is not a historic property, but is located outside the east boundary of the Arnold AFB Test Facility Historic District. Replacement of interior floor covering has no potential to affect the nearby historic district.	No	Non-historic property	No historic properties affected*	
ANZY090075	Upgrade ID Conference Area, Building 1103	Facility Renovations	This project would improve the workplace for users and bring the facility up to USAF standards by upgrading the ID Conference Room in Building 1103 through removal of one workstation and the construction of new floor to ceiling walled conference room with a door.	1103 [DNE]	Building 1103 is not historic property. It is located 0.16 mile SW of Building 100 [NREI]. This project is interior work and has no potential to affect nearby historic properties.	No	Non-historic property		
ANZY079032	Paint Shear Machine Shed (Corrosion Control), Building 443	Facility Renovations	This project would maintain Building 443 by cleaning and painting the structural steel and underside of the roof.	443 [DNE]	Building 443 is not a historic property and is located approximately 50 ft north of Building 451 [NREI]. Project is painting that has no potential to affect nearby historic properties.	No	Non-historic property	No historic properties affected*	

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ANZY105011	Upgrade Building 3058 – NAF Boat Storage/Repair	Facility Renovations	This project would modernize the lighting system at Building 3058 and bring it up to USAF standards.	3058 [DNE]	Building 3058 comprises two structures: a marine storage building adjacent to Woods Reservoir and a dock sitting in the Woods Reservoir. Building 3058 is not a historic property and the dock is a non-contributing element to to the Elk River Dam-Woods Reservoir Historic Landscape. The project is confined to the footprint of the non-historic building and has no potential to affect the nearby historic landscape.	No	Non-historic property	No historic properties affected*	
ANZY059016	Maintain Paint Interior Shop Area, Model Shop 451	Facility Renovations	This project would maintain the shop area at Building 451 by cleaning and painting it.	451 [NREI]	Building 451 is a historic property. Project entails removal of interior lead paint and repainting interior of the main shop area. Removal of lead paint is exempt under Appendix B.8.a.	No	Historic property	Exempt under 2014 PA Appendix B.8.a	
ANZY199026	Renovate Room 157, AMSC Building, Facility 939	Facility Renovations	This project would improve the workplace for users and bring the facility up to USAF standards by renovating Room 157 in Facility 939, including removal of existing office cubicles and installation of new cubicles, removal of an interior half wall, painting and patching of interior walls, replacement of carpet and ceiling panels, installation of electrical and communications as required, and adjustment of the current HVAC system as required.	939 [DNE-NEV] 1992, Arnold AFB Test Facility Historic District	Building 939 is a non-contributing building in the Arnold AFB Test Facility Historic District. The building was evaluated as not eligible in 2014 and recommended for re-evaluation in 2042. Project entails interior renovations. Interior work on a non-contributing building has no potential to affect the historic district.	No	Non-historic property in HD	No historic properties affected	
ANZY009123	Paint ETF EXH Process Air Ducting Building 879	Facility Renovations	This project would maintain the Building 879 by cleaning and painting the duct.	879 [NREC], Arnold AFB Test Facility Historic District	Building 879 is a historic property. If painting is interior, the project has no potential to affect historic properties. If project is exterior painting, it is exempt in PA 2014 Appendix B.2.a if paint matches existing or original color and abrasive cleaning methods are avoided.	No	Historic property	Exempt under 2014 PA Appendix B.2.a if conditions are met	
ANZY160005	Life-Cycle Repair Restrooms Facility 100	Facility Renovations	This project would modernize the restrooms at Facility 100 and bring the restrooms up to USAF standards.	100 [NREI]	Building 100 is a historic property. The restrooms are not identified as character-defining features in the 2014 Cold War Report Vol 2:2-7. Interior work will have no adverse effect on historic property.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY089065	Life-Cycle Upgrades, Building 922, ETF-c Refrigeration Control	Facility Renovations	This project would modernize Building 922 and bring it up to USAF standards by installing new insulation, repairing or replacing ceilings in Stairs 2 and 7, replacing personnel doors, and replacing lighting.	922 [NREC], Arnold AFB Test Facility Historic District	Building 922 is a historic property. Project includes new envelope insulation, replacement of 5 personnel doors, replace all ceilings in stairs, fire protection and lighting. Exterior cladding and doors are character-defining features. Replacement of doors and cladding will be exempt under 2014 PA Appendix B.1.a when done in kind to match existing materials and design.	No	Historic property	Exempt under 2014 PA Appendix B.1.a if conditions are met	
ANZY099071	Life-Cycle Upgrades, APTU Test Cell Building 579	Facility Renovations	This project would modernize Building 579 and bring it up to USAF standards by upgrading offices, installing new lighting, and replacing low-voltage electrical components.	579 [NREC], Arnold AFB Test Facility Historic District	Building 579 is a historic property. Project includes replacement of exterior doors, lighting, and electrical power. Most work is exempt under 2014 PA Appendix B.1.b. Exterior doors are character-defining features. Door replacements will be exempt under 2014 PA Appendix B.1.a if replaced in kind to match existing materials and design.	No	Historic property	Exempt under 2014 PA Appendix B.1.a and B.1.b if conditions are met	
ANZY089064	Life-Cycle Upgrades, Building 913, ETF-c Compressor Building	Facility Renovations	This project would modernize Building 913 and bring it up to USAF standards by installing new insulation, replacing three personnel doors, and replacing lighting.	913 [NREC], Arnold AFB Test Facility Historic District	Building 913 is a historic property. Project includes new envelope insulation, replacement of 3 personnel doors, and lighting replacement. Exterior cladding and doors are character-defining features. Replacement of windows, doors, and cladding could be exempt under 2014 PA Appendix B.1.a when done in kind to match existing materials and design.	No	Historic property	Exempt under 2014 PA Appendix B.1.a if conditions are met	
ANZY100036	Life-Cycle Upgrades-Pesticides Storage Building 1414	Facility Renovations	This project would modernize Building 1414 and bring it up to USAF standards by installing new insulation, updating restrooms, replacing low-voltage electrical components, and replacing lighting.	1414 [DNE]	Building 1414 is not a historic property, but is located east of Building 1478 [NREI], but not directly adjacent to it. Project will include new exterior insulation, new doors and interior work. Work confined to the footprint of the building has no potential to affect nearby historic properties.	No	Non-historic property	No historic properties affected*	
ANZY090033	Facility Upgrades, Fire Department, Building 251	Facility Renovations	This project would modernize Building 251 and bring it up to USAF standards by replacing windows and doors on the northeast-side security area and replacing the two current emergency generators with two newer, larger generators.	251 [DNE]	Building 251 is not a historic property nor located near historic district or historic landscapes.	No	Non-historic property		
ANZY090083	Energy Upgrades, Oil Pump House, Main Substation	Facility Renovations	This project would modernize the pump-house main substation and bring it up to USAF standards by replacing exterior windows, installing insulation, replacing an interior door, replacing a personnel double door, and replacing all fixtures with more energy-efficient lighting and lighting controls.	1526 [NREC], Arnold AFB Test Utilities Historic Landscape	Building 1526 is a historic property. Work entails new envelope of insulation, replacement of windows and exterior doors and interior work. The exterior cladding, windows and doors are character-defining features. Replacement of doors and cladding will be exempt under 2014 PA Appendix B.1.a when done in kind to match existing materials and design.	No	Historic property	Exempt under 2014 PA Appendix B.1.a if conditions are met	
ANZY090008	Modernize Warehouse VI	Facility Renovations	This project would modernize Warehouse VI and bring it up to USAF standards by replacing an overhead door, replacing lighting, installing a fire sprinkler system, replacing windows, and cleaning and sealing exterior walls.	1421 [DNE]	Building 1421 is not a historic property nor located near the historic district or landscapes.	No	Non-historic property		
ANZY100020	Sustain Fire Department Compressor Building 261	Facility Renovations	This project would modernize Building 261 and bring it up to USAF standards by installing new insulation, replacing exterior doors, and replacing all fixtures with more energy-efficient lighting and lighting controls.	261 [DNE]	Building 261 is not a historic property nor located near historic district or historic landscapes.	No	Non-historic property		

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ANZY089040	Sustain VKF Compressor Building, Facility 651	Facility Renovations	This project would modernize Building 651 and bring it up to USAF standards by installing new insulation, replacing all exterior windows, replacing power panels, replacing 11 personnel doors and 4 overhead doors with safety gates, and cleaning and sealing exterior walls.	651 [NREC], Arnold AFB Test Facility Historic District	Building 651 is a historic property. Project includes window replacements, all exterior personnel and overhead doors, and new envelope of insulation. Replacement of windows, doors, and cladding will be exempt under 2014 PA Appendix B.1.a when done in kind to match existing materials and design.	No	Historic property	Exempt under 2014 PA Appendix B.1.a if conditions are met	
ANZY089063	Life-Cycle Upgrades, Building 912, ETF-C Test Building	Facility Renovations	This project would modernize Building 912 and bring it up to USAF standards by installing new insulation, replacing 12 doors, replacing lighting, and installing a permanent heater in the mechanical room to protect the fire protection system riser.	912 [NREC], Arnold AFB Test Facility Historic District	Building 912 is a historic property. Work entails new envelope of insulation, replacement of 12 exterior doors,and interior work. The exterior cladding and windows are character-defining features. Replacement of windows, doors, and cladding could be exempt under 2014 PA Appendix B.1.a when done in kind to match existing materials and design.	No	Historic property	Exempt under 2014 PA Appendix B.1.a if conditions are met	
ANZY189052	Renovate Dot Lab Facility. 934 for the JSIS FOC Effort	Facility Renovations	This project would renovate Building 934 to accommodate the needs of the Joint Standard Instrumentation Suite (JSIS) Full Operational Capability (FOC) effort. This project includes making modifications to the interior finishes; raising the ceiling; upgrading lighting, fire protection, and HVAC; relocating interior electrical power for external access; and modifying the parking lot and driveway for increased building access.	934 [NCE], Arnold AFB Test Facility Historic District	Building 934 is a non-contributing building in the Arnold AFB Test Facility Historic District. Project entails renovations to building that is contained within footprint and parking lot and driveway modifications. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Non-historic property in HD	Mission Critical	Follow Stipulations II.C and VIII
ANZY099070	Life-Cycle Upgrades - APTU Test Cell Control Building 578	Facility Renovations	This project would modernize Building 578 and bring it up to USAF standards by cleaning and sealing exterior walls, replacing vinyl flooring, replacing door hardware on a personnel door, and installing more energy-efficient lighting and lighting controls.	578 [NREC], Arnold AFB Test Facility Historic District	Building 578 is a historic property. Project includes cleaning and sealing concrete exterior walls, changing door hardware, and interior work. Work will have no potential for adverse effects to historic properties provided SOI standards are followed with SHPO concurrence.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY109004	Renovate APTU Control Room 578	Facility Renovations	This project would renovate APTU Control Room 578 and bring it up to USAF standards by removing an existing wall between the data conditioning room and the primary control area to provide an expanded area and allow for more efficient operations.	578 [NREC], Arnold AFB Test Facility Historic District	Building 578 is a historic property. Project includes interior renovations. No interiors are identified as character-defining features in the 2014 Cold War Report Vol 2:61-63. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY080131	Life-Cycle Upgrades, Building 1433	Facility Renovations	This project would modernize Building 1433 and bring it up to USAF standards by installing cleaning and sealing exterior walls, replacing windows, replacing four personnel doors and one equipment room door, and installing a new fire sprinkler system and fire alarm.	1433 [DNE]	Building 1433 is not a historic property, but is located outside the south boundary of the Arnold AFB Test Facility Historic District opposite a group of non-contributing buildings. This building could be renovated or demolished. As a non-historic building outside the historic district, either renovation or demolition has no potential to affect the historic district.	No	Non-historic property	No historic properties affected*	
ANZY179026	Repair HVAC, Interior Exterior J6 Facilities 2123, 2124, 2132	Facility Renovations	This project would maintain J6 Facilities 2123, 2124, and 2132 and bring them up to USAF standards by repairing or replacing interior finishes in Space 112, replacing HVAC, painting and repairing the ceiling in Space 109, replacing the main entry exterior doors and frame, replacing any other rusting personnel exit doors, installing canopies over exit doors, painting the interior, and replacing the entry floor tile and base.	2123, 2124 [DNE-NEV] 1992, 1993, 2136 [DNE]	Buildings 2123, 2124, and 2136 are not historic properties, nor located near historic district or historic landscapes. Buildings 2123 and 2124 were evaluated as not eligible in 2014 and recommended for re-evaluation in 2042. Building 2136 is evaluated DNE in 2017.	No	Non-historic property		
ANZY090011	Sustainment Repairs, Arnold Lakeside Center	Facility Renovations	This project would maintain the Arnold Lakeside Center and bring it up to USAF standards by replacing one personnel door and one equipment room double door, completing facility lighting replacement, installing new power panels, and installing a new fire protection system that is up to code.	3017 [DNE]	Building 3017 is not a historic property, but is adjacent to the Elk River Dam-Woods Reservoir Historic Landscape. Alterations confined to the building footprint have no potential to affect the nearby historic landscape.	No	Non-historic property	No historic properties affected*	
ANZY109005	Renovate, Trenton Equipment Warehouse Building 1471	Facility Renovations	This project would renovate Trenton Equipment Warehouse Building 1471 and bring it up to USAF standards by repairing exterior walls, roof covering, HVAC and exhaust system, and fire detection and sprinkler systems; installing new insulation; installing separate men's and women's restrooms; renovating restrooms; replacing low-voltage electrical components; and installing more energy-efficient lighting and lighting controls.	1471 [DNE]	Building 1471 is not a historic property, but is located east of Building 1476 [NREI]. Project includes new building envelope; new HVAC, exhaust, fire detection systems; installation of restrooms. Alterations to this building will have no potential to affect nearby historic properties.	No	Non-historic property	No historic properties affected*	
ANZY100040	Repair/Maintain Recycling Building 1426	Facility Renovations	This project would maintain Recycling Building 1426 and bring it up to USAF standards by painting exterior walls, installing new insulation, installing new exterior doors, replacing low-voltage electrical components, and installing more energy-efficient lighting and lighting controls.	1426 [DNE-NEV], 1998	Building 1426 is not a historic property, nor located near any historic district or landscape. The building was evaluated as not eligible in 2014 but recommended for re-evaluation in 2048.	No	Non-historic property		

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ANZY189063	Renovate VKF Tunnel B High Bay Area VKF MTL Facility 676	Facility Renovations	This project would renovate the Tunnel B High Bay area and bring it up to USAF standards by cleaning; patching/repairing holes in walls and floors; painting walls, doors, and floors; removing obsolete components; and installing new LED lighting.	676 [NREC], Arnold AFB Test Facility Historic District	Building 676 is a historic property. Project is confined to interior work. No interior character-defining features are identified in the 2014 Cold War Rpt Vol 2:89-91. Interior work will have no adverse effect on historic property.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY080036	Renovate Power Control Building 1525	Facility Renovations	This project would modernize Power Control Building 1525 and bring it up to USAF standards by relacing overhead doors, lighting, office furniture, and tile flooring; improving the energy efficiency of the building; and providing a more modern workspace for the building users.	1525 [NREC], Arnold AFB Test Utilities Historic Landscape	Building 1525 is a historic property. Most work is interior and the interior is not identified as character-defining feature in the 2014 Cold War Report Vol 2:325-329. Exterior doors are character-defining features. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY9600721	Paint J4 Crane Structure, Phase 1	Facility Renovations	This project would abate corrosion by painting the J-4 overhead bridge crane superstructure.	530 [NREC], Arnold AFB Test Facility Historic District	Building 530 is a historic property. Project is mission critical and involves maintenance of overhead crane which is exempt in 2014 PA Appendix B.1.c.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY9600722	Paint J4 Crane Structure, Phase 2	Facility Renovations	This project would abate corrosion by painting the J-4 overhead bridge crane superstructure.	530 [NREC], Arnold AFB Test Facility Historic District	Building 530 is a historic property. Project is mission critical and involves maintenance of overhead crane which is exempt under 2014 PA Appendix B.1.c.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY109054	Life-Cycle Upgrade, Control & Breakroom, Stairwells Building 912	Facility Renovations	This project would remove existing wallpaper and paint the walls, replace carpeting, paint stair handrails, and install a fire protection system. This project would ensure Building 912 reflects the AFMC's and AEDC's continuing efforts to upgrade base appearance.	912 [NREC], Arnold AFB Test Facility Historic District	Building 912 is a historic property. Project entails renovations of restrooms and is interior work. The interior is not identified as a character-defining feature in 2014 Cold War Report Vol 2:222-224. Interior work will have no adverse effect on historic property.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY089049	Life-Cycle Upgrades, ETF Exhauster Building 879, b side	Facility Renovations	This project would improve the workplace for users and bring the facility up to USAF standards.	879 [NREC], Arnold AFB Test Facility Historic District	Building 879 is a historic property. Project includes interior furnishings, window and door replacements, and new envelope of insulation. Replacement of character-defining features such as windows, doors, and cladding will be exempt under PA 2014 Appendix B.a.1 if these elements are replaced in kind to match existing materials and design.	No	Historic property	Exempt under 2014 PA Appendix B.1.a if conditions are met	
ANZY199023	Renovation Back Hallway Restrooms to Improve Capacity, Facility 1088	Facility Renovations	This project would improve the workplace for users and bring the facility up to USAF standard by replacing systems furniture in Modular Operator Booths 100 and 200, replacing windows, and cleaning and sealing exterior walls.	1088 [DNE-NEV] 1995	Building 1088 is not a historic property, but is located outside the east boundary of the Arnold AFB Test Facility Historic District. The building was evaluated as not eligible in 2014 and recommended for re-evaluation in 2045. Project entails interior work to convert back hallway restrooms. Interior work has no potential to affect the nearby historic district.	No	Non-historic property	No historic properties affected*	
ANZY080090	Repair Facility Components Warehouse 8, Building 1428	Facility Renovations	This project would improve the workplace for users and bring the facility up to USAF standards by increasing current restroom capacity and creating a female-only restroom.	1428 [DNE-NEV] 1993	Building 1428 is not a historic property nor located near any historic district or landscape.	No	Non-historic property		
ANZY080132	Life-Cycle Upgrades, A&E Building 100	Facility Renovations	This project would modernize Building 100 and \bring it up to USAF standards by replacing windows, replacing one personnel door, replacing two power panels, and installing new insulation.	100 [NREI]	Building 100 is a historic property. Project is to update research library, which is discussed as a character-defining interior space in the 2014 Cold War Report Vol 2:2-7. Project includes new ceiling, new carpet tile and base, new shelving, replacement doors, and all windows. This will be a no adverse effect provided that the historic character of the building is maintained in accordance with SOI standards for rehabilitation with SHPO concurrence.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY105002	Upgrade ALC Storage Building 3060	Facility Renovations	This project would modernize Building 3060 and bring it up to USAF standards by installing carpet, tile, base, new ceiling tile, and grid in the library; performing associated asbestos/lead removal required to install new ceiling tile and diffusers; and replacing doors and windows in other areas of the building.	3060 [DNE]	Building 3060 is not a historic property, but is located approximately 430 ft northeast of boundary of the Elk River Dam-Woods Reservoir Historic Landscape. The project is confined to the footprint of the building and has no potential to affect the nearby historic landscape.	No	Non-historic property	No historic properties affected*	
ANZY080066	Renovate Gossick Leadership Center Kitchen	Facility Renovations	This project would modernize the GLC kitchen and bring it up to USAF standards by replacing a door and installing more energy- efficient lighting and lighting controls.	2912 [DNE]	Building 2912 is not a historic property, but is located adjacent to Elk River Dam-Woods Reservoir Historic Landscape. Work is interior and has no potential to affect nearby historic properties.	No	Non-historic property	No historic properties affected*	
ANZY100021	Sustain Incinerator Building 265	Facility Renovations	This project would modernize Building 265 and bring it up to USAF standards by painting exterior doors, installing new insulation, installing two new exterior doors, replacing low-voltage electrical components, and installing more energy-efficient lighting and lighting controls.	265 [DNE]	Building 265 is not a historic property nor located near historic district or historic landscapes.	No	Non-historic property		

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ANZY9901154	Replace Asbestos Insulation Basewide	Facility Renovations	This project would modernize Arnold AFB and bring it up to USAF standards by removing asbestos throughout the base. Portions of this project are in a floodplain.	100 [NREI], 1476 [NREI], 1478 [NREI], 1504 [NREC], 1507 [NREC], 1525 [NREC], 1526 [NREC], 20007 [NREC], 3038 [NREC], 3039 [NREC], 350 [NREI], 40CF310 [DNE], 40FR502 [DNE], 451 [NREI], 520 [NREC], 522 [NREC], 530 [NREC], 559 [NREC], 560 [NREC], 578 [NREC], 579 [NREC], 607 [NREC], 646 [NREC], 648 [NREC], 651 [NREC], 670 [NREC], 671 [NREC], 676 [NREC], 678 [NREC], 685 [NREC], 707 [NREC], 710 [NREC], 711 [NREC], 720 [NREC], 721 [NREC], 722 [NREC], 740 [NREC], 745 [NREC], 750 [NREC], 760 [NREC], 775 [NREC], 780 [NREC], 784 [NREC], 785 [NREC], 786 [NREC], 787 [NREC], 789 [NREC], 790 [NREC], 793 [NREC], 830 [NREC], 850 [NREC], 868 [NREC], 869 [NREC], 871 [NREC], 876 [NREC], 877 [NREC], 878 [NREC], 879 [NREC], 880 [NREC], 881 [NREC], 882 [NREC], 884 [NREC], 885 [NREC], 890 [NREC], 891 [NREC], 893 [NREC], 898 [NREC], 899 [NREC], 903 [NREC], 911 [NREC], 912 [NREC], 913 [NREC], 914 [NREC], 916 [NREC], 921 [NREC], 922 [NREC], 936 [NREC], Arnold AFB Elk River Dam-Woods Reservoir Historic Landscape [NREI], Arnold AFB Test Facility Historic District, Arnold AFB Utilities Historic Landscape [NREI], and many non-historic properties all throughout	This project entails the removal of asbestos as part of routine maintenance work in buildings located throughout base. It is assumed that all asbestos removal will occur inside buildings and will result in no ground disturbance. Asbestos removal is exempt for historic properties under 2014 PA Appendix B.8.a. Asbestos removal from non-historic properties has no potential to affect historic properties. Site 40CF310 (Camp Forest) is not NR eligible, but will not be affected since no ground disturbance will occur.	No	Historic property	Exempt under 2014 PA Appendix B.8.a	
ANZY080103	Renovate 3rd Floor, HQ Building, Facility 100	Facility Renovations	This project would modernize the HVAC and lighting system at Facility 100 and bring it up to USAF standards.	100 [NREI]	Building 100 is a historic property. Project is to replace HVAC ductwork, control system, fire supression system, and lighting on 3rd floor and roof repair. HVAC, lighting and fire suppression are exempt under 2014 PA Appendix B.1.b. Roof repair/replacement is exempted under 2014 Appendix B.1.a when done in kind to match existing materials and design.	No	Historic property	Exempt under 2014 PA Appendix B.1.a and B.1.b if conditions are met	
ANZY0400362	Renovate OPS Facility 1099, 1st Floor	Facility Renovations	This project would modernize OPS Facility 1099 and bring it up to USAF standards by renovating first-floor walls, ceilings, carpet, paint, doors, insulation, and associated electrical and mechanical components.	1099 [DNE], east of Arnold AFB Test Facility Historic District	Building 1099 is not a historic property, but is located outside southeast corner of the Arnold AFB Test Facility Historic District. Renovation work is interior and paving of existing parking area, north drive and service drive. Only NCE buildings are located in southeast corner of the historic district. Interior work has no potential to affect nearby historic properties.	Yes	Non-historic property		
ANZY139043	Mothball ETF ACT&T Building 878 (Test Side)	Facility Renovations	The purpose of this project is secure the AC&T Building 878 (Test Side) so that maintenance tasks can be terminated without risk to personnel, environment, or equipment.	878 [NREC], Arnold AFB Test Facility Historic District	Building 878 is historic property. The project entails mothballing the test side of the building. Mothballing is not mentioned in 2014 PA. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY0000501	Remove Asbestos Insulation - j2a	Facility Renovations	This project would modernize this facility and bring it up to USAF standards by removing asbestos insulation from piping and equipment in the J2A Test Cell Area and complex/support buildings.	880 [NREC], Arnold AFB Test Facility Historic District	Building 880 is a historic property. Project includes removal of asbestos insulation from piping and equipment in the J2A test cell area and in complex.	No	Historic property	Exempt under 2014 PA Appendix B.8.a	
ANZY099012	Repair G-Range Computer Room HVAC, Facility 678	Utility Upgrades	This project would modernize the HVAC unit for the Range G computer room (Room 210, approx. 25 feet by 50 feet) so the computer area can be cooled separately from the rest of the building.	678 [NREC]	Building 678 is a historic property. Project HVAC work is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY150010	Replace Product Recovery Tanks at Fuel Farms, Facility 870,1575	Utility Upgrades	This project would modernize the product recovery tanks at the bulk and test fuel farms.	870 [NCE], Arnold AFB Test Facility Historic District, and 1575 [DNE]	Building 870 and surrounding fuel tanks are non-contributing resources to the Arnold AFB Test Facility Historic District. Building 1575 and surrounding fuel tanks are not historic properties. Project entails replacement of existing product recovery tanks (55 gallon size). Installation of these tanks at 1575 has no potential to affect nearby historic properties. Replacement of existing non-historic tank with modern ones has no potential to affect surrounding historic properties.	No	Non-historic property in HD	No historic properties affected	

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ANZY079059	Corrosion Control Painting – LN2 Dewars, Facility 530	Utility Upgrades	This project would extend the life of the J4 GN2 bottles and LN2 dewars and provide energy savings by keeping the vessels cooler.	530 [NREC], Arnold AFB Test Facility Historic District	Building 530 is a historic property. Exterior painting is exempt under 2014 PA Appendix B.2.a when new paint matches the existing or original color.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY160009	Repair/Install 2 Valve Protection-Steam Distribution System	Utility Upgrades	This project would modernize the valve protection for the steam distribution system.	1411 [DNE], throughout Arnold AFB Test Facility Historic District	The project entails installation of 34 additional steam valves including some located within the Arnold AFB Test Facility Historic District. Work on steam lines is exempt under 2014 PA Appendix B.1.b. as heating systems.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY099091	Upgrade APTU Test Cell Overhead Bridge Crane 20-725, Facility 579	Utility Upgrades	This project would modernize the overhead bridge crane located at the APTU test facility that is used to perform precision positioning of critical and near-rated-capacity loads, improve the crane's reliability, and avoid performing lifts that approach the crane's rated capacity.	579 [NREC], Arnold AFB Test Facility Historic District	Building 579 is a historic property. Project is mission critical and includes replacement of bridge crane which is exempt under 2014 PA Appendix B.1.c.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY089023	Replace 24-Ton CO_2 Fire Suppression Tank, Building 912	Utility Upgrades	This project would replace and install a new tank that is functioning properly and would meet current USAF standards and codes and laws.	912 [NREC], Arnold AFB Test Facility Historic District	Building 912 is a historic property. Fire suppression work is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY179025	Replace HVAC t3/t11/Equipment, Facility 878	Utility Upgrades	This project would replace the old, failing units servicing the T3 and T11 control rooms with new, air-cooled units.	878 [NREC], Arnold AFB Test Facility Historic District	Building 878 is a historic property. Work on HVAC systems is exempt under 2014 PA Appendix B.1.b	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY089047	Repair Interior Lighting, ETF-C Air Supply 929	Utility Upgrades	This project would replace existing interior lighting throughout the building with energy-efficient lighting and lighting controls and would meet current USAF standards and codes and laws.	929 [NREC], Arnold AFB Test Facility Historic District	Building 929 is a historic property. Lighting work is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY090035	Inspect/Repair Bulk Fuel Tank 4 a	Utility Upgrades	This project would modernize Bulk Fuel Tank 4 and meet current USAF standards and codes and laws.	870 [NCE], 801 [NCE] Arnold AFB Test Facility Historic District	Building 870 and surrounding fuel tanks are non-contributing resources to the Arnold AFB Test Facility Historic District. Repair of existing tank has no potential to affect the historic properties or the historic district.	No	Non-historic property in HD	No historic properties affected	
ANZY099046	Upgrade Sprinkler System, ETF-C Test Building 912	Utility Upgrades	This project would modernize the sprinkler system at ETF-C Test Building 912 and would meet current USAF standards and codes and laws.	912 [NREC], Arnold AFB Test Facility Historic District	Building 912 is a historic property. Installation of fire suppression work is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY149044	Repair by Replace Cooling Towers, Building 1088	Utility Upgrades	This project would modernize the cooling towers at Building 1088 and would meet current USAF standards and codes and laws.	1088 [DNE-NEV] 1995	Building 1088 is not a historic property and is located outside the east boundary of the Arnold AFB Test Facility Historic District. The building was evaluated as not eligible in 2014 and recommended for re-evaluation in 2045. Project entails replacement of existing cooling towers on roof. Building 1088 is located across the road from several small non-contributing buildings and Building 711, a large testing tunnel with support buildings. HVAC changes to roof of Building 1088 located on the opposite side of the road to historic district has no potential to affect the historic district.	Yes	Non-historic property		
ANZY139049	Repair Deficiencies at the Retention Pond Dam,Facility 20008 (Phase 1)	Utility Upgrades	This project would repair deficiencies at the retention pond dam, Facility 20008, and would meet current USAF standards and codes and laws.	20008 [NREC], 2102 [NREC], Arnold AFB Test Utilities Historic Landscape]	Building 2102 is a dam that contributes to the Retention Reservoir 20008. Building 2102 is an earthen dam with riprap and stone on the water side. Project entails improving access roads, analysis of the pond overflow capabilities, cleaning and relining existing pond overflow point to remove all blockages, sealing off drain pipe, and installing monitoring weirs. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY159017	Repair Deficiencies at the Retention Pond Dam Facility 20008 (Phase 2)	Utility Upgrades	This project would repair deficiencies at the retention pond dam, Facility 20008, and would meet current USAF standards and codes and laws.	20008 [NREC], 2102 [NREC], Arnold AFB Test Utilities Historic Landscape	Building 2102 is a dam that contributes to the Retention Reservoir 20008. Building 2102 is an earthen dam with riprap and stone on the water side. Project entails correcting deficiencies not corrected in ANSY139049 and may include, but not limited to, installing seepage measure weirs, clearing and grading to permit access to inspection points, repair/upgrade of pond drain, and removal of existing drain structure. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY020012	Repair Piping Fuel, Facility 870	Utility Upgrades	This project would repair deficiencies in the fuel piping and related devices associated with the test fuel farm and would meet current USAF standards and codes and laws.	870 [NCE], Arnold AFB Test Facility Historic District	Building 870 and nearby fuel tanks are non-contributing resources to Arnold AFB Test Facility Historic District. Piping in the fuel storage area is not a contributing element to the historic district. Replacement of existing fuel piping and devices will result in no historic properties affected.	No	Non-historic property in HD	No historic properties affected	
ANZY0490001	Repair Steam/Condensate Piping and Provide Heat to ETF AC&T	Utility upgrades	This project would repair deficiencies in the steam/condensate piping in ETF Buildings 878, 879, and 898 to provide heat and steam to support testing and to meet current USAF standards and codes and laws.	878 [NREC], 879 [NREC], 898 [NREC], Arnold AFB Test Facility Historic District	Buildings 878, 879, and 898 are historic properties. HVAC work is exempt under 2014 PA Appendix B.1.b	No	Historic property	Exempt under 2014 PA Appendix B.1.b	

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ANZY089038	Repair Controls, Cranes 20-315 & 20-315-1, ETFA T-3, Facility 898	Utility Upgrades	This project would repair deficiencies in and upgrade the T-3 Test Cell cranes to meet current USAF standards and codes and laws.	898 [NREC], Arnold AFB Test Facility Historic District	Building 898 is a historic property. Repairs to overhead cranes is exempt under 2014 PA Appendix B.1.c.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY140018	Repair by Replacement HVAC Components East/West Rooms, Facility 1103	Utility Upgrades	This project would modernize the HVAC components and associated cooling towers for the penthouse (east and west) rooms on the roof of Building 1103, which serve the office areas on all three floors (approximately 360 people), and would meet current USAF standards and codes and laws.	1103 [DNE]	Building 1103 is not a historic property and is located 0.16 mile SW of Building 100 [NREI]. The work to modernize HVAC components will occur in the penthouses on the roof. Project has no potential to affect nearby historic property.	No	Non-historic property		
ANZY0300312	Repair u/g Raw Water Line, PWT/PES Area	Utility Upgrades	This project would repair deficiencies in the cooling water supply line in the PWT/PES area and would meet current USAF standards and codes and laws.	1090 [DNE], 1092 [DNE], 1094 [DNE-NEV] 1999	Buildings 1090, 1092, 1094 are not historic properties, and are located outside east boundary of the Arnold AFB Test Facility Historic District. Replacement of underground pipes around complex wil have potential to affect nearby historic district.	No	Non-historic property	No historic properties affected*	
ANZY080052	Replace Unit Sub 4, ETF-b Airside, Building 878	Utility Upgrades	This project would modernize Unit Substation 4 and associated components in Building 878 and would meet current USAF standards and codes and laws.	878 [NREC], Arnold AFB Test Facility Historic District	Building 878 is a historic property. Work is electrical that is exempt in 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY079027	Repair Plumbing, ETF Shop, Building 876	Utility Upgrades	This project would modernize plumbing and associated components in the ETF shop building and would meet current USAF standards and codes and laws.	876 [NREC], Arnold AFB Test Facility Historic District	Building 876 is a historic property. Work on plumbing systems is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY199006	Repair by Replace ASTF Cooling Tower Discharge Supply Header	Utility Upgrades	This project would modernize the ASTF cooling tower discharge supply header and associated piping components and would meet current USAF standards and codes and laws.	1090 (DNE)	Building 1090 is not a historic building and is located outside the east boundary of the Arnold AFB Test Facility Historic District. Building 1090 is located opposite to green space and Building 903 [NREC]. Improvements to the building outside the historic district will have no potential to affect the historic district.	Yes	Non-historic property		
ANZY189041	Replace the Control/Power Wiring to PWT01 through PWT07 Valves	Utility Upgrades	This project would modernize the control/power wiring that runs from various buildings to seven main water control valves in the PW ASTF area (PWT01 through PWT07 valves).	903 [NREC], 911 [NREC], 912 [NREC], 913 [NREC], 914 [NREC], 916 [NREC], 921 [NREC], 922 [NREC], 929 [NREC], 936 [NREC], Arnold AFB Test Facility Historic District	Project is located in Arnold AFB Test Facility Historic District and entails replacement of buried wiring that links to water control valves. Project is exempt under 2014 PA Appendix B.4.b.	No	Historic property	Exempt under 2014 PA Appendix B.4.b	
ANZY9801822	Replace 6.9 kV Switchgear-VKF (Phase 2)	Utility Upgrades	This project would replace aging equipment to maintain the life of the utility system.	651 [NREC], Arnold AFB Test Facility Historic District	Building 651 is a historic property. Project is mission critical and involves electrical work which exempt under 2014 PA Appendix B.1.b.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY020013	Repair Piping, Fuel, Facility 1575	Utility Upgrades	This project would replace aging equipment to maintain the life of the utility system.	1575 [DNE]	Building 1575 and surrounding complex are not historic properties. Fuel farm is located outside northern edge of Test Utilities Historic Landscape. Project calls for replacement piping within dike areas. Project has no potential to affect historic landscape.	No	Non-historic property	No historic properties affected*	
ANZY179012	Repair/maintain HVAC 7V Control Room, Facility 1077	Utility Upgrades	This project would modernize the HVAC system and would meet current USAF standards and codes and laws.	1077 [DNE]	Building 1077 is not a historic property. It is located outside the east boundary of the Arnold AFB Test Facility Historic District. Project entails interior HVAC work. Building 1077 is located across the road from the northeast corner of the historic district that contains several small non-contributing buildings and Building 711, a large testing tunnel with support buildings. HVAC changes to Building 1077 located on the opposite side of the road has no potential to affect the historic district.	NO	Non-historic property	No historic properties affected*	
ANZY159002	Replace Overhead Crane 20-034 Model Shop, Facility 451	Utility Upgrades	This project would modernize the building by replacing the 5-ton overhead crane, 20-034, located in Building 451 on the west side of the new machine shop, and would meet current USAF standards and codes and laws.	451 [NREI]	Building 451 is a historic property. Project is mission critical and involves replacement of overhead crane which is exempt under 2014 PA Appendix B.1.c.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY149018	Repair/Add Fire Protection for PWT PES Control Building, Facility 710	Utility Upgrades	This project would modernize the fire protection system for PWT PES Control Building, Facility 710. and would bring it up to USAF standards by replacing a door and installing more energy-efficient lighting and lighting controls.	710 [NREC], Arnold AFB Test Facility Historic District	Building 710 is a historic property. Project entails installation of new fire alarm fire suppression system. This project is exempt under the 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY189054	Repair by Replace HVAC for 10V Operations, Facility 1077	Utility Upgrades	This project would modernize the HVAC system and to meet current USAF standards and codes and laws.	1077 [DNE]	Building 1077 is not a historic property, but is located outside the east boundary of the Arnold AFB Test Facility Historic District. Project entails HVAC work which has no potential to affect nearby historic properties.	NO	Non-historic property	No historic properties affected*	
ANZY119003	Replace Piping PWT Instrument Tunnel	Utility upgrades	This project would modernize the existing piping in the PWT utility tunnel and associated components and reduce the risk of a water leak that could flood the instrument tunnel, and it would meet current USAF standards and codes and laws.	Arnold AFB Test Facility Historic District near Buildings 760, 740 and others	This project is planned for a tunnel located within the Arnold AFB Test Facility Historic District. The work will be in an existing underground utility service tunnel to replace existing piping, including raw water, potable water, steam, and condensate piping. Project is exempt under 2014 PA Appendix B.4.b.	No	Historic property	Exempt under 2014 PA Appendix B.4.b	

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ANZY119042	Replace Water and Sewer Piping inside ETF-A Building, Building 880	Utility Upgrades	This project would address deficiencies in the current piping, to modernize the interior sewer piping at Building 880, and to meet current USAF standards and codes and laws.	880 [NREC], Arnold AFB Test Facility Historic District	Building 880 is a historic property. Project entails replacement of water and sewer piping, which is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY149040	Repair/maintain C1 & C2 Overhead Crane, 20-840 & 20-841, Building 912	Utility Upgrades	This project would address deficiencies of the existing C1 (50/10 ton) and C2 (70/10 ton) overhead cranes in Building 912 by replacing them with newer, more modern cranes.	912 [NREC], Arnold AFB Test Facility Historic District	Building 912 is a historic property. Project is mission critical and involves work on cranes which is exempt under 2014 PA Appendix B.1.b.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY099036	Replace Halon with Sprinkler System, J6 Local Electronics, Facility 2123	Utility Upgrades	This project would modernize the fire protection system at Facility 2123 and bring it up to USAF standards.	2123 [DNE-NEV] 1992	Building 2123 is not a historic property nor located near the historic district or landscapes. The building was evaluated as not eligible in 2014, but recommended for re-evaluation in 2042.	No	Non-historic property		
ANZY140020	Repair/Maintain AHU and Condensers 7V Clean Room, Facility 1077	Utility Upgrades	This project would modernize the system of condensers and AHUs and associated HVAC system at Facility 1077 and bring it up to USAF standards by replacing a door and installing more energy- efficient components.	1077 [DNE]	Building 1077 is not a historic property, but is located outside the east boundary of the Arnold AFB Test Facility Historic District. Project entails interior work and window and door replacements with insulated glass units. Building 1077 is located across the road from the northeast corner of the historic district that contains several small non-contributing buildings and Building 711, a large testing tunnel with support support buildings. Changes to the exterior of Building 1077 located on the opposite side of the road has no potential to affect the historic district.	No	Non-historic property	No historic properties affected*	
ANZY129003	Life-Cycle Upgrade Drains in Steam Plant A, Building 1411	Utility Upgrades	This project would upgrade the existing drains and drain lines at Building 1411 and bring it up to USAF standards.	1411 [DNE]	Building 1411 is not a historic property, but is located east of Building 1478 [NREI] and south of the southern boundary of the Arnold AFB Test Facility Historic District. The project includes updating of storm, sewer, and roof drains. This activity will be underground and has no potential to affect nearby historic properties.	No	Non-historic property	No historic properties affected*	
ANZY180019	Repair Water Distribution Facility 20005, North Hap Arnold Drive Branch	Utility Upgrades	This project would repair approximately 18,000 linear feet of piping of numerous main branches that come off of North Hap Arnold Drive. This project would provide potable water to the AEDC Golf Course. The new line would provide potable water that meets or exceeds drinking water standards and has adequate capacity to meet current and future fire suppression requirements.	1476 [NREI], 1525 [NREC], 520 [NREC], 530 [NREC], 578 [NREC], 579 [NREC], Arnold AFB Test Facility Historic District, Arnold AFB Test Utilities Historic Landscape	Project includes replacing 18,000 lf of piping in numerous main water branches coming off North Hap Arnold Drive and Leif Sverdrup Road. Pipe sections to be replaced were installed in 1952, 1962, and 1970. Work on replacing underground utility pipelines is exempt under 2014 PA Appendix B.4.b.	No	Historic property	Exempt under 2014 PA Appendix B.4.b	
ANZY189044	Repair by Replace Three Overhead Doors, Power Control, Facility1525	Utility Upgrades	This project would reduce human safety hazards at Facility 1525 by replacing three antiquated overhead doors with modern doors and bringing the building up to USAF standards.	1525 [NREC], Arnold AFB Test Utilities Historic Landscape [NREI]	Building 1525 is a historic property. Exterior doors are character-defining features. Replacement of doors are exempt under 2014 PA Appendix B.1.a if new door replacements are done in kind to match existing materials and design.	No	Historic property	Exempt under 2014 PA Appendix B.1.a if conditions are met	
ANZY120016	Repair/Inspect/Modify, Tank 21, Bulk Fuel Farm 1585	Utility Upgrades	This project would perform API-653 out-of-service internal and external inspection of Bulk Fuel Tank 21 (Waste Fuel Tank) and repair it as needed to ensure the tank meets all USAF and regulatory standards, codes, and requirements.	1585 [DNE]	Building 1585 and surrounding complex are not historic properties, but are located approximately 253 ft north of Test Utilities Historic Landscape. Project includes installing new gauges, a new man-way, roof work within the current footprint of an existing tank. The project has no potential to affect nearby historic properties.	No	Non-historic property	No historic properties affected*	
ANZY159011	Repair 2nd-Floor HVAC Units, ETF Shop Building. 876	Utility Upgrades	This project would install an HVAC system with the current heat load for the four areas on the second floor of Building 876 and would meet current USAF standards.	876 [NREC], Arnold AFB Test Facility Historic District	Building 876 is a historic property. HVAC work is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY980007	Repair by Replace VKF Raw Water Lines	Utility Upgrades	The purpose of this multiyear/multiphase effort is to replace and repair the raw-water supply and return headers and the supply and return lines to coolers located throughout the V-PLT Main Compressor Plant.	651 [NREC], 670 [NREC], 671 [NREC], 676 [NREC], Arnold AFB Test Facility Historic District	Buildings 651, 670, 671, 676 are historic properties. No NR eligible archeological sites have been identified in the project area. Replacement of in-ground water lines is exempt under 2014 PA Appendix B.4.b.	No	Historic property	Exempt under 2014 PA Appendix B.4.b	
ANZY089013	Install Fire Alarm/Detection & Emergency Lighting, PWT MB	Utility Upgrades	This project would provide a modern fire protection system and associated components and would bring the system up to USAF standards.	760 [NREC], Arnold AFB Test Facility Historic District	Building 760 is a historic property. Work on fire alarms and suppression system is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY159006	Replace ETF-C AFFF Fire Suppression Systems, Facility 903 & 929	Utility Upgrades	This project would demolish existing aqueous-film-forming foam (AFFF) fire suppression systems located in the ETF-C Exhaust Building, Building 903 (protecting lube oil LOCs 1.1, 1.2, 1.3, 1.4, 2.1, 2.2, 2.3 and 3.1), ETF-C Air Supply Building, and Building 929 (protecting lube oil LOCs 1.1, 1.2 and 2.1) and install new AFFF fire suppression systems to protect the lube oil systems located in the ETF-C Test Area.	903 [NREC], 929 [NREC], Arnold AFB Test Facility Historic District	Buildings 903 and 929 are historic properties. Work entails removal of existing fire suppression system and installation of new one. Installation of fire suppression system is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	

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ANZY179005	Repair by Replace Fire Alarm System PWT 4t Test Facility 707	Utility Upgrades	This project would provide a modern fire protection system and associated components and would bring the system up to USAF standards.	707 [NREC], Arnold AFB Test Facility Historic District	Building 707 is a historic property. Project entails installation of new fire alarm system. This project is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY160010	Repair Steam Plant A Fuel Storage Tank Facility 1413	Utility Upgrades	This project would repair current deficiencies in the fuel storage tank, containment, and oil water separator and bring the tank into compliance with USAF and regulatory standards, codes, and regulations.	1413 [DNE]	Building 1413 is not a historic property. It is an oil tank located south of Building 1411 and southeast of Building 1478 [NREI]. The project entails painting the tank, upgrading controls, and replacing piping. Project has no potential to affect nearby historic properties.	No	Non-historic property	No historic properties affected*	
ANZY189061	Repair by Replace AC&T Potable Water Line Facility 878	Utility Upgrades	This project would restore potable water to Facility 878 by replacing the existing potable water system of pipes and valves inside Building 878, the AC&T Building.	878 [NREC], Arnold AFB Test Facility Historic District	Building 878 is a historic property. Work on plumbing systems is exempt under 2014 PA Appendix B.1.b	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY160021	Repair Fuel Systems Steam Plant A, Facility 1411	Utility Upgrades	This project would provide a modern, safe, and reliable steam system at Facility 1411 by replacing the antiquated natural-gas, liquid fuel, and propane system for Steam Plant A.	1411 [DNE]	Building 1411 is not a historic property. It is located east of 1478 [NREI] and south of the Arnold AFB Test Facility Historic District. Project entails repair to fuel systems for the steam plant. Project has no potential to affect nearby historic properties.	No	Non-historic property	No historic properties affected*	
ANZY070033	Repair Plumbing, fp&c Facility 251	Utility Upgrades	This project would modernize the plumbing at Facility 251 and would bring the system up to USAF standards.	251 [DNE]	Building 251 is not a historic property nor located close to historic properties.	No	Non-historic property		
ANZY109025	Replace Unit Sub #11, ETF-a Exhaust n. Of Building 882	Utility Upgrades	This project would provide better personnel safety and equipment protection at Building 882 by replacing the antiquated Sub Unit 11 currently at the building and would bring the building up to USAF standards.	882 [NREC], Arnold AFB Test Facility Historic District	Building 882 is a historic property. Project entails replacement of unit substation 11 located north of building. Substation 11 is an electrical system exempted under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY080053	Replace Unit Sub 10, ETF-a Exhaust	Utility Upgrades	This project would provide better personnel safety and equipment protection at Building 882 by replacing the antiquated Sub Unit 10 currently at the building and bringing the building up to USAF standards.	882 [NREC], Arnold AFB Test Facility Historic District	Building 882 is a historic property. Work is associated with ventilation that is exempt in 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY179020	Repair by Replacement J5 Unit Substation Facility. 527	Utility Upgrades	This project would address deficiencies of the current J5 Unit Substation by replacing it with a modern and energy-efficient unit substation that meets current USAF standards.	527 [NCE], Arnold AFB Test Facility Historic District	Building 527 is a non-contributing resource to Arnold AFB Test Facility Historic District. Work involves electrical system. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Non-historic property in HD	Mission Critical	Follow Stipulations II.C and VIII
ANZY040043	Repair Steam Condensate Pumps	Utility Upgrades	The purpose of this project to reduce maintenance requirements and increase energy efficiency by replacing the antiquated condensate pumps in the steam distribution system at Buildings 445, 451, 522, 535, 537, 541, 542, 563, 640, 645, 651, 678, 707, 722, 728, 740, 750, 760, 775, 780, 786, 790, 792, 794, 796, 830, 878, 879, 890, 897, 898, 914, 1088, 1093, 1103, 1400, 1401, 1461, 1476, 1484, 1507, 2123, 2124, 2132; Manholes MH1E4, MHD13, MHA13, MH56, MN100, MH105; and field locations (ASTF Reboiler, APTU area, J4 Accumulators, J1-J2 Fuel Area, J6 Accumulators).	760 [NREC], 722 [NREC], 780 [NREC], 707 [NREC], 890 [NREC], 914 [NREC], 795 [NREC], 790 [NREC], 678 [NREC], 651 [NREC], 878 [NREC], 740 [NREC], 451 [NREI], 775 [NREC], 880 [NREC], 879 [NREC], 830 [NREC], 750 [NREC], 786 [NREC], 1476 [NREI], 745 [NREC], 898 [NREC], 522 [NREC], 1507 [NREC], Arnold AFB Test Facility Historic District, Arnold AFB Test Utilities Historic Landscape	Maintenance is occuring on the system of steam pipes throughout the Arnold AFB Test Facility Historic District, which is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY189030	Replace Retention Pond Skimming & Dividing Booms, Facility 20008	Utility Upgrades	This project would replace the dividing boom, two main skimming booms, and associated lagoon booms on the Retention Reservoir that have begun to degrade.	20008 [NREC], Arnold AFB Test Utilities Historic Landscape	Lagoon #1 is historic property in Test Utilities Historic Landscape. Replacement of existing booms will have no adverse effect on historic properties.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY120005	Replace Potable Water Lines Serving Model Shop Building 451	Utility Upgrades	This project would modernize the potable water lines inside the model shop, service the connections, and meet current USAF standards.	451 [NREI]	Building 451 is a historic property. Work related to plumbing systems is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY199003	Repair by Replace HVAC System for Secure Area, Facility 760	Utility Upgrades	This project would install a modern HVAC system with the current heat load at the secure area on the first floor of Building 760 and would meet current USAF standards.	760 [NREC], Arnold AFB Test Facility Historic District	Building 760 is a historic property. Work on HVAC system is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY199035	Repair by Replace HVAC, j6 LEB Building, Facility 2123	Utility Upgrades	This project would install a modern HVAC system with the current heat of Building 2123 and would meet current USAF standards.	2123 [DNE-NEV] 1992	Building 2123 is not a historic property nor located near the historic district or historic landscapes.	No	Non-historic property		

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ANZY1330011	Replace ug 161 kv Cables Facility 10004, Phase 1	Utility Upgrades	The purpose of the project is to modernize the facility and provide proper cathodic protection by replacing the existing oil-filled 161 kV cable system with solid insulation cables.	1526 [NREC], 648 [NREC], 651 [NREC], 721 [NREC], 722 [NREC], 790 [NREC], Arnold AFB Test Facility Historic District, Arnold AFB Test Utilities Historic Landscape	Historic properties are present. Project entails replacing existing underground oil filled 161 kV cable system with solid insulation cables. Project is mission critical and involves work on underground electrical line, which is exempt under 2014 PA Appendix B.4.b.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY199013	Repair by Replacing HVAC and Heaters, Building 912	Utility Upgrades	This project would install a modern HVAC system with the current heat load of the entire Building 912 and would meet current USAF standards.	912 [NREC], Arnold AFB Test Facility Historic District	Building 912 is a historic property. Installation of HVAC is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY199020	Repair Exhaust Fans and Louvers, Facility. 913	Utility Upgrades	The purpose of this project is to create ambient conditions inside the building that allow for proper equipment operation, equipment life, and personnel accessibility by installing a building ventilation system.	913 [NREC], Arnold AFB Test Facility Historic District	Building 913 is a historic property. Project entails designing a ventilation system for the building that may include fans installed in the side exterior walls and roof repairs. Ventilation is exempt under 2014 PA Appendix B.1.b. Installation of side wall fans in outer walls will be exempt under 2014 PA Appendix B.1.a if the fans are designed to be compatible to match existiing siding in materials and design.	No	Historic property	Exempt under 2014 PA Appendix B.1.a and B.1.b if conditions are met	
ANZY189065	Construct Backup Steam Using Steam Plant c (j6), Facility 563	Utility Upgrades	This project would provide a connection to maintain the steam distribution pressure by using the J6 steam plant and accumulators.	563 [DNE-NEV] 1993	Building 563 is not a historic property. The building was evaluated as not eligible in 2014 and recommended for re-evaluation in 2043. It is located approximately 294 ft outside the Arnold AFB Test Facility Historic District and approximately 200 ft southwest of Buildings 559 [NREC] and 560 [NREC]. Project involves augmenting existing steam pipes. Construction of backup steam system has no potential to affect the historic properties in the vicinity.	No	Non-historic property	No historic properties affected*	
ANZY179003	Repair Fire Alarm and Suppression System for Model Shop Facility 451	Utility Upgrades	This project would modernize the fire protection system for the model shop at Facility 451 and would meet USAF standards.	451 [NREI]	Building 451 is a historic property. Project involves replacement of fire alarm and suppression systems. Project is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY140009	Install Crane/Construct Shelter Bradley Creek Pump Station 436	Utility Upgrades	This project would upgrade the Bradley Creek Pump Station to protect the pumps, motors, and valves from the weather.	436	Building 436 is not located near historic district or historic landscapes. The building is not included in 2014 or the 2017 Cold War Reports, the 2019 ICRMP, or the 2017 memo of historic buildings. Per 2014 PA, Stipulation IV.E.2, this building with an undetermined eligibility status is presumed to be National Register eligible. The project entails the construction of shelter at the Bradley Creek Pump Station to project pumps, motors, and valves from the weather and the construction of a crane/hoist to move pumps, etc. for maintenance purposes. The construction of a shelter and a crane will have no adverse effect on historic properties.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY149032	Repair by Replace Heating Sys astf Exhauster Facility 903	Utility Upgrades	This project would provide a reliable and efficient source of heat by replacing the existing heating system in Building 903.	903 [NREC], Arnold AFB Test Facility Historic District	Building 903 is a historic property. Project entails replacement of existing heating system. HVAC work is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY149014	Replace Cooling Water Main Between w4 and PWT04 Facility 20009	Utility Upgrades	This project would replace approximately 1,000 feet of buried steel cooling water line that runs between the W4 and PWT04 valve to reduce future impacts to the base's water supply due to the currently leaking line.	near 877 [NREC], Arnold AFB Test Facility Historic District	Project is located within Arnold AFB Test Facility Historic District. Project is ission critical and involves work on underground utility lines which is exempt under 2014 PA Appendix B.4.b.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY149050	Repair Fire System for Primary Pumping Station, Building 3038	Utility Upgrades	This project would modernize the fire protection system at the primary pumping station, Building 3038, and would meet USAF standards.	3038 [NREC], Arnold AFB Elk River Dam-Woods Reservoir Historic Landscape [NREI]	Building 3038 is a historic property. The project entails installation of a new fire suppression system, which is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY149031	Repair by Replace the Heating System in Facility 922	Utility Upgrades	This project would provide a reliable and efficient source of heat by replacing the existing heating system in Building 922.	922 [NREC], Arnold AFB Test Facility Historic District	Building 922 is a historic property. HVAC work is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY149015	Repair by Replace CW Main to PWT K1 Valve Vault Facility 20009	Utility Upgrades	This project would replace approximately 200 feet of buried cooling water line that feeds the PWT K1 valve vault to reduce future impacts to the base water supply due to the currently leaking line.	near 789 [NREC], Arnold AFB Test Facility Historic District	Project is located within Arnold AFB Test Facility Historic District. Work to underground utility lines is exempt under 2014 PA Appendix B.4.b.	No	Historic property	Exempt under 2014 PA Appendix B.4.b	
ANZY080092	Install Fire Protection System Building 253, Special Projects	Utility Upgrades	This project would modernize the fire protection system at Building 253 and would meet USAF standards.	253 [DNE]	Building is not a historic property nor located near historic district or historic landscapes.	No	Non-historic property		

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ANZY159004	Repair Heat Systems, A PTU Test Building 579	Utility Upgrades	This project would provide a reliable and efficient source of heat to personnel and equipment in APTU Test Building 579, including the pump room.	579 [NREC], Arnold AFB Test Facility Historic District	Building 579 is a historic property. Project entails HVAC system repairs which are exempt under 2014 PA Aopendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY189039	Repair Central Lateral Cooling Water Main w5 to pw, Facility 20009	Utility Upgrades	This project would replace approximately 600 feet of buried supply line that feeds the ETF A/B Plant and T/J cells to reduce future impacts to the base water supply due to the currently leaking line.	850 [NREC], 898 [NREC], Arnold AFB Test Facility Historic District	Project is located in Arnold AFB Test Facility Historic District and entails replacement of buried pipe, which is exempt under 2014 PA Appendix B.4.b.	No	Historic property	Exempt under 2014 PA Appendix B.4.b	
ANZY159001	Repair HVAC, ETFA Exhauster Facility 882	Utility Upgrades	This project would install a modern HVAC system with the current heat load of the control room for the control room in Building 882 on the second floor and would meet current USAF standards.	882 [NREC], Arnold AFB Test Facility Historic District	Building 882 is a historic property. Project entails new HVAC system which is exempt under 2014 PA Aopendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY070086	Repair Fire Suppression System, BX/Commissary	Utility Upgrades	This project would modernize the fire protection system at the BX/commissary and would meet current USAF standards.	125 [DNE]	Building 125 is not a historic property nor located near any historic properties.	No	Non-historic property		
ANZY059028	Repair HVAC, j J4/J5/J6 LEB Building 520	Utility Upgrades	This project would install a modern HVAC system with the current heat load to serve the J4/J5/J6 LEB in Building 520 and to meet current USAF standards.	520 [NREC], Arnold AFB Test Facility Historic District	Building 520 is a historic property. Work related to HVAC systems is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY080038	Repair Water Distribution Systems, Arnold Village	Utility Upgrades	This project would replace the potable water distribution system from the Estill Springs water meter on the south side of North Shore Road south to the Arnold Lake Side Club and to loop the raw-water system at base housing and replace the existing pipe. The raw-water system is used to supply the cooling needs and fire suppression needs of base housing.	Arnold Village	Arnold Village is not a historic property, but is located outside the edge of the Elk River Dam-Woods Reservoir Historic Landscape. The installation of underground pipe has no potential to affect the nearby historic landscape.	No	Non-historic property	No historic properties affected*	
ANZY099048	Install Fire Sprinkler System, ETF-C EXH Building 903	Utility Upgrades	This project would modernize the fire protection system at Building 903 to meet current USAF standards.	903 [NREC], Arnold AFB Test Facility Historic District	Building 903 is historic property. Installation of fire sprinkler system is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY980073	Upgrade Heating System j6 Test Cell Facility 2124	Utility Upgrades	This project would increase the heating capacity in the high bay area and replace all existing steam heaters in J6 Test Cell, Facility 2124.	2124 [DNE-NEV] 1993	Building 2124 is not a historic property nor located near historic district or historic landscapes.	No	Non-historic property		
ANZY189018	Replace Arnold Village Fire Pump, Facility. 3038	Utility Upgrades	This project would replace the 1,500-gallon-per-minute fire-water supply pump that serves the MFH/Arnold Village area with a new pump to ensure uninterrupted fire protection.	3038 [NREC], 3039 [NREC], Arnold AFB Elk River Dam-Woods Reservoir Historic Landscape [NREI]	Building 3038 is a historic property. The project entails replacement of component of the fire compression system for Arnold Village, which is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY059029	Repair HVAC, fsd Research, Building 648	Utility Upgrades	This project would provide a modern and energy-efficient HVAC system and associated components for the building and would bring the system up to USAF standards.	648 [NREC], Arnold AFB Test Facility Historic District	Building 648 is a historic property. Work related to HVAC systems is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY189035	Repair ASTF Cooling Tower Structure and Fans, Facility 1090	Utility Upgrades	This project would replace the existing wooden ASTF cooling tower structure, fans, spray piping, and other supporting systems down to the concrete basin with more modern and durable components in order to extend the life of the structure.	1090 [DNE]	Building 1090 is not a historic builidng. It is located outside the east boundary of the Arnold AFB Test Facility Historic District. Building 1090 is located opposite to green space and Building 903 [NREC]. Replacement of the cooling tower structure has no potential to affect the historic district.	No	Non-historic property	No historic properties affected*	
ANZY199012	Repair by Replace HVAC Units, Building 899	Utility Upgrades	This project would provide a modern and energy-efficient HVAC system and associated components for the building and would bring the system up to USAF standards.	899 [NREC], Arnold AFB Test Facility Historic District	Building 899 is a historic property. HVAC work is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY019109A	Repair by Replace 16s lpco2 System, Facility 745	Utility Upgrades	This project would provide a modern and appropriately sized storage tank and associated components for Facility 745 and would bring the facility up to USAF standards.	745 [NREC], Arnold AFB Test Facility Historic District	Building 745 is a historic property. Work entails removal and replacement of fire suppression system, which is exempt in 2014 PA Appendix B.1.b	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY149043	Repair by Replace AC Units outside of 445	Utility Upgrades	This project would provide a modern and energy-efficient HVAC system and associated components for the building and would bring the system up to USAF standards.	445 [DNE]	Building 445 is not a historic property, but is located east of Building 451 [NREI]. Project entails replacement of existing AC units with new ones. Project will have no potential to affect nearby historic properties.	No	Non-historic property	No historic properties affected*	
ANZY099047	Install Fire Sprinkler System, Mark 1 Test Building 1075	Utility Upgrades	This project would provide a modern fire protection system and associated components for the Mark 1 Test Building 1075 and would bring the system up to USAF standards.	1075 [DNE]	Building 1075 is not a historic property, but is located outside the east boundary of the Arnold AFB Test Facility Historic District. Work is interior and will have no potential to affect the nearby historic district.	No	Non-historic property	No historic properties affected*	
ANZY080125E1	Test Area Energy Improvements - ETF Shop HVAC	Utility Upgrades	This project would provide a modern and energy-efficient HVAC system and associated components for the ETF Shop and would bring the system up to USAF standards.	876 [NREC], Arnold AFB Test Facility Historic District	Building 876 is a historic property. HVAC work is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY160011	Repair by Replace Humidifiers, PMEL Building Facility. 350	Utility Upgrades	This project would provide a modern and efficient humidifier system for the entire Building 350 that operates with the current water quality at AEDC (i.e., Armstrong Humidifier).	350 [NREI]	Building 350 is a historic property. Project entails replacing existing humidifiers. HVAC project is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	

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ANZY149027	Repair HVAC Equipment, Steam Plant Control Room, Facility. 1411	Utility Upgrades	This project would provide a modern and efficient HVAC system and associated components to serve the control room at Steam Plant A in Building 1411 and would bring the system up to USAF standards.	1411 [DNE]	Building 1411 is not a historic property, but is located southeast of 1478 [NREI] and south of the Arnold AFB Test Facility Historic District. Project entails installation of a new HVAC system which should be contained within building envelope. Project has no potential to affect nearby historic properties.	Yes	Non-historic property		
ANZY059035	Repair HVAC, PWT mib	Utility Upgrades	This project would provide a modern and efficient HVAC system and associated components to serve the balance laboratory, machine shop, office area, and the pretest area of Building 760 and would bring the system up to USAF standards.	760 [NREC], Arnold AFB Test Facility Historic District	Building 760 is a historic property. HVAC work is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY150007	Repair by Replace HVAC, Hazmat Building 1456	Utility Upgrades	This project would provide a modern and efficient HVAC system and associated components to serve the office area at Building 1456 and would bring the system up to USAF standards.	1456 [DNE] 1997	Building 1456 is not a historic property. Building is located 120 ft outside the southeast corner of Test Utilities Historic Landscape near secondary reservoir 1506 [NREC]. Project involves HVAC replacement that has no potential to affect the historic district.	No	Non-historic property	No historic properties affected*	
ANZY189031	Replace Return Ditch Gates and Hoist Systems, Facility 2008	Utility Upgrades	This project would provide reliable operations of the gates and hoist systems at Facility 2008.	20008 [NREC], Arnold AFB Test Utilities Historic Landscape	Facility 20008 is a historic property. Project entails maintenance of ditch gates. Project is exempt under 2014 PA Appendix B.6.a.	No	Historic property	Exempt under 2014 PA Appendix B.6.a	
ANZY18905611	Repair by Replacement ASTF and EAF Power Systems, p-11	Utility Upgrades	In recent years there have been multiple failures of air-insulated switches due to water intrusion. This project would remove the air-insulated switches and replace them with Vista switches, thereby eliminating the failures of air-insulated switches because Vista switches are sealed, gas-insulated units.	Arnold AFB Test Facility Historic District, Arnold AFB Test Utilities Historic Landscape	Project includes multiple historic properties in Arnold AFB Test Facility Historic District and Test Utilities Historic Landscape. Project is mission critical and involves work on electrical switches which is exempt under 2014 PA Appendix B.1.b.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY199019	Repair by Replacement HEDI Unit Substation & Switchgear, Facility 583	Utility Upgrades	This project would replace the antiquated current HEDI Unit Substation and would bring the system up to USAF standards.	583 [NCE], Arnold AFB Test Facility Historic District	Building 583 is a non-contributing resource to the Arnold AFB Test Facility Historic District. Work on electrical systems inside the building has no potential to affect historic properties. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Non-historic property in HD	Mission Critical	Follow Stipulations II.C and VIII
ANZY189046	Rebuild Return Basin Structure and install Vertical Turbine	Utility Upgrades	This project would modify the basin structure to permit the installation of vertical turbine pumps and install new pumps, motors, discharge valves, and check valves.	908 [NCE], Arnold AFB Test Facility Historic District	Building 908 is a non-contributing resource located in Arnold AFB Test Facility Historic District. The project entails modification to an existing basin structure to allow installation of new equipment. Project will result in no affects to historic properties since modifications will occur within the current structure footprint.	No	Non-historic property in HD	No historic properties affected	
ANZY189029	Repair/Dredge Rowland Creek Pumps Inlet, Facility 20008	Utility Upgrades	This project would avoid future sedimentation and maintenance issues associated with sedimentation that accumulates at the inlet of the Rowland Creek pumps.	1560 [NREC], Arnold AFB Test Utilities Historic Landscape	Building 1560 and the reservoir are historic properties. Project entails the removal of sedimentation that accumulates at pumps. This action will have no adverse effects on historic properties.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY189009	Repair ASTF Unit Substation #8, Facility 929	Utility Upgrades	This project would replace ASTF Unit Substation 8 located in the ASTF Airside Plant Building 929 with a modern unit that is a more efficient transformer, which would both increase ASTF reliability and reduce unwanted downtime, and would bring the system up to USAF standards.	929 [NREC], Arnold AFB Test Facility Historic District	Building 929 is a historic property. Project is mission critical and involves electrical work which is exempt under the 2014 PA Appendix B.1.b.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY070084	FASCAP - Replace Insulation on Steam Lines	Utility Upgrades	Steam is provided to facilities at Arnold AFB with more than 9 miles of piping. This project would replace damaged or missing insulation at various points in the Arnold AFB steam distribution system and to increase the energy efficiency of the system.	1476 [NREI], 1478 [NREI], 1504 [NREC], 1507 [NREC], 1525 [NREC], 350 [NREI], 451 [NREI], 520 [NREC], 530 [NREC], 578 [NREC], 579 [NREC], 607 [NREC], 651 [NREC], 676 [NREC], 678 [NREC], 707 [NREC], 710 [NREC], 711 [NREC], 722 [NREC], 740 [NREC], 745 [NREC], 780 [NREC], 784 [NREC], 786 [NREC], 787 [NREC], 789 [NREC], 790 [NREC], 795 [NREC], 830 [NREC], 865 [DNE], 868 [NREC], 876 [NREC], 877 [NREC], 878 [NREC], 879 [NREC], 880 [NREC], 882 [NREC], 884 [NREC], 890 [NREC], 893 [NREC], 898 [NREC], 903 [NREC], 913 [NREC], 914 [NREC], 921 [NREC], 922 [NREC], 929 [NREC], Arnold AFB Test Facility Historic District, Arnold AFB Test Utilities Historic Landscape [NREI]	The steam lines link historic properties and are located within the Arnold AFB Test Facility Historic District and the Test Utilities Historic Landscape. Work on steam lines are HVAC which is exempt in 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	

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ANZY159005	Repair by Replace HVAC System, rpa-4, Building 2201	Utility Upgrades	This project would provide a modern and efficient HVAC system and associated components for Building 2201 and would bring the system up to USAF standards.	2201 [DNE]	Building 2201 is not a historic property nor located near historic district or historic landscapes.	No	Non-historic property		
ANZY089036	Renovate PWT Blade Shop Building. #645 Mixing Booth Ventilation	Utility Upgrades	This project would provide an appropriately sized and efficient ventilation system and associated components in the mixing booth and would bring the system up to USAF standards.	645 [NCE], Arnold AFB Test Facility Historic District	Building 645 is a non-contributing resource to Arnold AFB Test Facility Historic District. Project is to install larger ventilation fan and necessary electrical, steam, HVAC ducts, and controls. Interior work has no potential to affect historic properties.	No	Non-historic property in HD	No historic properties affected	
ANZY080100	Renovate HQ Building, Facility 100	Utility Upgrades	This project would modernize Facility 100 and would meet current USAF standards and codes and laws.	100 [NREI]	Building 100 is a historic property. Project includes replacement of entire HVAC system on the 1st, 2nd, 3rd floors of Wings A, B, and C; replacement of roof membrane; new fire protection suppression; new electrical panels; and renovation of interior elevator. The interior elevator is not identified as a character-defining feature in the 2014 Cold War Report Vol 2:2-7. The replacement of the roof membrane will have no adverse effect to the historic property if the profile of the roof is maintained and with SHPO concurrence.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY089072	Install Air Conditioning, APTU Support Building 577	Utility Upgrades	This project would install air conditioning in the APTU Support Building 577 to provide comfort for workers in the facility.	577 [NCE], Arnold AFB Test Facility Historic District	Building 577 is a non-contributing building within the Arnold AFB Test Facility Historic District. Work entails installation of air conditioning, which has no potential to affect the surrounding historic property.	No	Non-historic property in HD	No historic properties affected	
ANZY970081	Repl High Bay Heaters ETF Shop (Sust)	Utility Upgrades	This project would modernize heating, exhaust, and ventilation components in the high bay area of the ETF Shop building and would meet current USAF standards and codes and laws.	876 [NREC], Arnold AFB Test Facility Historic District	Building 876 is a historic property. HVAC work is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY080105	Renovate 1st Floor, HQ Building, Facility 100	Utility Upgrades	This project would provide a modern and efficient HVAC system and associated components for the first floor at Facility 100 and would bring the system up to USAF standards.	100 [NREI]	Building 100 is a historic property. Project is to replace HVAC ductwork, control system on 1st floor, Wings A, B, and C, and penthouse. Demolition to include all existing ceilings, ductwork, diffusers, piping and asbestos abatement. HVAC systems are exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY089026	Provide Air Circulation Fans for j1/j2 High Bay	Utility Upgrades	This project would install large-diameter circulation fans, louvers, and side-wall fans to replace the existing fans in the ceiling of ETF-A Test Building 880 to provide comfort for workers in the facility and freeze protection for the building.	880 [NREC], Arnold AFB Test Facility Historic District	Building 880 is a historic property. Project entails installation of large air circulation fans, including large diameter fans that will be installed in exterior walls. This will be a no adverse effect provided that the historic character of the building is maintained in accordance with SOI standards for rehabilitation with SHPO concurrence.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY080107	Renovate 2nd Floor, HQ Building, Facility 100	Utility Upgrades	This project would provide a modern and efficient HVAC system and associated components for the second floor at Facility 100 and would bring the system up to USAF standards.	100 [NREI]	Building 100 is a historic property. Project is to replace HVAC ductwork, control system on 2nd floor. Demolition to include all existing ceilings, ductwork, diffusers, piping and asbestos abatement. HVAC systems are exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY149036	Repair by Replace HVAC System for Labs in Facility 390	Utility Upgrades	This project would modernize the HVAC system at Facility 390 by installing a new HVAC unit, piping, ducting, insulation, electrical components, controls, and valves and would bring the system up to USAF standards.	390 [DNE]	Building 390 is not a historic property, but is located directly north of Building 350 [NREI]. Replacement of HVAC system will have no potential to affect historic property.	No	Non-historic property	No historic properties affected*	
ANZY099006	Install SL2 High Bay Heat	Utility Upgrades	This project would upgrade the SL2 high bay into a workable area in the winter months without the use of portable kerosene heaters.	541 [DNE-NEV]	Building 541 built 1998 is not a historic property, but is located between the Arnold AFB Test Facility Historic District and Test Utilities Historic Landscape. The building was evaluated as not eligible in 2014, but recommended for re-evaluation in 2048. Project entails interior work that has no potential to affect nearby historic districts.	No	Non-historic property	No historic properties affected*	
ANZY099066	Upgrade fsd Research Building 648 (Old Centaur)	Utility Upgrades	This project would modernize the existing HVAC system and ensure the HVAC system meets current codes and regulations.	648 [NREC], Arnold AFB Test Facility Historic District	Building 648 is a historic property. Project entails HVAC work, replacement of exterior personnel including the front door, replacing lighting, installing new sprinkler system. Work related to HVAC, lighting and sprinkler systems is exempt under 2014 PA Appendix B.1.b. The exterior doors are character-defining features. Replacement of doors and cladding will be exempt under 2014 PA Appendix B.1.a when done in kind to match existing materials and design.	No	Historic property	Exempt under 2014 PA Appendix B.1.a and B.1.b if conditions are met	
ANZY179015	Repair by Replace Heat, Ventilation, Windows High Bay Facility 451	Utility Upgrades	This project would modernize Facility 451 by replacing the existing, antiquated heating and ventilation systems and high-bay windows.	451 [NREI]	Building 451 is a historic property. Project involves HVAC work. Project is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY160015	Repair by Replacing Steam Heaters in Facility 760	Utility Upgrades	This project would ensure a reliable, working steam heating system at Facility 760.	760 [NREC], Arnold AFB Test Facility Historic District	Building 760 is a historic property. Work on HVAC system is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	

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ANZY960152	Replace Wash Piping 2nd Reservoir	Utility Upgrades	This project would replace existing washdown piping and create a more modern and efficient piping system.	1506 [NREC], Arnold AFB Test Utilities Historic Landscape	Building 1506 is the secondary reservoir and is a contributing resource in the Test Utilities Historic Landscape. Project entails replacement of underground piping which is used to wash sediment out of reservoir during outages and environmental discharge limits are tight. Project is exempt under 2014 PA Appendix B.4.a.	No	Historic property	Exempt under 2014 PA Appendix B.4.a	
ANZY199016	Replace the Heating System and Exhaust System in Facility 878	Utility Upgrades	This project would provide a modern heating and cooling system in Building 878 by replacing the existing heating system, including piping, valves, pneumatic controls, unit heaters, electrical components, and exhaust fans and controls.	878 [NREC], Arnold AFB Test Facility Historic District	Building 878 is historic property. Work on HVAC systems is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY079057	Replace Emergency Generators ETFA	Utility Upgrades	This project would replace existing, old emergency generators and to ensure the USAG has operable emergency generators that meet current codes and regulations.	881 [NREC], Arnold AFB Test Facility Historic District	Building 881 is a historic property. Project entails electrical work, which is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY160026	Repair HVAC in High Bay Facility 1077	Utility Upgrades	The purpose of this project is modernize the HVAC system at Facility 1077 to ensure proper cooling of the equipment housed in the facility, as well as occupants operating out of the facility, and to ensure the HVAC system meets current codes and regulations.	1077 [DNE]	Building 1077 is not a historic property. It is located outside the east boundary of the Arnold AFB Test Facility Historic District. Project entails interior HVAC work. Building 1077 is located across the road from the northeast corner of the historic district that contains several small non-contributing buildings and Building 711, a large testing tunnel with support buildings. HVAC changes to Building 1077 located on the opposite side of the road has no potential to affect the historic district.	No	Non-historic property	No historic properties affected*	
ANZY149023	Replace HVAC at rpa #3, Facility 2210	Utility Upgrades	This project would modernize the existing HVAC system and ensure the HVAC system meets current codes and regulations.	2210 [DNE]	Building 2210 is not a historic property nor located near historic district or historic landscapes. Project has no potential to affect historic properties.	No	Non-historic property		
ANZY189040	Replace Cooling Water Supply Line 5th Street, Facility 20009	Utility Upgrades	This project would modernize the existing cooling water system that feeds the steam plant and other facilities south of 5th Street.	1476 [NREI], 1478 [NREI], 1504 [NREC], Arnold AFB Test Utilities Historic Landscape [NREI]	Project includes replacement of 1800 ft of 8-inch buried water supply line that feeds Steam Plant and other facilities south of 5th Street. Project is exempt under 2014 PA Appendix B.4.b.	No	Historic property	Exempt under 2014 PA Appendix B.4.b	
ANZY999160	Repair HVAC, ETF AC&T	Utility Upgrades	This project would modernize the existing HVAC system and bring the facility up to USAF standards.	878 [NREC], Arnold AFB Test Facility Historic District	Building 878 is a historic property. HVAC work is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY149042	Repair Exhaust Fans, Secondary Pumping Station, 1507	Utility Upgrades	This project would install new exhaust fans on the roof of the secondary pumping station and create roof access to the new fans for improved safety and ease of access; this will provide safe/easy access by maintenance personnel.	1507 [NREC], Arnold AFB Test Utilities Historic Landscape	Building 1507 is a historic property. Project entails removal of old fans and installation of new ones on roof. Project will be exempt under 2014 PA Appendix B.1.b as ventilation project.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY019117	Repair HVAC, T1/T4/Equip - ETF AC&T	Utility Upgrades	This project would modernize the HVAC system serving the T1 control room, T4 control room, equipment room, and scanner room in Building 878 and bring the facility up to USAF standards.	878 [NREC], Arnold AFB Test Facility Historic District	Building 878 is a historic property. HVAC is exempt under 2014 PA Appendix B.1.b	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY080086	Renovate PWT Offices, Facility 740	Utility Upgrades	This project would modernize Facility 740, including replacing the existing 40-ton chiller, four equipment room doors, and a personnel door; installing a halon system sprinkler system and new fire protection potable water line; renovating interior offices and restrooms; and bringing the facility up to USAF standards.	740 [NREC], Arnold AFB Test Facility Historic District	Building 740 is a historic property. No interior character-defining features are identified in the 2014 Cold War Report Vol 2:117-119. Air conditioning, sprinkler systems, fire protection potable water line are exempted under 2014 PA Appendix B.1.b. Replacement of exterior doors is exempt if done in kind to match existing materials and design under 2014 PA Appendix B.1.a.	No	Historic property	Exempt under 2014 PA Appendix B.1.a and B.1.b if conditions are met	
ANZY199030	Repair by Replace Cooling Water Lines, Facility. 20009	Utility Upgrades	This project would modernize the existing water lines at Facility 20009 and bring the facility up to USAF standards.	1090 [DNE], 1092 [DNE], 1094 [DNE-NEV] 1999	Buildings 1090, 1092, and 1094 are not historic properties, but are located outside the east boundary of the Arnold AFB Test Facility Historic District. Project will replace existing underground and above-ground piping, and relocate 4 sewer lines. Underground work has no potential to affect to nearby historic district.	Yes	Non-historic property		
ANZY189051	Upgrade 75-Ton PWT Outdoor Overhead Crane to 110-Ton, Facility 773	Utility Upgrades	This project would upgrade the current PWT outdoor overhead crane at Facility 773 by adding a plate to a small portion of the bridge girders, replacing the trolley with a new 110-ton trolley, replacing trolley rails, replacing end truck equalizer pins, and replacing axels and wheels as well as ensuring compliance with current USAF standards.	780 [NREC], Arnold AFB Test Facility Historic District	Building 780 is a historic property. Project is mission critical and involves work on outdoor cranes and equipment which is exempt under 2014 PA Appendix B.1.c.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY120022	Replace Potable, Raw, Storm, Sewer Piping Mark I Building 1075	Utility Upgrades	This project would modernize the potable, raw, storm, and sewer water system piping at Building 1075 so that the water supply to the building can be restored and would bring the system up to USAF standards.	1075 [DNE]	Building 1075 is not a historic property, but is located outside the east boundary of the Arnold AFB Test Facility Historic District. Replacement of interior sewer chase, and sewer lift station piping and controls. Project has no potential to affect the nearby historic district.	No	Non-historic property	No historic properties affected*	

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ANZY099065	Upgrade Building FSD Maintenance Shop 645	Utility Upgrades	This project is needed to modernize the building and includes replacing doors, replacing lighting and associated lighting panels and transformers, installing a wet-pipe sprinkler system, upgrading interior finishes, upgrading HVAC, replacing the steam-heating system, repairing the ceramic tile floor, providing venting in the equipment room, replacing exterior windows, and refinishing all floors to industrial grade as well as bringing the facility up to USAF standards.	645 [NCE], Arnold AFB Test Facility Historic District	Building 645 is a non-contributing resource to Arnold AFB Test Facility Historic District. Project is to replace 5 exterior doors, replace lighting, install sprinkler system, and upgrading interior finishes. Work within footprint of building has no potential to affect nearby historic properties.	No	Non-historic property in HD	No historic properties affected	
ANZY099011	Provide Utilities Building 1073	Utility Upgrades	Building 1073 currently has no utilities (e.g., electricity, water, steam). The purpose of this project to restore the electricity, water, and possibly steam services to this building that were disconnected several years ago.	1073 [DNE]	Building 1073 is not a historic property and is located outside the east boundary of the Arnold AFB Test Facility Historic District. The project has no potential to affect the historic district.	No	Non-historic property	No historic properties affected*	
ANZY1260146	Replace VKF C92 Compressor, Facility 651	Utility Upgrades	This project would replace the existing equipment, provide connections points for rental compressors in case of failure, and ensure compliance with the Energy Policy Act of 2005 (Public Law 109-58) and Energy Independence and Security Act 2007 (Public Law 110-140), which requires continued energy reduction in the federal sector.	651 [NREC], Arnold AFB Test Facility Historic District	Building 651 is a historic property. Project is mission critical and entails replacement of air compressor equipment which is exempt under 2014 PA Appendix B.1.c.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY199027	Add C-Plant Waste Fuel Tank Fire Protection	Utility Upgrades	This project would install a fire protection system for the C-Plant waste fuel tank to meet current codes and regulations.	914 [NREC], Arnold AFB Test Facility Historic District	Building 914 is a historic property. Installation of a fire protection system is exempt under 2014 PA Appendix B.1.b.	No	Historic property	Exempt under 2014 PA Appendix B.1.b	
ANZY009139	Replace Building 792, PWT Pipe Shop	New Construction	The project would is to replace the existing metal building and construct a new metal building.	792 [NCE], Arnold AFB Test Facility Historic District	Building 792 is non-contributing to the Arnold AFB Test Facility Historic District. Demolition of this NCE building would be no adverse effect. Proposed construction of a replacement building will have no adverse effect to historic properties provided that the new design is compatible to the historic character of the historic district in accordance with 2014 PA Stipulation VII.C and with SHPO concurrence.	No	Non-historic property in HD	No adverse effect	Follow Stipulations V.A.2 and VII.C in 2014 PA
ANZY010027A	Upgrade Skimming Lagoon#1	New Construction	The project would update Skimming Lagoon #1 on the Retention Reservoir to ensure that a large fuel spill does not result in the shutdown of all cooling water used by test facilities and plants until spills can be controlled and cleaned up. The following project components would be installed: a permanent fuel/water separator with a flow capacity of 100 gallons per minute; an electric air compressor with the capacity to supply air to a drum skimmer, weir skimmer, and three air-powered pumps; a work platform; a storage building; a storage area for a small boat; a gravel staging area; a safety shower and eyewash station; and permanent barriers.	20008 [NREC], Arnold AFB Test Utilities Historic Landscape	Lagoon #1 is a historic property in the Test Utilities Historic Landscape. Project area is mapped as a small section of larger reservoir near Building 1543 [NCE]. New construction entails a permanent fuel/water separator, electric air compressor, work platform, storage building, small boat storage building, gravel staging area, safety shower, traveling screen, and a permanent barrier tape area. New construction will have no adverse effect provided that the new construction is compatible to the historic character of the landscape in accordance with 2014 PA Stipulation VII.C and with SHPO concurrence.	No	Historic property	No adverse effect	Follow Stipulation V.A.2 in 2014 PA
ANZY010067P	Demo PWT Test Fuel Building, Facility 750	Demolition	The project would demolish the PWT Test Fuel facility and restore the grounds. The facility is an inactive fuel-metering facility with piping and valves with special asbestos insulation that must be abated.	750 [NREC], Arnold AFB Test Facility Historic District	Building 750 is a historic property. Demolition is an adverse effect, but the project is classified as mission critical. The adverse effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY020049	LRDP - Petroleum Operations/Fuels Lab Facility	New Construction	This project would construct a 2,000 SF petroleum operations/laboratory facility. Due to the nature of Arnold AFB mission, the base has performed an average of 4,125 test procedures per year for the past 3 years using the current lab facility. The purpose of the project is to construct a lab of an appropriate size commensurate to the number of test procedures conducted annually and located near the fuel farm, thus remedying the current process whereby samples must be transported across the base to perform the required fuels testing.	Arnold AFB Test Facility Historic District	New construction adjacent to Building 870 within the Arnold AFB Test Facility Historic District. No building demolition is proposed at current stage. New construction will have no adverse effect. The project is classified as mission critical. The effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY030047A	Install Watercraft Barriers, Elk River Dam	New Construction	This project is in a floodplain and would a 650-linear-foot barrier project to meet all current AFI/UFI requirements.	3101 [NREC], Woods Reservoir 20007 [NREC], Arnold AFB Elk River Dam-Woods Reservoir Historic Landscape [NREI]	Elk River Dam (3101) and the Woods Reservoir (20007) is a historic resource. Project entails providing 650 ft of barriers to prevent entry to restricted areas by boat or watercraft. The barriers will not be attached to the dam. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY040045	Construct Sandblast Facility, Facility 1604	New Construction	This project would demolish the old structure and construct a new, larger aggregate blasting facility. The project would provide a facility of an adequate size that can be used regardless of weather conditions. This project would assist the testing community in completing construction of their facilities and meeting testing schedules.	1650 near, Old Salvage Yard [DNE]	No historic properties are present in area. Area for new construction is not located near historic district/landscapes.	Yes	Non-historic property		

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ANZY060028	Add/Alter Road at Retention Reservoir, Facility 60010	Road Maintenance	This project would increase vehicle safety and the stability of the road at Gate 1 and Gate 2 near the retention pond by widening it to 10 feet or wider, providing a guardrail along the road, and replacing the culvert, if a larger culvert is required.	20008 [NREC], Arnold AFB Test Utilities Historic Landscape	Road maintenance will occur within historic landscape. Road maintenance is exempt under 2014 PA Appendix B.4.a as minor location of access roads and curbs.	No	Historic property	Exempt under 2014 PA Appendix B.4.a	
ANZY060046	Install Streetlights, AE Annex Parking Lot, Facility 10006	New Construction	This project would make it easier for drivers to see in the dark by installing street lighting at base entrance gates and the parking lot.	Parking lot between 100 [NREI] and 1103 [DNE]	Parking lot is adjacent to Building 100 [NREI]. Installation of lights in the parking area near Building 100 has no potential to affect that historic property.	No	Non-historic property	No historic properties affected*	
ANZY060075	Add/Alter Perimeter Fence Road, Facility 60010	Road Maintenance	This project would increase vehicle safety and the stability of the road along the perimeter fence at Facility 60010 by adding new gravel to the unimproved sections of the interior perimeter of the industrial area and constructing gravel turn arounds at unimproved sections susceptible to flooding.	Perimeter fencing	Perimeter fence road is not located near historic properties, district, landscapes, or any archeological sites.	Yes	Non-historic property		
ANZY070055	Demolish J-3 Test Cell	Demolition	The project would demolish the J-3 test cell to consolidate facilities and ultimately demolish unused or redundant facilities. This demolition project is needed because the J-3 test ceill is not longer used.	890 [NREC], Arnold AFB Test Facility Historic District	Building 890 is a historic property. Demolition is an adverse effect, but project is mission critical. The adverse effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY073001	Add/alter Test Cell Delivery Bay	New Construction	This project would demolish J-2A Test Cell, J-2A Cryogenic Building 893, ETFA Valve Repair Shop Building 897, and associated plant equipment and construct an extension to the north side of the ETF Test Building 880's high bay. This project would increase the structural capacity of the existing Building 880 bridge crane and extend the crane support to the new high bay area.	880 [NREC], 884 [NREC], 891 [NREC], 893 [NREC], 897 [NCE], Arnold AFB Test Facility Historic District	Buildings 880, 884, 891, and 893 are historic properties. Demolition of historic properties in the historic district would be adverse effect. Construction of a new addition onto Building 880 will have no adverse effect. The project is classified as mission critical, and any effects will be mitigated through 2014 PA Stipulation II.C.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY080025	Repair Concrete Trenches, J1/J2 Area	Road Maintenance	This project would repair/modify the concrete overpasses at Trench A and Trench B in the J1/J2 area to accommodate heavy equipment transport.	Arnold AFB Test Facility Historic District	Project area is located near Building 881 in Arnold AFB Test Facility Historic District. Project is mission critical and involves maintenance and repair of existing roads which is exempt under 2014 PA Appendix B.4.a.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY080033	Construct Security Fence, Munitions Storage Area	New Construction	This project would construct security fence with gates within the munitions storage area in compliance with Air Force Pamphlet 91-201, which requires the fence to prevent unauthorized access to the storage area.	40CF334 [DNE]	Project area is not located near historic properties. Site 40CF334 is DNE (NOTE: DNE in ICRMP table but NEV in GIS data).	No	Non-historic property		
ANZY100034	Construct Bulk Fuel Farm Tank Access Roads, Facility 60009	Road Maintenance	This project would increase vehicle safety and the stability of the bulk fuel farm tank access roads by paving and widening the roadway at the turns and adding the necessary riprap in washed out areas.	1575 et at. [DNE]	Building 1575 and surrounding complex are not historic properties. Area is located adjacent to the Test Utilities Historic Landscape. Improving and paving existing gravel roads in bulk fuel complex has no potential to affect historic landscape.	No	Non-historic property	No historic properties affected*	
ANZY110022	Repave Test Fuel Farm Drive Pavement	Road Maintenance	This project would increase vehicle safety along the Overlay Test Fuel Farm Drive by repaving it from the beginning of the asphalt section north of Building 873 to 3rd Street and adding street lighting to the drive.	Roads near 882 in Arnold AFB Test Facility Historic District	Roadway is located in Arnold AFB Test Facility Historic District. Maintenance and repair of existing streets and roads are exempt under 2014 PA Appendix B.4.a.	No	Historic property	Exempt under 2014 PA Appendix B.4.a	
ANZY110068	Repair Perimeter Fence Road near Landfill	Road Maintenance	This project would increase vehicle safety and the stability of Perimeter Fence Road near the landfill by replacing the four existing culverts southeast of the landfill and widening the road in this area to approximately 24 feet.	Landfill	No historic built resources are located at the landfill. The landfill is not located historic district or historic landscape.	No	Non-historic property		
ANZY119050	Nitrogen Conversion Facility	New Construction	This project provides a new, additional nitrogen conversion facility outside the J4 explosives zone. This project would construct a new facility that includes all equipment to store and convert liquid nitrogen to 5,000 pounds per square inch gaseous nitrogen and that could be tied into the utility gaseous nitrogen (GN2) system by constructing a new GN2 to liquid nitrogen (LN2) conversion facility outside of the J4 blast zone, which is designed to be reliable and maintainable.	north of NE corner of Arnold AFB Test Facility Historic District.	Proposed new construction is located outside of the northern boundary of the Arnold AFB Test Facility Historic District. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Non-historic property		
ANZY122003	Demolish High Bay 1 (HB1) Heaters, Building 676	Demolition	The project would demolish an old 1,344 square foot gas-fired HB1 heater on the west side of Building 676. The heater has been disconnected from process air and the natural gas. This demolition project is needed because the old gas-fired HB1 heater has been abandoned in place since the 1990s.	676 [NREC], Arnold AFB Test Facility Historic District	Building 676 is historic property. Project entails removal of a large heater located west of the building installed in 1990. Project is mission critical and involves HVAC work which is exempt under 2014 PA Appendix B.1.2.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY132009	Demolish J-6 Support Building, Facility 2120	Demolition	This project would demolish the J-6 Support Building 2120 in to consolidate facilities. This demolition project is needed because the building is in a blast zone and cannot be occupied by personnel.	2120 [DNE]	Building 2120 is not a historic property nor located near historic district or historic landscapes.	Yes	Non-historic property		

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ANZY142002	Demolish Water Pump Control House, Facilities 2114, 2115, and 2116	Demolition	This project would demolish the water pump control house (Facilities 2114, 2115, and 2116) to consolidate facilities and restore the grounds. This demolition project is needed because the facilities are damged beyond repair and are no longer needed.	2114, 2115, 2116 [DNE]	Building 2114, 2115, and 2116 are not historic properties nor located near historic district or historic landscapes.	Yes	Non-historic property		
ANZY149006	Construct Industrial Water Supply, Steam Plant A 1411	New Construction	This project would construct an industrial water supply for Steam Plant A. The purpose of the industrial water supply system is to provide water needed to operate Steam Plant A, including water storage as required.	1504 [NREC], Arnold AFB Test Utilities Historic Landscape, 1411 [DNE]	Project is an underground water line beginning at Building 1504 [NREC] in the Test Utilities Historic Landscape to Building 1411, a non-historic property located southeast of warehouse Building 1478 [NREI] and outside south boundary of the Arnold AFB Test Facility Historic District. Project entails construction of a new industrial water supply system. Project will augment an existing water supply feed. The installation of an underground water pipeline and additional water storage inside Building 1411 in an industrial area have no potential to affect surrounding historic properties.	No	Non-historic property	No historic properties affected*	
ANZY149046	Construct Fuel Transfer Line to SL1 Test Cell	New Construction	This project would install a fuel transfer line from the fuel transfer trench at the corner of Fourth Street and North Hap Arnold Drive to SL1. The purpose of this line is to fill the SL1 fuel tank.	1541 [NCE], to Arnold AFB Utilities Historic Landscape [NREI], also along west side of Arnold AFB Test Facility Historic District	Project will construct a new fuel transfer line from Building 1541, a non-contributing resource to the Test Utilities Historic Landscape to an existing fuel trench. The fuel transfer line will follow the road at eastern edge of the historic landscape. Construction of an underground fuel line has no potential to affect historic landscape.	No	Non-historic property in HD	No historic properties affected	
ANZY1500261	Replace Perimeter Security Fence	New Construction	This project would construct approximately 61,700 linear feet of perimeter fencing in two phases. This project would bring the perimeter gates/access points into accordance with UFC 4-022-02 standards and would maintain the security of the Installation.	40CF293 [DNE]; Fencing surrounds AEDC area	Fencing surrounds the central core of Arnold AFB. No historic properties are located in the proposed path of the perimeter security fence.	Yes	Non-historic property		
ANZY152004	Demolish Acid Storage Shed, Building 1460	Demolition	This project would demolish the acid storage shed, Building 1460, to consolidate facilities and ultimately demolish unused or redundant facilities and would restore the grounds. Utilities have already been disconnected to the building. This demolition project is needed because the building is no longer used.	1460 [DNE]	Building 1460 is not a historic property. Building is located 120 ft outside the southeast corner of the Test Utilities Historic Landscape near secondary reservoir 1506 [NREC]. Project involves demolition of non-historic building. Project has no potential to affect historic district.	Yes	Non-historic property		
ANZY169004	Construct New VKF Storage Building	New Construction	This project would construct a new building suitable for tunnel equipment storage and usable and efficient workspace. The current building has very limited usable space to house all the parts, equipment, and many various items required to function on a day-to-day basis. Presently, the second floor cannot meet all requirements due to floor loading restrictions.	651 [NREC], Arnold AFB Test Facility Historic District	Project entails new construction adjacent to Building 651 within the Arnold AFB Test Facility Historic District. No building demolition appears to be required. New construction will have no adverse effect to the historic district provided that the new construction is compatible to the historic character of the district. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY169010	Repair Concrete Road North Side of the Model Shop Facility 451	Road Maintenance	This project would reduce loading equipment stability issues and tripping hazards by repairing the concrete road on the north side of the model shop, Facility 451.	Road north of 451 [NREI]	Road repair is located directly north of Building 451 [NREI]. Repair of an existing roadway has no potential to affect nearby historic properties.	No	Non-historic property		
ANZY180010	Construct Addition to Fitness Center, Facility. 1358	New Construction	As a military installation, physical fitness and quality of life are crucial aspects of maintaining moral and supporting a productive work force. The purpose of this new construction project, which includes an associated 0.5 acre of tree removal, is to provide an area of adequate size with modern amenities for physical fitness activities.	1358 [DNE]	Building 1358 is not a historic property nor located near any historic district or landscape.	No	Non-historic property		
ANZY180017	Add/Alter Installation Access Control Point Gate 2 Upgrade	New Construction	Gate 2 is currently used to process both privately-owned vehicles and commercial traffic. The primary purpose of this project would be to separate the two vehicle entry points to increase processing efficiency and update access control points to meet AFI/UFC requirements.	1757, Gate 2 area	Building 1757 located at Gate 2 is not included in 2014 or the 2017 Cold War Reports, the 2019 ICRMP, or the 2017 memo of historic buildings. Other buildings located at Gate 2 (1752, 1753, 1756, and 1745) constructed during the 1980s were evaluated as not eligible in the 2104 and 2017 Cold War Reports. Per 2014 PA , Stipulation IV.E.2, Building 1757 with an undetermined eligibility status is presumed National Register eligible. Gate 2 is not located near historic district or historic landscapes. The project entails reconfiguring the gate area to separate privately-owned vehicles and commercial traffic by relocating existing barriers, the construction of a new inspection building and commercial holding area, new fencing, etc. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY180022	Construct Commissary / BX Entrance Drive Modification, Facility 60002	New Construction	This project would remove existing entrance drives and construct a new access drive west of the ground retractable automobile barrier. Its purpose is to comply with AT/FP standards.	125 [DNE]	Building 125 is not a historic property nor located near any historic district or landscape.	Yes	Non-historic property		

Project ID	Project Name	Project Type	Description of the Proposed Action (5Nov2020)	Resources Associated with Projects	Analysis of Resources Potentially Affected by Projects	Mission Critical?	Property Status	Applicable PA Stipulations	PA Treatment Requirements
ANZY189060	Add Addition to PWT Blade Shop, Facility. 645	New Construction	This project would construct a new addition to the existing PWT Blade Shop Building. Its purpose is to increase the capacity of the current shop.	645 [NCE], Arnold AFB Test Facility Historic District	Building 645 is a non-contributing resource to the Arnold AFB Test Facility Historic District. Project entails construction of new addition approximately 20 x 100 ft. Construction of a new addition will have no adverse effect to the historic district provided that the new addition is compatible to the historic character of the district. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Non-historic property in HD	Mission Critical	Follow Stipulations II.C and VIII
ANZY189067	Construct Ethylene Glycol Storage Capability for C-Airside	New Construction	This project would to remove a decommissioned and never-used TCE stripper located on top of the east side of the C-Airside; cut, grade, and install gravel; install a concrete slab; remove, clean, paint, and install two new A-plant glycol storage tanks on top of new concrete slab; install pump and piping to/from storage tanks; and connect piping to existing glycol storage system at the bottom of the CAS cut.	West of 922 [NREC], Arnold AFB Test Facility Historic District	Site of new construction is located west of 922 [NREC] within the Arnold AFB Test Facility Historic District. The project entails removing a TCE stripper and installing two new glycol storage tanks with piping on a new concrete slab. Project is located in an outdoor equipment area associated with air supply, cooling and refrigeration buildings. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Non-historic property in HD	Mission Critical	Follow Stipulations II.C and VIII
ANZY190012	Repair Pavement, South Hap. Arnold Road Facility. 60009	Road Maintenance	This project would increase vehicle safety and the stability of South Hap Road by repaving and striping the road.	Road leads south from Wattendorf Memorial Highway to Arnold village	Road leads south from Wattendorf Memorial Highway to Arnold village. No historic properties are located in this area and project area is not located near the historic district and/or landscapes.	No	Non-historic property		
ANZY950085	Modify Ramp – G-Range	Road Maintenance	This project would improve the ramp on the south end of Building 678 by widening it by 10 feet and lessening its slope to accommodate large-transport-vehicle traffic.	678 [NREC]	Building 678 is a historic property. Project is mission critical and involves modification to an existing ramp which is exempt Appendix B.4.a.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY960128	Add to Propulsion Tech Lab	New Construction	This project would construct a 100-foot-by-40-foot addition at Building 936, which would include a 30-foot-by-40-foot machine shop area. This project would provide a proper machine shop area spatially separated from other personnel.	936 [NREC], Arnold AFB Test Facility Historic District	Building 936 is a historic property. Construction of a new addition will have no adverse effect provided that the new addition is compatible to the historic character of the district. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII
ANZY199037	Cooling Water Expansion, Rowland Creek 20009	Utility Upgrades	The purpose of this project is to Construct 1800' of 72" diameter coated steel water line and a 1500 sq ft addition with motor/pump combo to the Rowland Creek Pumping Station.This will allow the system to convey 620,000 gallons/minute of cooling water.The line will have the flexibility to deliver to multiple test facilities, while remaining test capabilities are served from other portions of the distribution system.	Arnold AFB Test Facility Historic District and Test Utilities Historic Landscape	Underground water line will pass along eastern edge of the Test Utilities Historic Landscape and turn eastward under parking lots in front of buildings located within fronting onto a street in the Arnold AFB Test Facility Historic District. The area is developed. The pipeline avoids historic built resources. No archeological potential is identified in area. The project is classified as mission critical, and any effect will be mitigated through 2014 PA Stipulation II.C.	Yes	Historic property	Mission Critical	Follow Stipulations II.C and VIII

APPENDIX C

RESUMES OF KEY PERSONNEL

KATHRYN M. KURANDA, M. ARCH.HIST.

SENIOR VICE PRESIDENT
HISTORICAL & ARCHITECTURAL SVCS.

Ms. Kathryn M. Kuranda, M. Arch. Hist., Senior Vice-President – Architectural and Historical Services, directs the architectural history and history programs of R. Christopher Goodwin & Associates, Inc. Ms. Kuranda holds a Bachelor of Arts degree in American Studies from Dickinson College and a Master of Architectural History degree from the University of Virginia. Ms. Kuranda's professional qualifications exceed those established by the Secretary of the Interior in the field of architectural history. She is a court-qualified architectural historian.

Ms. Kuranda has managed heritage resource investigations across the United States, in the Caribbean, and in Europe. Her early career with the Colorado Department of Highways and the Nevada State Historic Preservation Office provided hands-on experience in the identification, evaluation, and management of active and historic mining resources and landscapes. Since joining R. Christopher Goodwin & Associates, Inc. as a Senior Project Manager in 1989, Ms. Kuranda has served as Principal Investigator on numerous cultural resource investigations involving large and complex properties. These properties have ranged from the Mississippi Basin Model, the last physical model employed by the U.S. Army Corps of Engineers; to DoD's nationwide Capehart Wherry Housing Programs, to the Enrico Fermi Atomic Power Plant.

She has directed architectural survey projects ranging in scale from single building, to multi-component industrial facilities, to state- and nation-wide multiple-property efforts covering thousands of properties. She has designed and directed nationwide Cultural Heritage Studies in support of holistic Federal agency compliance with the National Historic Preservation Act of 1966, as amended , including historic contexts for the evaluation of Department of Defense Cantonments constructed between 1790 and 1940, for the Navy Guided Missile Program, for World War II Permanent Military Construction, for Army Fixed Wing Air Fields, and for DoD Ammunition Production and Storage, and Unaccompanied Housing (UPH). These studies have become standard references in the field.

Ms. Kuranda possesses particular expertise in American vernacular architectural history, preservation technologies, and historic preservation applied practice. She has extensive working knowledge in fulfilling the provisions of 36 CFR Part 800, Protection of Historic Properties, and in supporting the development of agreement documents (MOAs and PAs) to avoid, limit, or mitigate effects under Section 106 of the National Historic Preservation Act of 1966, as amended. Her staff of architectural historians and historians is comprised of seasoned practitioners in the field.

JEFFREY H. MAYMON, M.A., ABD

SENIOR PROJECT MANAGER

Mr. Jeffrey H. Maymon, Senior Project Manager, received his baccalaureate degree from the University of New Hampshire in 1983 and his M.A. from SUNY Binghamton in 1991, where he currently is A.B.D. He taught courses in archaeological field methods at Elmira College in New York and at SUNY Binghamton. He is a member of the Society for American Archeology, American Anthropological Association, Northeastern Anthropological Association, Conference on Iroquois Research, and numerous regional archaeological societies. Mr. Maymon has considerable archaeological field experience.

Prior to joining R. Christopher Goodwin & Associates, Inc., in 1993, Mr. Maymon served as a crew member, crew chief, and field director on archaeological field projects in New York, New Jersey, Virginia, Connecticut, Massachusetts, and New Hampshire. In Connecticut, he served as field director for the American Indian Archeological Institute on the Robbins Swamp project, for excavations of the Weantinoge Site, and for several Phase I investigations. He served as a research assistant at the University of New Hampshire in the analysis of the Early to Middle Archaic Wadleigh Falls and Weirs Beach sites.

Since joining Goodwin & Associates, Inc. twenty-seven years ago, Mr. Maymon has served as field director and project manager on numerous Phase I, II, and III archaeological investigations throughout the eastern United States. In particular, Mr. Maymon served as project manager for Phase II evaluation of four sites and Phase III data recovery at one site in Maryland for the Maryland State Highway Administration; and numerous Phase I, Phase II (24 sites), and Phase III (12 sites) studies in the Middle Atlantic region. He also served as a project manager for the Ohio portion of the cultural resources survey and evaluations of the proposed Independence Pipeline corridor, a multi-year pipeline project, and for the REX East project. Additional experience in the mid-West includes Phase I archaeological surveys on military installations in Ohio and Wisconsin, and Cultural Resources Evaluation of Air National Guard Installation in Wisconsin.

In addition to technical reports, Mr. Maymon has published papers in *Artifacts* (the newsletter of the American Indian Archeological Institute) and has contributed a chapter on the Wadleigh Falls Site to *Early Holocene Occupation in Northern New England*. He has presented professional papers to the Society for American Archeology, the Northeastern Anthropological Association, Middle Atlantic Archaeological Conference, and the Archeological Societies of New Hampshire, Maine, and Massachusetts. His research interests include lithic and mortuary analysis, ethnohistory, the Early Holocene and Late Woodland periods, and Iroquoian cultures.

KATHERINE E. GRANDINE, M.A. SENIOR PROJECT MANAGER / SENIOR HISTORIAN

Ms. Katherine Grandine, Senior Project Manager/Senior Historian, received a Master of Arts degree in American Civilization with Emphasis on Historic Preservation in 1983 from the George Washington University, Washington, D.C. She has been professionally active in the field of historic preservation since 1981. Ms. Grandine has extensive experience in conducting historical research for a wide variety of projects and applications. Her project experience includes historic research for nationwide context studies and for local history, architectural surveys in numerous states, Historic American Buildings Survey documentation, National Register of Historic Places nominations, local landmark and historic district nominations, historic property mitigation documentation, and cultural resources planning documents.

Ms. Grandine is especially proud of her contributions to the development of nationwide military historic contexts, including the National Historic Context for Department of Defense (DoD) Installations from 1790 to 1940, support and utility structures from 1917 to 1946, Air Force and Navy Wherry and Capehart housing, and the book *Leading the Way: History of Air Force Civil Engineering 1907 – 2012*. She has conducted numerous architectural surveys at military installations nationwide. She also conducted research and managed cultural resource investigations for 36 state parks and wildlife management areas for the Maryland Department of Natural Resources. She has performed numerous reconnaissance-level and intensive-level architectural surveys in a variety of urban and rural settings in Maryland, Virginia, Pennsylvania, Ohio, West Virginia, North Carolina, New Jersey, and at numerous DoD installations nationwide. She has conducted literature searches for Phase I archaeological surveys and undertaken in-depth archival research for Phase II and Phase III archaeological studies in the Mid-Atlantic region. She has extensive experience in researching in local primary sources including land records, deeds, wills, inventories, and tax records to support archaeological and architectural documentation projects. She has managed numerous architectural survey and evaluation projects and written National Register nominations for individual properties and large historic districts. She has co-authored integrated cultural resources management plans and numerous technical reports, and provided technical support for a variety of cultural resources projects. She also has provided documentation assessing project impacts to historic properties to assist Section 106 reviews for architectural compliance with various state historic preservation offices. She has worked on pipeline projects in the northeast region (Pennsylvania, Maryland, and New Jersey), the southeast region (West Virginia), and the central region (Ohio). Projects include the Texas Eastern Market Area Expansion (TEMAX), East Side Expansion Project, Auburn Line Extension, Rockies Express East Project, Line 1655, and the Duke Energy/Spectra Energy TEAM 2014 projects, Leach Xpress, and WB Xpress.

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Active Environmental Restoration Program Sites at Arnold Air Force Base

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Table C-1. Active Environmental Restoration Program Sites at Arnold Air Force Base

ERP Site	SWMU	Site Name	Description	Status
LF001	SWMU 1 & 2	Landfill No. 2/ Leach Pit No. 2	Includes former Landfill No. 2 and the former Leach Pit No. 2 for the Arnold AFB. Landfill No. 2 was a hazardous material disposal area from 1956 to 1982 and used to dispose of nonhazardous wastes until 1992. Leach Pit No. 2 consisted of a pit that was used from the 1950s to 1975 to dispose of a variety of acids. Solvents released from the landfill and leach pit are believed to be the primary source of contamination.	**RAO.** A Groundwater Extraction and Treatment System was installed in 1994 and updated in 2007. The system consists of five wells that extract contaminated groundwater, which is treated at an on-site treatment unit and discharged into the retention reservoir. In 1997, the landfill and leach pit were capped with native material, a geosynthetic clay liner, and soil
WP002 SD005 WP011	SWMU 3, 7, & 15	Retention Reservoir, Rowland Creek, and Chemical Treatment Pond	Retention Reservoir and pond are joined as one contiguous body of water. Past discharges may have included a variety of aquatic pollutants. Influent of process water from the MTA is via Rowland Ditch from Retention Reservoir to Woods Reservoir. Previous studies have found PCBs and metals in sediments.	**LUC.** Process water is being recycled and reused; water is pumped back into the MTA processes and reused as noncontact cooling water.
WP002	SWMU 4	J-4 Test Cell Drainage Area	Drainage ditch carries J-4 groundwater discharge from the J-4 area to the Retention Reservoir.	**LUC.** J-4 groundwater discharge treatment plant began operating in late 1990s. Treats water during normal cell operations; peak flows bypass system.
LF003	SWMU 5	Coffee County Landfill	The landfill was operated by local municipalities from 1971 to1989 when it received municipal and industrial waste from surrounding communities. Operated as an unlined-trench landfill. Contaminants of concern—chlorinated volatile organic compounds—have migrated via both soil gas and groundwater movement.	**RAO.** Groundwater extraction and treatment systems were installed along the west side of the landfill as part of a treatability study associated with the Focused Field Investigation (1993) and have been in operation since 1995. The systems were upgraded as a final measure in 2004 to provide hydraulic containment of groundwater at the landfill boundary.
SD004	SWMU 6	Bradley Creek Drainage Area	Bradley Creek receives cooling water and runoff from MTA.	**LUC.** Hydraulic control and a pump-back station were installed in 1996. Signs were posted in 2005 and a Statement of Basis was drafted in February 2005.

ERP Site	SWMU	Site Name	Description	Status
WP006	SWMU 8	Former Camp Forrest Water Treatment Plant	Building was demolished after WWII, but sedimentation basins, filter cells, and clear wells were left in place. Between 1953 and 1980, the concrete tanks were used for disposal of wastes, including solvents, rocket fuels, and acids. These activities resulted in releases of contaminants to the subsurface.	**RAO.** Aboveground concrete structures of former WTP were demolished in 1981. Site was graded and covered with native soil in 1986. Belowground clear well of former WTP was demolished, filled, and capped in 1995. Groundwater extraction and treatment began in 1997; expanded in 1998. Public water lines were extended to residents in 2000. Test pits were excavated into the former WTP structure in 2002 to evaluate the contents of the concrete structure.
WP008	SWMU 10	Former Leach Pit No. 1	Former location of the Vapor Degreaser Facility and Leach Pit No. 1. Leach pit operated from 1950s to 1972. Chlorinated solvents and acids were discharged into the pit. Contaminants detected included DNAPLE and VOC.	**RAO**. Source area shallow soils were remediated in 1995. A shallow groundwater solvent recovery system and groundwater treatment unit was installed within source area. Hydraulic containment of shallow aquifer is ongoing. Downgradient intermediate aquifer extraction system was installed. Thermal remediation was performed between 2010 and 2011.
SD009	SWMU 11	Brumalow Creek Drainage Area	The Brumalow Creek drainage area begins in the southern section of the MTA. It flows through a skimmer pond after leaving the MTA, then flows southward to Woods Reservoir. Discharges from the skimmer pond are monitored through a NPDES permit.	**LUC.** Hydraulic control and a pump-back station were installed in 1996.
FT010	SWMU 12	Fire Protection Area No. 2	Gravel-lined burn area approximately 30 feet in diameter and 0.5 acre in area. Materials burned include JP-4 fuel, waste oils, thinners, solvents, halon, aqueous film-forming foam, dry chemicals, and sodium and potassium alloys.	**LTM.** 1993 SWMU capped.
FT010	SWMU 13	Burn Area No. 1	Opened unlined trench, approximately 0.3 acre in area. Materials burned include waste oils, solvent, thinners, fuels, and solid wastes.	**LTM.** 1993 SWMU capped.
FT010	SWMU 14	Landfill No. 1	Unlined landfill approximately 2 acres in area. Accepted facility refuse, garbage, coal ash, construction debris, and metal shop wastes (fuels, oils, solvents, thinners, and other combustible wastes).	**LTM.** 1993 SWMU Capped

ERP Site	SWMU	Site Name	Description	Status
WP012	SWMU 16	Former Leach/Burn Area	The site consisted of a concrete pad and a concrete culvert that discharged into a soil depression. The site was used to transfer fuels between trucks and to burn and leach small amounts of fuels and propellants.	**LTM.** In 1993, contaminated soils were removed to the water table and replaced with clean soils. The site is currently covered with grass, and adjacent areas are wooded.
SS019	SWMU 24	Camp Forrest RFI No. 4	Camp Forrest is a former WWII-era Army Training Base and POW Camp. Eighty-five potentially contaminated sites were identified including former gas stations, motor pools, warehouses, fuel storage areas, landfills, etc. Potential contaminants of concern included metals, VOCs, semivolatiles, pesticides, fuels, and asbestos.	**LTM.** Confirmatory sampling was completed in 1994. Results were reevaluated in 2000 to compare to current background and regulatory values. Asbestos-containing building material has been consolidated and signs posted. A fence has been constructed around the former incinerator and ash landfill. Contaminated surface soil and asbestos-containing material have been removed.
WP020	SWMU 25	Steam Plant Ash Pits	The steam plant ash pits were located south of 5th Street in the MTA. There were three interconnected below-grade steel hoppers and pits used to dispose of coal ash by mixing it with water to form a slurry, which was discharged into a drainage ditch before discharging into Brumalow Creek. The pits also received waste oil contaminated with PCBs.	**LUC.** The pits have been filled in, but the drainage ditch remains. No interim corrective measures have been completed.
SD009	SWMU29	Hunter's Road Site	A 2.4-mile-long gravel road, mainly used by hunters during select times of the year. Waste oil and oil/water mixtures that may have contained PCBs were applied to the road for dust control from the mid-1960s until 1979.	**LUC.** Access is now limited by a locked cable gate near Wattendorf Highway, except when access is permitted during hunting season.
SS022	SWMU 44, 49, 59, & 62	Satellite Accumulation Areas and Drip Pans	Satellite accumulation areas are located in MTA. SWMU 44 consists of a former drum storage rack where isopropyl alcohol and varsol were reportedly stored. SWMU 49 consists of drums that formerly stored waste oil and Freon. Former drip pans are located in MTA west of Building 640 and beneath the Propulsion Wind Tunnel. Each of these sites contained drum storage racks, and VOCs were found in soils at both sites.	**LTM.** Drums at both Satellite Accumulation Areas were removed in the early 1990s and VOCs were found in soil at both sites. At SWMU 49, ongoing building sump is pumped for protection of Mark I structure. Drums at both drip pan sites were also removed in the early 1990s. At SWMU 59, ongoing J-4 Cell is being pumped.

ERP Site	SWMU	Site Name	Description	Status
WP008	SWMU 68	Chemical/ Metallurgical Laboratory Accumulation Area	Located adjacent to the northwest side of the Chemical/Metallurgical Laboratory and roughly 250 feet southeast of SWMU 10. Area was used for temporary storage of hazardous material (asbestos, waste oil, solvents, acids, and other solid and liquid wastes).	**LUC.** Area is fenced and LUC inspections take place annually.
SS022	SWMU 74	Main Test Area Northwest Plume	SWMU 74 has been defined as "Undifferentiated Contaminated Groundwater" beneath the base. Sources are believed to be SWMUs 1 and 2, MTA, and possibly Retention Reservoir. VOCs have been detected in two private wells (one is being used) and in springs at Rutledge Falls.	**RAO.** Groundwater extraction and treatment has been completed at the J- 4 Test Cell, ASTF, SWMUs 1 and 2, ETF, and at Gossick Road near the AEDC airfield. Extraction and treatment continues at Gossick Road (2020).
ED-C501	SWMU 98	Former Explosive Ordnance Disposal Range	The SWMU is located in an open field south of the airstrip. Material treated in excavated trenches at the site included a variety of munitions, chemicals, and rocket propellants. Commingled fuel (JP-4 and gasoline) were used as igniter during ordnance burns; chlorinated solvents were likely mixed into the fuel during treatment.	**LTM.** A source area treatability study has been completed to remediate perchlorate concentrations in groundwater through substrate injection and enhanced biodegradation, Additional substrate was injected in October 2011 in the former injection wells and six additional downgradient wells to complete remediation at the site.
OW001	SWMU 99	Bulk Fuel Farm Oil/Water Separator	In 2002, the OWS transfer pump malfunctioned and the contents of the OWS overfilled. The fuel and water contents of the separator seeped from the pump access chamber to the surrounding subsurface soils and into the edge of the drainage ditch approximately 20 feet away.	**LUC.** Groundwater in the immediate vicinity is collected in a sump and sent to an OWS.
SS-C504	SWMU 100	ASTF Air Supply Building and Yard	This site includes the ASTF Air Supply Building and Air Supply Yard, both located within the western section of the test facility. Releases of TCE have reportedly occurred inside the Air Supply Building, and from tanks RC14 and RC13. Hydraulic oil releases have occurred over time at the pumping pads located near the northern and southern ends of the yard.	**LTM.** A Water Management System has been implemented, which collects stormwater and groundwater in the subgrade and treats this water via air stripping technology prior to discharge to Rowland Ditch. The north sump has been upgraded to detect TCE spill and pump to an isolated aboveground storage tank.

ERP Site	SWMU	Site Name	Description	Status
SS025	SWMU 101	Engine Test Facilities Area	Five underground tanks once received waste fuels from test cells, the test fuel tank farm, and the process/storage tanks. Past potential contaminant releases include: spills/leaks of TCE and mercury within and surrounding the AC&T Building; PCB and Freon releases near the J-3 Test Cell; jet fuel leaks near the Fuel Farm; releases of TCE associated with the former vapor degreasing unit located in the Shop Building; and releases to the ground surface from various liquid release pipes.	**LTM.** A total of 16 areas required soil excavation and disposal (approximately 180 cubic yards) because of elevated levels of VOCs, SVOCs, PCBs, and lead.
SS026	SWMU 102	Propulsion Wind Tunnel Facility	The Propulsion Wind Tunnel Area is located within the eastern portion of the MTA. The primary contaminants associated with SWMU 102 include chlorinated solvents and petroleum compounds.	**LTM.** A total of 4 areas required soil excavation and disposal (approximately 7 cubic yards) because of elevated levels of PCBs and benzo(a)pyrene. Shallow soil and groundwater investigation took place within southern section of site in December 2004.
LF001	C	Nursery	Approximately 2.5-acre plant nursery and pesticide mixing area.	**LUC.**
PL001	N	ASTF Fuel Pipeline Header Leak	Commingled fuel from the bulk farm to the ASTF heaters located at ETF-C plan was released during a pressure test of the line in 2012.	**LTM.** Contaminated soils were removed from site, however, some chlorinated solvents and petroleum compounds remain at the site.
DA201P		BFF Foam House/Tank Dike 21	Building 1576 (Bulk Fuel Farm Foam House) contained an AFFF fire suppression system. AFFF was accidentally discharged to the ground just outside of the building during annual system testing in 1996. The building has floor drains that discharge to an OWS, with flow to a ditch that leads to a nearby retention reservoir to the west. Tank Dike 21 is a concrete dike that captures AFFF during system checks and contains a drain that leads to the stormwater drainage system that ultimately discharges to a ditch leading to the nearby retention reservoir to the west.	**RI.** Area is currently being investigated to determine extent of contamination in surface and groundwater.
DA202P		Fire Truck Operational Checks Area	When the airfield was operational (1965-2009), a fire truck was stationed at the parking area at the airfield between Buildings 2303 and 2315. The parking area is	**RI.** Area is currently being investigated to determine extent of contamination in surface and groundwater.

ERP Site	SWMU	Site Name	Description	Status
			paved and a ditch runs north along the western edge of the parking area. Base water well 17 (not currently operational) is located at the south end of the parking area. Daily operational checks for the fire truck were performed on the paved parking area.	
DA203P		Current Fire Training Area	The Current FTA replaced FTA No. 2 in the late 1980s, and was last used in 1996. The FTA consisted of an approximately 60-foot-diameter gravel-filled area with a small concrete containment berm. AFFF likely was used at this location and may have been released outside of the containment area.	**RI.** Area is currently being investigated to determine extent of contamination in surface and groundwater.
TG027		Artillery Impact Area North	A total of 612 acres of which 50 craters were investigated and Munitions Debris (MD) was found. No Munitions and Explosives of Concern (MEC) were found. The MMRP CSE Phase II recommended continuation to the next phase to perform evaluation. A Phase I and Phase II RI was conducted in 2012 to 2013 and there is currently an RI, IRA, FS, PP, and ROD. Project was completed in June 2017. A DD was signed in July 2017 and this site was cleared for UXOs at designated grids (fieldwork ended November 2017) and is under LUCs.	**LUC.** Semiannual.
TG028		Old Impact Area South	This site consists of 538 acres of which approximately 506 acres have been surface cleared. A Phase I and Phase II RI was conducted in 2012 to 2013 and there is currently an RI, IRA, FS, PP, and ROD Project were completed in June 2017. A DD was signed in July 2017 and this site is now under LUCs.	**LUC** Semiannual
TG028A		Impact Buffer Zone Area	This site consists of 206.8 acres of which 10 craters have been investigated. MD and UXO were identified. MC were identified below residential screening levels. A Phase I and Phase II RI was conducted in 2012 to 2013 and an RI, IRA, FS, PP, and a ROD Project were completed in June 2017. A DD was signed in July 2017 and this site is now under LUCs.	**LUC.** Semiannual.

ERP Site	SWMU	Site Name	Description	Status
TG028B		Training and Maneuver Area within the Old Impact Area South	This MRA consists of 1,376.9 acres and was not recommended to proceed to the next phase in the CSE Phase II report resulting in NFA from TDEC. Subsequent investigations of neighboring TG028A, however, found MEC and MD on the TG028A and TG028B range boundary. Some acreage will be transferred to TG028A.	**LUC.** Semiannual.
TM720A		Old Camp Forrest Maneuver Area	This site consists of 20,632 acres east of Camp Forrest. MEC and UXO were found in 2009 and 2010 and during a CSE Phase I and II in January and February 2011 in this 1,000-acre MRS. There was a surface clearance of 35 acres along an historical tank trail and 27 miles of recreational trails were surface cleared 100 feet out from the centerline. A CSE Phase I and II were conducted in 2011 to 2013 and a RI, IRA, FS, PP, and ROD Project were completed in June 2017. A DD was signed in July 2017 and this site is now under LUCs.	**LUC** Semiannual

Source: Arnold AFB 2012

Status: **LUC** – Land Use Controls; **LTM** – Long Term Monitoring; **RAO** – Remedial Action Operation; **ERP**– Environmental Restoration Program; **SWMU** – Solid Waste Management Unit; **AFB** – Air Force Base; **MTA** – Main Test Area; **PCB** – polychlorinated biphenyl; **WWII** – World War II; **WTP** – Water Treatment Plant; **DNAPL** – Dense Non-Aqueous Phase Liquid; **VOC** – volatile organic compound; **NPDES** – National Pollutant Discharge Elimination System; **POW** – prisoner of war; **AEDC** – Arnold Engineering Development Complex; **OWS** – oil-water separator; **ASTF** – Aeropropulsion System Test Facility; **TCE** – trichloroethylene; **SVOC** – semivolatile organic compound; **BFF** – Bulk Fuel Farm; **FTA** – Fire Training Area; **MD** – munitions debris; **MEC** – munitions and explosives of concern; **RI** – remedial investigation; **ROD** – Record of Decision; **DD** – Decision Document; **UXO** – unexploded ordnance; **LUC** – land use controls; **TDEC** – Tennessee Department of Environmental Conservation;

References

Arnold Air Force Base (AFB). 2020. Installation Restoration Plan (IRP) Facility Action Plan.

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Air Conformity Applicability Model Report
Record of Air Analysis (ROAA)

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AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF AIR ANALYSIS (ROAA)

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:

Base: ARNOLD AFB
State: Tennessee
County(s): Coffee; Franklin
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Arnold AFB IDP EA

c. Project Number/s (if applicable): Arnold AFB IDP EA

d. Projected Action Start Date: 1 / 2021

e. Action Description:

Arnold AFB IDP EA

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the General Conformity Rule are not applicable. Total net direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the start of the action through achieving "steady state" (i.e., net gain/loss upon action fully implemented) emissions. The ACAM analysis used the latest and most accurate emission estimation techniques available; all algorithms, emission factors, and methodologies used are described in detail in the USAF Air Emissions Guide for Air Force Stationary Sources, the USAF Air Emissions Guide for Air Force Mobile Sources, and the USAF Air Emissions Guide for Air Force Transitory Sources.

"Insignificance Indicators" were used in the analysis to provide an indication of the significance of potential impacts to air quality based on current ambient air quality relative to the National Ambient Air Quality Standards (NAAQSs). These insignificance indicators are the 250 ton/yr Prevention of Significant Deterioration (PSD) major source threshold for actions occurring in areas that are "Clearly Attainment" (i.e., not within 5% of any NAAQS) and the GCR de minimis values (25 ton/yr for lead and 100 ton/yr for all other criteria pollutants) for actions occurring in areas that are "Near Nonattainment" (i.e., within 5% of any NAAQS). These indicators do not define a significant impact; however, they do provide a threshold to identify actions that are insignificant. Any action with net emissions below the insignificance indicators for all criteria pollutant is considered so insignificant that the action will not cause or contribute to an exceedance on one or more NAAQSs. For further detail on insignificance indicators see chapter 4 of the Air Force Air Quality Environmental Impact Analysis Process (EIAP) Guide, Volume II - Advanced Assessments. The action's net emissions for every year through achieving steady state were compared against the Insignificance Indicator and are summarized below. None of estimated annual net emissions associated with this action are above the insignificance indicators, indicating no significant impact to air quality.Therefore, the action will not cause or contribute to an exceedance on one or more NAAQSs.No further air assessment is needed.

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF AIR ANALYSIS (ROAA)

All Construction Emissions Combined in to a Single Year

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	3.673	250	No
NOx	6.718	250	No
CO	7.516	250	No
SOx	0.017	250	No
PM 10	17.315	250	No
PM 2.5	0.298	250	No
Pb	0.000	25	No
NH3	0.005	250	No
CO2e	1696.0		

Operational Emissions

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.252	250	No
NOx	1.623	250	No
CO	1.215	250	No
SOx	0.181	250	No
PM 10	0.246	250	No
PM 2.5	0.246	250	No
Pb	0.000	25	No
NH3	0.000	250	No
CO2e	1015.5		

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location
Base: ARNOLD AFB
State: Tennessee
County(s): Coffee; Franklin
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Arnold AFB IDP EA

- Project Number/s (if applicable): Arnold AFB IDP EA

- Projected Action Start Date: 1 / 2021

- Action Purpose and Need:
Arnold AFB IDP EA

- Action Description:
Arnold AFB IDP EA

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Arnold AFB IDP EA - ALL Construction, Demolition, and Paving
3.	Heating	Heating of Buildings
4.	Emergency Generator	Back-Up Genrators
5.	Tanks	Tanks

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location
County: Coffee; Franklin
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Arnold AFB IDP EA - ALL Construction, Demolition, and Paving

- Activity Description:

Project Number Clearing and Grading Building Construction Trenching Architectural Coating Paving

New Construction
ANZY980175 57,064 57,064 0 0 0 0
ANZY060046 60,818 0 1,000 500 0 1,000
ANZY960128 4,444 8,887 4,444 267 4,444 2,222
ANZY149006 14,325 28,650 14,325 479 14,325 7,162
ANZY009139 1,110 2,219 1,110 133 1,110 555
ANZY073001 44,013 88,026 44,013 839 44,013 22,006
ANZY189060 2,956 5,912 2,956 217 2,956 1,478

ANZY010027A 78 78 0 0 0 0
ANZY020049 2,727 5,454 2,727 209 2,727 1,363
ANZY169004 103,036 206,071 103,036 1,284 103,036 51,518
ANZY180017 18,616 37,232 18,616 546 18,616 9,308
ANZY040045 5,207 10,415 5,207 289 5,207 2,604
ANZY080033 1,467,684 0 0 5,700 0 0
ANZY119050 18,855 37,709 18,855 549 18,855 9,427
ANZY180010 1,971 3,942 1,971 178 1,971 986
ANZY180022 17,147 17,147 0 0 0 17,147
ANZY189067 1,426 2,852 1,426 151 1,426 713
ANZY030047A 811,697 0 5,000 0 0 0
ANZY149046 41,250 0 0 5,000 0 0
ANZY1500261 616,881 0 0 61,700 0 0
Total 511,658 224,684 78,040 218,684 127,489

Demolition

ANZY152004 3,449
ANZY142002 2,016
ANZY132009 10,012
ANZY070055 4,709
ANZY122003 54,827
ANZY010067P 1,637
Total 76,649

Renovations and Paving

ANZY950085 54,098
ANZY169010 20,011
ANZY110022 19,066
ANZY190012 448,398
ANZY060028 3,397
ANZY080025 12,415
ANZY100034 39,380
ANZY110068 17,411
ANZY060075 184,373
Total 798,548

- Activity Start Date

Start Month: 1
Start Month: 2021

- Activity End Date

Indefinite: False
End Month: 12
End Month: 2021

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	3.672830
SO_x	0.017448
NO_x	6.717585
CO	7.516066
PM 10	17.315207

Pollutant	Total Emissions (TONs)
PM 2.5	0.298439
Pb	0.000000
NH_3	0.005156
CO_2e	1696.0

2.1 Demolition Phase

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

2.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 12
Number of Days: 0

2.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 76649
Height of Building to be demolished (ft): 12

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Excavators Composite	3	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0443	0.0006	0.3176	0.3761	0.0170	0.0170	0.0040	58.563
Excavators Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0687	0.0013	0.3576	0.5112	0.0158	0.0158	0.0062	119.73
Rubber Tired Dozers Composite								

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.283	000.002	000.217	003.292	000.007	000.006		000.023	00324.051
LDGT	000.361	000.003	000.383	004.629	000.009	000.008		000.024	00417.982
HDGV	000.727	000.005	001.011	015.230	000.021	000.019		000.045	00771.997
LDDV	000.109	000.003	000.133	002.561	000.004	000.004		000.008	00314.635
LDDT	000.249	000.004	000.379	004.384	000.007	000.006		000.008	00446.751
HDDV	000.510	000.013	004.987	001.786	000.170	000.156		000.029	01506.976
MC	002.595	000.003	000.737	013.274	000.028	000.024		000.054	00396.864

2.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards ($1\ yd^3 / 27\ ft^3$)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.2 Site Grading Phase

2.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 3
Number of Days: 0

2.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 511658
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	1	8
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Scrapers Composite	2	8
Tractors/Loaders/Backhoes Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Excavators Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0687	0.0013	0.3576	0.5112	0.0158	0.0158	0.0062	119.73
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1814	0.0026	1.2262	0.7745	0.0491	0.0491	0.0163	262.89
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.283	000.002	000.217	003.292	000.007	000.006		000.023	00324.051
LDGT	000.361	000.003	000.383	004.629	000.009	000.008		000.024	00417.982
HDGV	000.727	000.005	001.011	015.230	000.021	000.019		000.045	00771.997
LDDV	000.109	000.003	000.133	002.561	000.004	000.004		000.008	00314.635
LDDT	000.249	000.004	000.379	004.384	000.007	000.006		000.008	00446.751
HDDV	000.510	000.013	004.987	001.786	000.170	000.156		000.029	01506.976
MC	002.595	000.003	000.737	013.274	000.028	000.024		000.054	00396.864

2.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.3 Trenching/Excavating Phase

2.3.1 Trenching / Excavating Phase Timeline Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 2
Number of Days: 0

2.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 78040
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Excavators Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0687	0.0013	0.3576	0.5112	0.0158	0.0158	0.0062	119.73
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61
Rubber Tired Dozers Composite								

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1814	0.0026	1.2262	0.7745	0.0491	0.0491	0.0163	262.89
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.283	000.002	000.217	003.292	000.007	000.006		000.023	00324.051
LDGT	000.361	000.003	000.383	004.629	000.009	000.008		000.024	00417.982
HDGV	000.727	000.005	001.011	015.230	000.021	000.019		000.045	00771.997
LDDV	000.109	000.003	000.133	002.561	000.004	000.004		000.008	00314.635
LDDT	000.249	000.004	000.379	004.384	000.007	000.006		000.008	00446.751
HDDV	000.510	000.013	004.987	001.786	000.170	000.156		000.029	01506.976
MC	002.595	000.003	000.737	013.274	000.028	000.024		000.054	00396.864

2.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.4 Building Construction Phase

2.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 12
Number of Days: 0

2.4.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 224684
Height of Building (ft): 12
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	7
Forklifts Composite	2	7
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

2.4.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0845	0.0013	0.6033	0.3865	0.0228	0.0228	0.0076	128.82
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0293	0.0006	0.1458	0.2148	0.0056	0.0056	0.0026	54.462
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0362	0.0006	0.2977	0.2707	0.0130	0.0130	0.0032	61.074
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0280	0.0003	0.1634	0.1787	0.0088	0.0088	0.0025	25.665

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.283	000.002	000.217	003.292	000.007	000.006		000.023	00324.051
LDGT	000.361	000.003	000.383	004.629	000.009	000.008		000.024	00417.982
HDGV	000.727	000.005	001.011	015.230	000.021	000.019		000.045	00771.997
LDDV	000.109	000.003	000.133	002.561	000.004	000.004		000.008	00314.635
LDDT	000.249	000.004	000.379	004.384	000.007	000.006		000.008	00446.751
HDDV	000.510	000.013	004.987	001.786	000.170	000.156		000.029	01506.976
MC	002.595	000.003	000.737	013.274	000.028	000.024		000.054	00396.864

2.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.5 Architectural Coatings Phase

2.5.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 3
Number of Days: 0

2.5.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 218684
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.5.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.283	000.002	000.217	003.292	000.007	000.006		000.023	00324.051
LDGT	000.361	000.003	000.383	004.629	000.009	000.008		000.024	00417.982
HDGV	000.727	000.005	001.011	015.230	000.021	000.019		000.045	00771.997
LDDV	000.109	000.003	000.133	002.561	000.004	000.004		000.008	00314.635
LDDT	000.249	000.004	000.379	004.384	000.007	000.006		000.008	00446.751
HDDV	000.510	000.013	004.987	001.786	000.170	000.156		000.029	01506.976
MC	002.595	000.003	000.737	013.274	000.028	000.024		000.054	00396.864

2.5.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

VMT_{WT} = (1 * WT * PA) / 800

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

2.6 Paving Phase

2.6.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2021

- Phase Duration
Number of Month: 3
Number of Days: 0

2.6.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 926037

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Pavers Composite	1	8
Paving Equipment Composite	2	8
Rollers Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.6.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Excavators Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0687	0.0013	0.3576	0.5112	0.0158	0.0158	0.0062	119.73
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0860	0.0014	0.5212	0.5747	0.0247	0.0247	0.0077	132.93
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0533	0.0012	0.3119	0.3497	0.0121	0.0121	0.0048	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2015	0.0024	1.4660	0.7661	0.0581	0.0581	0.0181	239.53
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1814	0.0026	1.2262	0.7745	0.0491	0.0491	0.0163	262.89
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0407	0.0007	0.2505	0.3606	0.0112	0.0112	0.0036	66.890

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.283	000.002	000.217	003.292	000.007	000.006		000.023	00324.051
LDGT	000.361	000.003	000.383	004.629	000.009	000.008		000.024	00417.982
HDGV	000.727	000.005	001.011	015.230	000.021	000.019		000.045	00771.997
LDDV	000.109	000.003	000.133	002.561	000.004	000.004		000.008	00314.635
LDDT	000.249	000.004	000.379	004.384	000.007	000.006		000.008	00446.751
HDDV	000.510	000.013	004.987	001.786	000.170	000.156		000.029	01506.976
MC	002.595	000.003	000.737	013.274	000.028	000.024		000.054	00396.864

2.6.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)

H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / $acre)^2$ / acre)

3. Heating

3.1 General Information & Timeline Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Franklin; Coffee
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Heating of Buildings

- Activity Description:

- Activity Start Date
Start Month: 1
Start Year: 2022

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.041834
SO_x	0.004564
NO_x	0.760618
CO	0.638919
PM 10	0.057807

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.057807
Pb	0.000000
NH_3	0.000000
CO_2e	915.7

3.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 148035
Type of fuel: Natural Gas
Type of boiler/furnace: Industrial (10 - 250 MMBtu/hr)
Heat Value ($MMBtu/ft^3$): 0.00105
Energy Intensity ($MMBtu/ft^2$): 0.1079

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

3.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

3.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year
FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement ($MMBtu/ft^2$)
HV: Heat Value ($MMBTU/ft^3$)
1000000: Conversion Factor

- Heating Emissions per Year

$HE_{POL} = FC * EF_{POL} / 2000$

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

4. Emergency Generator

4.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Franklin
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Back-Up Genrators

- Activity Description:
Possible Back-Up Generaotrs

- Activity Start Date
Start Month: 1
Start Year: 2022

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.209250
SO_x	0.176250
NO_x	0.862500
CO	0.576000
PM 10	0.188250

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.188250
Pb	0.000000
NH_3	0.000000
CO_2e	99.8

4.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 5

- Default Settings Used: No

- Emergency Generators Consumption
Emergency Generator's Horsepower: 300
Average Operating Hours Per Year (hours): 100

4.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

4.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year
$AE_{POL} = (NGEN * HP * OT * EF_{POL}) / 2000$

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

5. Tanks

5.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Coffee
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Tanks

- Activity Description:
Tanks

- Activity Start Date
Start Month: 1
Start Year: 2022

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.000547
SO_x	0.000000
NO_x	0.000000
CO	0.000000

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.000000
Pb	0.000000
NH_3	0.000000
CO_2e	0.0

PM 10	0.000000		

5.2 Tanks Assumptions

- Chemical

Chemical Name:	Jet kerosene (JP-5, JP-8 or Jet-A)
Chemical Category:	Petroleum Distillates
Chemical Density:	7
Vapor Molecular Weight (lb/lb-mole):	130
Stock Vapor Density (lb/ft^3):	0.000170775135930213
Vapor Pressure:	0.00725
Vapor Space Expansion Factor (dimensionless):	0.068

- Tank

Type of Tank:	Horizontal Tank
Tank Length (ft):	20
Tank Diameter (ft):	5
Annual Net Throughput (gallon/year):	50

5.3 Tank Formula(s)

- Vapor Space Volume

VSV = (PI / 4) * D^2 * L / 2

VSV: Vapor Space Volume (ft^3)
PI: PI Math Constant
D^2: Tank Diameter (ft)
L: Tank Length (ft)
2: Convertion Factor (Vapor Space Volume is assumed to be one-half of the tank volume)

- Vented Vapor Saturation Factor

VVSF = 1 / (1 + (0.053 * VP * L / 2))

VVSF: Vented Vapor Saturation Factor (dimensionless)
0.053: Constant
VP: Vapor Pressure (psia)
L: Tank Length (ft)

- Standing Storage Loss per Year

SSL_{VOC} = 365 * VSV * SVD * VSEF * VVSF / 2000

SSL_{VOC}: Standing Storage Loss Emissions (TONs)
365: Number of Daily Events in a Year (Constant)
VSV: Vapor Space Volume (ft^3)
SVD: Stock Vapor Density (lb/ft^3)
VSEF: Vapor Space Expansion Factor (dimensionless)
VVSF: Vented Vapor Saturation Factor (dimensionless)
2000: Conversion Factor pounds to tons

- Working Loss Turnover (Saturation) Factor per Year

WLSF = 1

WLSF: Working Loss Turnover (Saturation) Factor per Year

- Working Loss per Year

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

WL_{VOC} = 0.0010 * VMW * VP * ANT * WLSF / 2000

0.0010: Constant
VMW: Vapor Molecular Weight (lb/lb-mole)
VP: Vapor Pressure (psia)
ANT: Annual Net Throughput
WLSF: Working Loss Turnover (Saturation) Factor
2000: Conversion Factor pounds to tons

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