U.S. ARMY CYBER GROWTH
PROGRAMMATIC ENVIRONMENTAL ASSESSMENT

Fort Gordon, Georgia

April 2020

DRAFT

FINDING OF NO SIGNIFICANT IMPACT
U.S. ARMY CYBER GROWTH PROGRAMMATIC ENVIRONMENTAL ASSESSMENT
Fort Gordon, Richmond, Jefferson, Columbia, and McDuffie Counties, Georgia

1. **Name of Action:** U.S. Army Cyber Growth Programmatic Environmental Assessment

2. **Background Information:** This Draft Finding of No Significant Impact (FNSI) evaluates the environmental and socioeconomic impacts associated with the Proposed Action and alternatives for a range of potential stationing actions at Fort Gordon, Georgia (USAGFG), related to cyber support, such as the U.S. Army Cyber Command / 2nd Army (ARCYBER) Cyber Warfare Support Battalion (CWB). These actions are collectively termed "Cyber Growth." The PEA also evaluates developable acreage and the installation's capacity for growth. Where activities are similar in nature, broad in scope, or at the planning level, applicable National Environmental Policy Act (NEPA) regulations authorize programmatic environmental review as a means to eliminate repetitive discussions of the same issues. As more detailed information for individual stationing actions becomes available, a Record of Environmental Consideration would be prepared, tiered off of this PEA. More in-depth NEPA analysis, such as a supplemental Environmental Assessment, would be required if an activity is planned at a location that is not considered in the PEA, if the sum of activities exceeds those identified in the Proposed Action, or if the action does not meet the screening criteria in 32 CFR 651, Subpart D.

3. **Description of Proposed Action:** The Proposed Action is to increase staffing by up to 5,000 personnel, and it includes the renovation of existing facilities and construction of new facilities needed to adequately house and support the elements being stationed or realigned to USAGFG. The majority of the facilities to be built or renovated would be located within the cantonment area, but some may be located in the adjacent trainings areas.

   In order to support the ARCYBER mission better, elements of a number of supporting and cyber security-related organizations are expected to realign by either moving to USAGFG or increasing personnel in units already stationed on USAGFG. One such supporting unit would be the Cyber Warfare Support Battalion (CWB), which is proposed to be stationed at USAGFG in Fiscal Year (FY) 2021. In addition, some stationing actions not related to ARCYBER may also occur.

   Some additional organizations that may increase personnel at USAGFG include, but are not limited to:

   - Army Intelligence and Security Command (INSCOM)
   - NSA
   - Navy
   - U.S. Army National Guard
   - Other Department of Defense (DoD) active and reserve services

4. **Alternatives Evaluated:** The No Action Alternative and two action alternatives were presented and discussed in this PEA:

   - *High Growth Alternative* – This alternative would increase personnel at USAGFG by up to 5,000 active duty, civilians, and government contractors, and would require the renovation and/or construction of up to 850,000 square feet (sf) of facilities on up to 1,700 acres of land.

   - *Low Growth Alternative* – This alternative would increase personnel at USAGFG by up to 2,000 and would require the renovation and/or construction of up to 350,000 sf of facilities on up to 800 acres of land.

5. **Development Categories:** The PEA evaluated areas that the scoping process deemed to be buildable acreage within the cantonment areas and several adjacent training areas for conducting the types of activities expected to come to USAGFG as part of Cyber Growth. Buildable acreage tracts are categorized as being in one of three categories based on environmental and other constraints:

   - *Green* – areas having no or minor adverse environmental or other constraints.

   - *Amber* – areas having minor to moderate environmental or other constraints that could be mitigated for or overcome through design or engineering solutions.

   - *Red* – areas having major environmental or other constraints that would require major changes to land use or existing facilities, or that would have significant impacts without extensive mitigation measures.

   The Green-Amber-Red development categories would be used to aid in locating projects according to levels of potential environmental impacts and mitigation required. The decision hierarchy would be Green, Amber, and Red, respectively, for new construction. Any growth alternatives could have actions occurring in any of the three development categories.

6. **Anticipated Impacts:** Table 1 provides a summary of the potential environmental and cumulative impacts associated with the implementation of the No Action and High Growth Alternatives. It is understood that the correlation can be made that lower growth alternatives would have less impacts as there would be less growth. Accordingly, if the High Growth Alternative would not produce significant adverse impacts, neither would the Low Growth Alternative.

   As noted in Section 3.0 of the PEA, there would be expected minor adverse impacts to land use, visual resources and aesthetics, air quality, noise, geology and soils, groundwater, surface water, biological resources, infrastructure and utilities, public health and safety, family support services, and recreational facilities from the construction of any of the alternatives; minor impacts, both adverse and beneficial, would also occur to housing and schools; minor beneficial impacts to environmental justice and protection of children; and minor adverse impacts, after mitigation, to traffic would also be expected. There would be negligible impacts to stormwater, wetlands, floodplains, and cultural resources; and minor overall cumulative impacts, both adverse and beneficial, would be expected for any of the proposed alternatives.

Potential adverse impacts to traffic would be reduced to minor levels through mitigation. While implementation of the Proposed Action has the potential to result in adverse traffic effects to select intersections, there are ongoing traffic mitigation projects based on the traffic study in Appendix B. These projects are expected to lessen the projected traffic impacts and Fort Gordon will evaluate the need for further traffic mitigation as construction of Cyber Growth projects progresses.

No significant adverse impacts have been identified for any of the other resources described in the PEA.

7. **Public Involvement:** The Final PEA and draft FNSI were made available to Federal, state, and local agencies, Native American tribes, and the public for review and comment for 30 days. A Notice of Availability for the PEA and draft FNSI was published in the *Augusta Chronicle*. During the public review and comment period, copies of the PEA were made available on USAGFG's website, USAGFG's Facebook page, and the Environmental Division's Green Matters Facebook page. During and immediately following this public comment period, the Army collected, logged, and incorporated any comments received into the PEA and FNSI as necessary. Assuming no additional significant impacts emerge during the comment period, the Army will prepare and release a final FNSI (and final EA, if necessary) to the appropriate local, state, and Federal repositories after receiving all comments.

8. **Conclusion:** After a review of the PEA, which is incorporated by reference, and all of the public comments received by USAGFG, the Army has concluded that no significant adverse environmental or socioeconomic impacts are likely to result from implementation of the Proposed Action under either of the alternatives analyzed. Therefore, an EIS is not required, and will not be prepared.

   Appropriate supplemental NEPA analysis and documentation may need to be prepared at the installation as more details on implementing the Proposed Action become available.

Date: _____ _____

JAMES S. CLIFFORD
COLONEL, SC
Commanding
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Table 1: SUMMARY OF POTENTIAL INDIVIDUAL AND CUMULATIVE EFFECTS ON ENVIRONMENTAL RESOURCES

Resource Area	Potential Impacts	
	High Growth Alternative	**No Action Alternative**
Air Quality	Minor adverse impacts	No potential adverse impacts
Biological Resources	Minor adverse impacts	No potential adverse impacts
Cultural Resources	Negligible impacts expected; subsequent NEPA will be completed if adverse impact is determined	No potential adverse impacts
Cumulative Impacts	Minor overall impacts	No potential adverse impacts
Environmental Justice, Socioeconomics, and Protection of Children	Minor adverse impacts to public health and safety, family support services, and recreational facilities; Minor impacts, both adverse and beneficial, to housing and schools; Minor beneficial impacts to environmental justice and protection of children	No potential adverse impacts
Geology and Soils	Minor adverse impacts	No potential adverse impacts
Infrastructure and Utilities	Minor adverse impacts	No potential adverse impacts
Land Use	Minor adverse impacts	No potential adverse impacts
Noise	Minor adverse impacts	No potential adverse impacts
Traffic and Roadways	Minor adverse impacts after mitigation	No potential adverse impacts
Visual Resources and Aesthetics	Minor adverse impacts	No potential adverse impacts
Wetlands and Water Resources	Minor adverse impacts to ground water and surface water; Negligible impacts to stormwater, wetlands, and floodplains	No potential adverse impacts

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U.S. Army Garrison Fort Gordon, Georgia

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EXECUTIVE SUMMARY

INTRODUCTION

The Army will potentially conduct stationings and realignments resulting in force increases at U.S. Army Garrison Fort Gordon (USAGFG). Many of these will be in response to the growing need for cyber support, such as the U.S. Army Cyber Command / 2nd Army (ARCYBER) Cyber Warfare Support Battalion (CWB), so these actions are collectively referred to as "Cyber Growth." These actions would increase the number of active duty military, government civilians, and contractors at USAGFG by the end of Fiscal Year (FY) 2025. The increase in personnel would lead to additional space and mission requirements. The Proposed Action includes the renovation of existing facilities and construction of new facilities needed to adequately house and support the elements being re-stationed or realigned to USAGFG. The majority of these facilities would be located within the cantonment area, particularly in the West District, but some may be located in adjacent training areas (TAs).

This Programmatic Environmental Assessment (PEA) has been prepared to analyze the potential environmental, cultural, traffic, and socioeconomic effects associated with the anticipated growth of up to 5,000 personnel at USAGFG required to stand up the ARCYBER CWB, staff other supporting units, and meet other stationing needs across the installation. In addition to the increase in workforce, additional facilities and infrastructure at USAGFG are needed to support this growth.

This PEA was prepared pursuant to the National Environmental Policy Act (NEPA) of 1969 (42 United States Code Section 4321 *et seq.*); the Council on Environmental Quality (CEQ) regulations that implement NEPA (40 Code of Federal Regulations [CFR] 1500-1508); and 32 CFR 651, *Environmental Analysis of Army Actions*.

BACKGROUND AND SETTING

Camp Gordon, now USAGFG, was established in 1941 and encompasses approximately 55,600 acres in east central Georgia. The majority of the installation and the entire cantonment area lie within Richmond County, with a small portion of the TA in Jefferson, Columbia, and McDuffie counties. USAGFG is the largest communications training facility (offering 130 courses to 16,000 troops per year) in the Armed Forces, and is the focal point for the development of tactical communications and information systems. USAGFG was designated as the U.S. Army Cyber Center of Excellence in 2014.

PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose of the Proposed Action is to provide an increased workforce of up to 5,000 active duty military, government civilian, and contract personnel at USAGFG necessary to stand up the ARCYBER CWB, staff other supporting units, and meet other stationing needs across the installation. In anticipation of expanding the USAGFG and ARCYBER workforce, additional facilities and infrastructure at USAGFG are needed.

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The Proposed Action is to increase staffing by up to 5,000 personnel, and it includes the renovation of existing facilities and construction of new facilities needed to adequately house and support the elements being stationed or realigned to USAGFG. The majority of these facilities would be located within the cantonment area, particularly in the West District, but some may be located in other parts of the cantonment area and adjacent TAs.

Two action alternatives have been identified to account for variability in growth levels and associated infrastructure upgrades anticipated to occur under the Cyber Growth actions. This PEA identifies where the maximum amount of growth activities could be performed with acceptable levels of impacts. The impact analysis identifies what additional environmental studies and/or approvals may be needed - if any - for the proposed activities to be performed at specific sites. The goal is to identify the maximum amount of developable areas on the installation where the proposed activities can be performed with the least amount of environmental impacts.

Within the Proposed Action, there are two growth levels that will be analyzed over three – Green, Amber, and Red – categories of development.

Proposed Action: To provide an increased workforce on USAGFG to support ARCYBER and other missions, and to construct new facilities and renovate existing facilities in order to adequately support the current and planned workforce.

- Alternative 1 – High Growth Alternative: This alternative would increase personnel at USAGFG by up to 5,000 active duty, civilians, and government contractors, and would require the renovation and/or construction of up to 850,000 square feet (sf) of facilities on up to 1,700 acres of land.

- Alternative 2 – Low Growth Alternative: This alternative would increase personnel at USAGFG by up to 2,000 and would require the renovation and/or construction of up to 350,000 sf of facilities on up to 800 acres of land.

No Action Alternative: Under the No Action Alternative, there would be no increase in personnel at USAGFG as part of the Cyber Growth actions, and existing facilities would continue to be used for the existing workforce. Renovations may be accomplished under this alternative to address space, safety, and function of the current facilities, allowing the existing workforce to continue operations.

SUMMARY OF ENVIRONMENTAL EFFECTS

As detailed in this PEA, there would be expected minor adverse impacts to land use, visual resources and aesthetics, air quality, noise, geology and soils, groundwater, surface water, biological resources, infrastructure and utilities, public health and safety, family support services, and recreational facilities from the construction of any of the alternatives; minor impacts, both adverse and beneficial, would also occur to housing and schools; minor beneficial impacts to environmental justice and protection of children; and minor adverse impacts, after mitigation, to

traffic would also be expected. There would be negligible impacts to stormwater, wetlands, floodplains, and cultural resources; and minor overall cumulative impacts, both adverse and beneficial, would be expected for any of the proposed alternatives.

Potential adverse impacts to traffic would be reduced to minor levels through mitigation. While implementation of the Proposed Action has the potential to result in adverse traffic effects to select intersections, there are ongoing traffic mitigation projects based on the traffic study in Appendix B. These projects are expected to lessen the projected traffic impacts and Fort Gordon will evaluate the need for further traffic mitigation as construction of Cyber Growth projects progresses.

No significant adverse impacts have been identified for any of the other resources described in this PEA.

Table ES-1 summarizes the potential consequences the Proposed Action and No Action Alternative would have on resources evaluated in the PEA.

PUBLIC INVOLVEMENT

The Draft EA and Draft Finding of No Significant Impact (FNSI) were made available for a 30-day public review on USAGFG's website, USAGFG's Facebook page, and the Environmental Division's Green Matters Facebook page. A Notice of Availability of the Draft EA and Draft FNSI was published in the *Augusta Chronicle*. All comments received from agencies and the public during this review period were considered.

CONCLUSION

Based on the evaluation of environmental consequences accomplished by this PEA, implementation of the Proposed Action would not have a significant environmental impact within the meaning of NEPA Section 102(2) (c), and preparation of an Environmental Impact Statement is not required; therefore, a FNSI has been prepared.

Table ES-1: SUMMARY OF POTENTIAL INDIVIDUAL AND CUMULATIVE EFFECTS ON ENVIRONMENTAL RESOURCES

Resource Area	Potential Impacts	
	High Growth Alternative	**No Action Alternative**
Land Use	Minor adverse impacts	No potential adverse impacts
Visual Resources and Aesthetics	Minor adverse impacts	No potential adverse impacts
Air Quality	Minor adverse impacts	No potential adverse impacts
Noise	Minor adverse impacts	No potential adverse impacts
Geology and Soils	Minor adverse impacts	No potential adverse impacts
Wetlands and Water Resources	Minor adverse impacts to groundwater and surface water; Negligible impacts to stormwater, wetlands, and floodplains	No potential adverse impacts
Biological Resources	Minor adverse impacts	No potential adverse impacts
Cultural Resources	Negligible impacts expected; subsequent NEPA will be completed if adverse impact is determined	No potential adverse impacts
Traffic and Roadways	Minor adverse impacts after mitigation	No potential adverse impacts
Infrastructure and Utilities	Minor adverse impacts	No potential adverse impacts
Socioeconomics, Environmental Justice, and Protection of Children	Minor impacts to public health and safety, family support services, and recreational facilities; Minor impacts, both adverse and beneficial, to housing and schools; Minor beneficial impacts to environmental justice and protection of children	No potential adverse impacts
Cumulative Impacts	Minor overall impacts	No potential adverse impacts

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1 PURPOSE, NEED, AND SCOPE

1.1 INTRODUCTION

U.S. Army Garrison Fort Gordon (USAGFG) is the home of the newly established U.S. Army Cyber Center of Excellence, which was previously called the Signal Center of Excellence, and the U.S. Army Cyber Command/2nd Army (ARCYBER). The current workforce on Fort Gordon is made up of approximately 32,595 people, including about 18,580 active duty and reserve military and about 14,015 civilians and contractors (U.S. Army Garrison Fort Gordon [USAGFG], 2019a). As ARCYBER, the National Security Agency (NSA), and other existing units located at USAGFG continue to grow, they will require additional stationing assignments. These additional personnel will include active duty military, government civilians, and contractors. New or upgraded facilities and infrastructure will be needed to adequately support this growth.

1.1.1 Existing Site Details

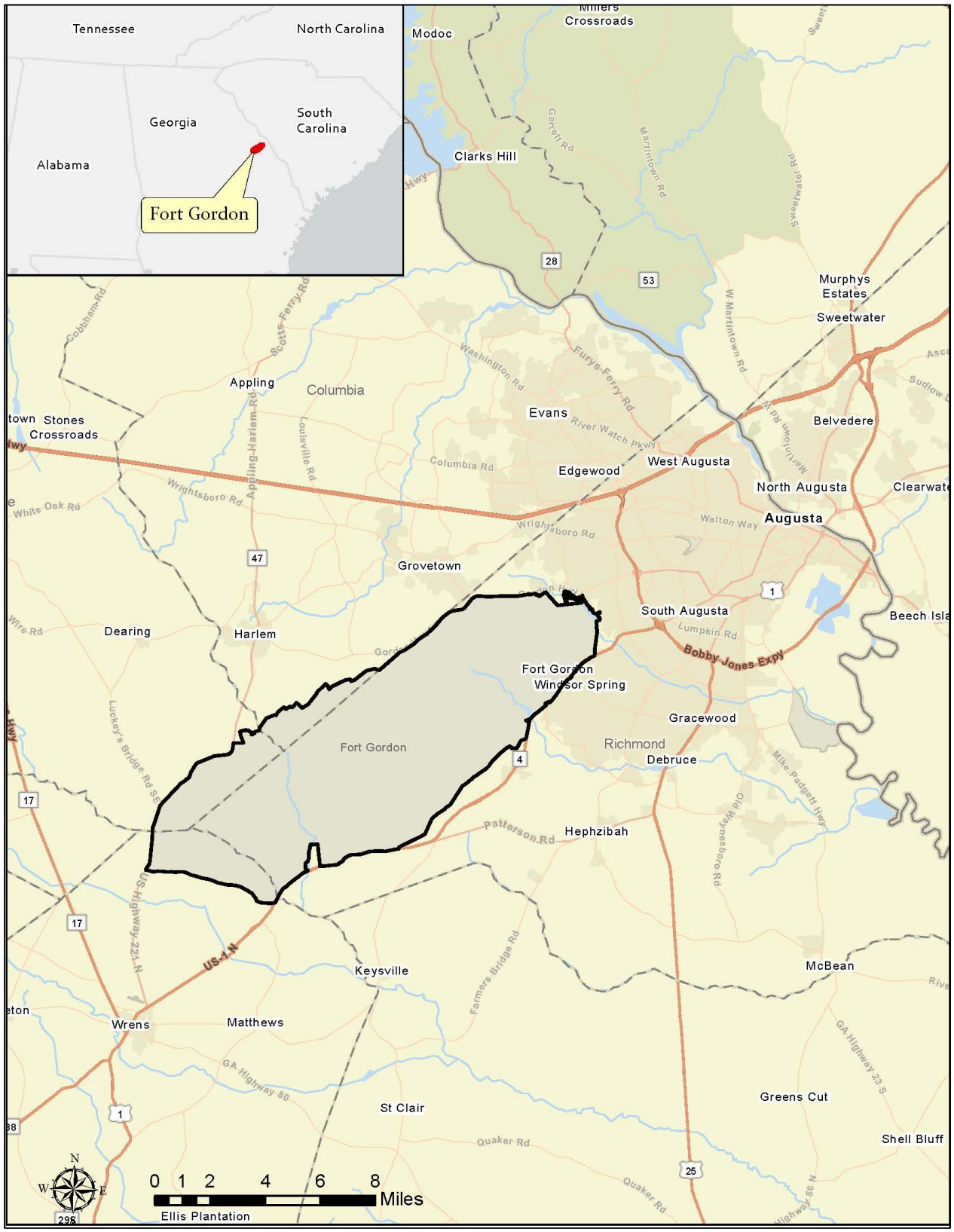
Originally established in 1941, USAGFG encompasses approximately 55,600 acres in east central Georgia. The majority of the installation and the entire cantonment area lie within Richmond County, with a small portion of the training area (TA) in Jefferson, Columbia, and McDuffie Counties (Figure 1-1). As the home to the U.S. Army Signal Corps and ARCYBER, USAGFG is the largest communications training facility in the Armed Forces, offering 130 courses to 16,000 troops each year, and is the focal point for the development of tactical communications and information systems (USAGFG, 2019c). The installation trains soldiers with the most sophisticated communications equipment and technology available. The Leader College of Information Technology is the U.S. Army's premier site for all automation training and home to the Regimental Non-Commissioned Officer (NCO) Academy.

USAGFG is also home to the National Security Agency Georgia (NSAG) (including the 706th Military Intelligence [MI] Group, the Naval Security Group Activity (NSGA), and United States Air Force 480th Intelligence, Surveillance, and Reconnaissance Group), the Southeast Region Medical Command, the Southeast Region Dental Command, the Southeast Region Veterinary Command, the Dwight D. Eisenhower Army Medical Center (DDEAMC), the U.S. Army's only Dental Laboratory, 67th Signal Battalion, the Regional Training Site-Medical, the National Science Center-Army, two deployable brigades (35th Signal Brigade and 513th MI Brigade), and the Georgia National Guard Youth Challenge Academy.

1.2 BACKGROUND

ARCYBER, established in 2010, leads a corps of 21,000 soldiers and civilians who serve worldwide operating and defending all Army networks with supporting organizations such as the Army Network Enterprise Technology Command (NETCOM), 780th MI Brigade, and 1st Information Operations Command. ARCYBER plans, coordinates, integrates, synchronizes, directs, and conducts network operations and defense of all Army networks. When directed, ARCYBER conducts cyberspace operations in support of full spectrum operations to ensure U.S./Allied freedom of action in cyberspace, and to deny the same to our adversaries.

Figure 1-1: Location (Area Map) of Fort Gordon, Georgia



In order to better support the ARCYBER mission, elements of a number of supporting and cyber security-related organizations are expected to realign by either moving to USAGFG or increasing personnel in units already stationed on USAGFG. One such supporting unit would be the Cyber Warfare Support Battalion (CWB), which is proposed to be stationed at USAGFG in Fiscal Year (FY) 2021. This battalion will allow commanders the ability to plan, synchronize, and integrate cyberspace and electromagnetic warfare operations and maintain the tactical and operational capability to combat our adversaries in cyberspace warfare. The CWB is being created to provide a Service-retained, authority-enabled, cyber formation capable of conducting forward deployed offensive and defensive Cyberspace Electromagnetic Activity (CEMA) operations and providing reachback to operations centers at Fort Meade and USAGFG in support of conventional maneuver forces. The expected increase in personnel at USAGFG for this mission may require additional soldier support facilities and staffing. In addition, some stationing actions not related to ARCYBER may also occur.

Some additional organizations that may increase personnel at USAGFG include, but are not limited to:

- Army Intelligence and Security Command (INSCOM)
- NSA
- Navy
- U.S. Army National Guard
- Other Department of Defense (DoD) active and reserve services

1.3 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

The purpose of the Proposed Action is to provide an increased workforce at USAGFG necessary to stand up the ARCYBER CWB, staff other supporting units, and meet other stationing needs across the installation. In anticipation of expanding the USAGFG and ARCYBER workforce, additional facilities and infrastructure at USAGFG are needed.

1.4 REGULATORY REQUIREMENTS

The National Environmental Policy Act of 1969 (NEPA) requires that Federal agencies consider the potential environmental consequences of proposed major Federal actions and alternatives to those actions in their decision-making process. The Council on Environmental Quality (CEQ) was established under NEPA for the purpose of implementing and overseeing Federal policies as they relate to this process. This Programmatic Environmental Assessment (PEA) is being prepared to analyze the potential environmental, cultural, and socioeconomic effects associated with the growth in personnel and facilities needed to support the CWB and other units at USAGFG. This PEA will be prepared pursuant to the NEPA of 1969 (42 United States Code [USC] Section 4321 *et seq.*); the CEQ regulations that implement NEPA (40 CFR 1500-1508); and the Army's NEPA regulations at 32 CFR 651.

These regulations establish the Army policies and responsibilities for the early integration of environmental considerations into planning and decision making. These regulations require the Army to conduct an environmental analysis of actions affecting human health and the environment. The regulations also provide criteria and guidance on actions normally requiring Environmental

Assessments (EAs) or Environmental Impact Statements (EISs) and list Army actions that are categorically excluded from such requirements provided specific criteria are met. These regulations must be read in conjunction with CEQ's regulations.

Applicable Federal, state and local regulations will be considered during the analysis of the impacts to individual environmental and social resources evaluated as a part of the PEA. Some of these authorities prescribe standards for compliance, while others require specific planning and management actions to protect environmental values potentially affected by Army actions. A list of all applicable Federal environmental statutes and EOs, and the level of compliance attained by this PEA, can be found in Table 1-1.

Table 1-1: Compliance with Federal Statutes and Executive Orders

Federal Laws	Compliance
American Indian Religious Freedom Act (AIRFA) (42 USC 1996)	FULL
Archaeological Resources Protection Act (ARPA), as amended (16 USC 470aa et seq.)	FULL
Clean Air Act (CAA), as amended (42 USC 7401)	FULL
Clean Water Act (CWA), as amended (33 USC 1251)	FULL
Coastal Zone Management Act (16 USC 1451 et seq.)	N/A
Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 (42 USC 9601 et seq.)	N/A
Endangered Species Act (ESA) of 1973, as amended (16 USC 1531-1543)	FULL
Farmland Protection Policy Act (FPPA) (7 USC 4202a)	FULL
Fish and Wildlife Coordination Act, as amended (16 USC 661 et seq.)	FULL
Migratory Bird Treaty Act (MBTA) (16 USC 703-712, et seq.)	FULL
National Environmental Policy Act (NEPA) of 1969 (42 USC 4321 et seq.)	FULL
National Historic Preservation Act (NHPA) of 1966, as amended (16 USC 470 et seq.)	FULL
Native American Graves Protection and Repatriation Act (NAGPRA) (25 USC 3001 et seq.)	FULL
Noise Control Act (NCA) of 1972, as amended (42 USC 4901 et seq.)	FULL
Resource Conservation and Recovery Act (RCRA) (42 USC 6901 et seq.)	FULL
Safe Drinking Water Act, as amended (Public Law 93-523)	FULL
Sikes Act, as amended (Public Law 86-797)	FULL
Solid Waste Disposal Act of 1965, as amended (Public Law 89-272, Title II)	FULL
Toxic Substances Control Act of 1976 (Public Law 94-469)	N/A

Federal Laws	Compliance
Watershed Protection and Flood Prevention Act of 1954 (16 USC 1101 et seq.)	FULL
Wetlands Conservation Act (Public Law 101-233)	FULL
Wild and Scenic Rivers Act (Public Law 90-542, as amended)	FULL
Executive Orders (EO)	
Floodplain Management (EO 11988)	FULL
Protection of Wetlands (EO 11990)	FULL
Federal Compliance with Pollution Control Standards (EO 12088)	FULL
Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (EO 12898)	FULL
Protection of Children from Environmental Health Risks and Safety Risks (EO 13045)	FULL
Consultation and Coordination with Indian Tribal Governments (EO 13175)	FULL
Strengthening Federal Environmental, Energy, and Transportation Management (EO 13514)	FULL

1.5 OTHER RELATED NEPA DOCUMENTATION

In accordance with CEQ regulations for implementing NEPA and with the intent of reducing the size of this document, the following materials relevant to the Proposed Action are incorporated by reference:

- Fort Gordon Integrated Natural Resources Management Plan (INRMP) dated March 2019.
- Fort Gordon Integrated Cultural Resources Management Plan (ICRMP) dated January 2011.
- PEA for Road to Growth Stationing Actions, U.S. Army Garrison, Fort Gordon, Georgia, dated December 2014. "Road to Growth PEA."
- U.S. Army Cyber Command and Control Facility Environmental Assessment, dated October 2013. "ARCYBER EA."

1.6 DECISION MAKING

USAGFG, as a Federal agency, is required to incorporate environmental considerations into its decision-making process for the actions it proposes to undertake. This is done according to the regulations and guidance identified in Section 1.4 of this document.

In accordance with these regulations, this PEA provides USAGFG with the necessary analysis to address and support decision making for the Proposed Action and serves to:

- Inform the public of the possible environmental impacts of the Proposed Action and its considered alternatives, as well as methods to reduce these impacts;
- Provide for public, state, interagency, and tribal input into USAGFG's planning and evaluation;

- Document the NEPA process; and
- Support informed decision-making by the Federal government.

As the decision document for this proposed Federal undertaking, this PEA also identifies the actions that USAGFG would undertake to minimize environmental impacts, as required under NEPA, its implementing regulations from CEQ (40 CFR 1500-1508) and the Army (32 CFR 651). The decision to be made is whether or not USAGFG should implement the Proposed Action or other alternative, including measures to reduce potential adverse effects as needed, while considering the potential environmental, physical, traffic, socioeconomic, and cultural impacts.

An EA provides a sufficient level of analysis and evidence to evaluate whether or not an action would cause a significant environmental impact. Because some details of the Proposed Action are unknown in a PEA, supplemental NEPA documentation may need to be prepared once further details are determined. It is expected that in the case of this Cyber Growth PEA, supplemental NEPA documentation will be needed, tiered off of this PEA, once further details of construction projects resulting from the Proposed Action are determined. When the EA concludes there is no significant impact, the agency may issue a Finding of No Significant Impact (FNSI) (40 CFR 1508.9). A FNSI is a decision document that briefly presents the reasons why an action would not have a significant effect on the human environment (40 CFR 1508.13). Conversely, when an action may have a significant adverse impact on the environment, the agency may consider issuing a Notice of Intent (NOI) to prepare an EIS.

1.7 SCOPE OF ANALYSIS

This PEA was prepared with the best data and information available at the time of its development. Any changes to the project scope or its potential impacts require that the project manager responsible for this project coordinate with the USAGFG NEPA team to re-evaluate this document for consistency and applicability to the revised project. This re-evaluation shall be performed based on the new information and shall result in either a finding of sufficiency between this PEA and the new project scope, or the completion of a supplemental NEPA analysis to assess the potential impacts of the new project scope. All work on the Proposed Action exceeding that described in the PEA shall be halted until the new assessment is completed.

This Cyber Growth PEA analyzes the potential impacts that could arise from the stationing of up to 5,000 additional military and civilian personnel at USAGFG. These stationings could be related to the growing ARCYBER mission, or to various other Army, DoD, or non-DoD missions on USAGFG. The document analyzes direct effects (those resulting from the alternatives and occurring at the same time and place) and indirect effects (those distant or occurring at a future date) of those proposed stationings and the subsequent infrastructure growth that may be needed to support the increase in personnel; however, details of the construction or renovation of infrastructure needed to support the additional personnel will need to be addressed in subsequent NEPA documentation. The potential for cumulative impacts as defined by 40 CFR 1508.7 is also addressed.

All resource areas that were considered in this PEA are listed in Table 1-2. Resource areas that were determined to not be at risk for any adverse impacts were labeled “No potential adverse impacts” and they will not be discussed in further detail in this PEA. Those resources screened from further analysis for this PEA include: coastal zones and hazardous, toxic, and radioactive

substances (HTRS). Coastal zones were screened from further consideration because the study area is not within the coastal zone or critical area. HTRS were screened from further consideration because the Proposed Action does not include the use or storage of any hazardous materials. Any fuels and other materials would be stored in appropriate containers and spill containment measures would be enacted to prevent spills. During construction, contractors would perform daily equipment inspections to ensure no equipment leaks occur. Any project plans that require use or storage of HTRS beyond minimal amounts required for life-safety generators would require supplemental NEPA documentation. Resource areas that are evaluated in further detail in this PEA include: land use; visual resources and aesthetics; air quality; noise; geology and soils; wetlands and water resources; biological resources; cultural resources; traffic and roadways; infrastructure and utilities; and socioeconomics, environmental justice, and protection of children.

1.8 PUBLIC INVOLVEMENT

The Army invites and strongly encourages public participation in the NEPA process. Consideration of the views and information of all interested persons and entities promotes open communication and enables better decision making. All agencies, organizations, and members of the public having a potential interest in the Proposed Action are urged to participate in the decision-making process.

Public participation opportunities with respect to this PEA and decision making on the Proposed Action are guided by 32 CFR 651. The PEA and draft FNSI will be made available to Federal, state, and local agencies; Tribes; and the public for review and comment for 30 days. A Notice of Availability for the PEA and draft FNSI was published in the *Augusta Chronicle*. During the public review and comment period, copies of the PEA will be available on USAGFG's website, USAGFG's Facebook page, and the Environmental Division's Green Matters Facebook page. During and immediately following this public comment period, the Army will collect, log, and incorporate any comments received into the PEA and FNSI as necessary. The Army will prepare and release a final FNSI and PEA to the appropriate local, state, and Federal repositories after receiving all comments. The signed FNSI and PEA will remain on record with the USAGFG DPW, Environmental Division Office.

1.9 INTERAGENCY AND INTERGOVERNMENTAL COORDINATION

Federal, state, and local agencies, and Native American Tribes with jurisdiction that could be affected by the Proposed Action will be notified and consulted during the NEPA process, and copies of correspondence with agencies will be included in Appendix A prior to finalization and signature of the PEA and FNSI.

Table 1-2: Resource Areas Considered

Resource Area	Potential Impacts		Evaluated in EA?
	High Growth Alternative	No Action Alternative	
Land Use	Minor adverse impacts	No potential adverse impacts	Yes
Visual Resources and Aesthetics	Minor adverse impacts	No potential adverse impacts	Yes

Resource Area	Potential Impacts		Evaluated in EA?
	High Growth Alternative	No Action Alternative	
Air Quality	Minor adverse impacts	No potential adverse impacts	Yes
Noise	Minor adverse impacts	No potential adverse impacts	Yes
Geology and Soils	Minor adverse impacts	No potential adverse impacts	Yes
Wetlands and Water Resources	Minor adverse impacts to groundwater and surface water; Negligible impacts to stormwater, wetlands, and floodplains	No potential adverse impacts	Yes
Biological Resources	Minor adverse impacts	No potential adverse impacts	Yes
Cultural Resources	Negligible impacts expected; subsequent NEPA will be completed if adverse impact is determined	No potential adverse impacts	Yes
Traffic and Roadways	Minor adverse impacts after mitigation	No potential adverse impacts	Yes
Infrastructure and Utilities	Minor adverse impacts	No potential adverse impacts	Yes
Socioeconomics, Environmental Justice, and Protection of Children	Minor impacts to public health and safety, family support services, and recreational facilities; Minor impacts, both adverse and beneficial, to housing and schools; Minor beneficial impacts to environmental justice and protection of children	No potential adverse impacts	Yes
Cumulative Impacts	Minor overall impacts	No potential adverse impacts	Yes
Coastal Zones	No potential adverse impacts	No potential adverse impacts	No
HTRS	Negligible impacts	No potential adverse impacts	No

2 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

The DoD will potentially conduct stationings and realignments resulting in force increases at USAGFG. Many, but not necessarily all, of these will be in response to the growing need for ARCYBER support, such as the CWB, so these actions are collectively referred to as "Cyber Growth." These actions would increase the number of active duty military, government civilians, and contractors at USAGFG by the end of FY 2025. The increase in personnel would lead to additional space and mission requirements. The Proposed Action includes the renovation of existing facilities and construction of new facilities needed to adequately house and support the elements being stationed to USAGFG. The majority of these facilities would be located within the cantonment area, particularly in the West District, but some may be located in adjacent TAs. Figure 2-1 shows the cantonment area and the TAs included in the analysis of the Proposed Action and alternatives.

2.1 PROPOSED ACTION ALTERNATIVES

The potential stationing actions at USAGFG, collectively termed "Cyber Growth", include actions associated with force realignment in a number of Army components. The dynamic nature and timing in planning multiple stationing actions does not allow for specific site locations to be reserved early in the analysis stage. Therefore, specific locations for growth activities are not identified or evaluated in this PEA. Rather, this PEA considers potential sites within the installation where growth and stationing activities could occur. The document evaluates the potential environmental effects of those activities for a range of personnel increases that reasonably might occur.

Based on the amount of growth that might occur, and the amount of renovation and/or construction activities that may be required to accommodate these additional personnel on USAGFG, two action alternatives have been identified. The PEA identifies where the maximum amount of growth activities could be performed with acceptable levels of impacts. The impact analysis identifies what additional environmental studies and/or approvals may be needed - if any - for the proposed activities to be performed at specific sites. The goal is to identify the maximum amount of developable areas on the installation where the proposed activities can be performed with the least amount of adverse environmental impacts.

Potential site locations on USAGFG for the CWB main operations building, support facilities for active duty military personnel, and associated temporary structures are included in the potential areas for development. The anticipated additional workforce required for the CWB is included in both the Low and High Growth Alternatives outlined in Sections 2.1.1 and 2.1.2, and the sites for the CWB facilities would be chosen in accordance with the development categories outlined in Section 2.2.

2.1.1 Alternative 1: High Growth Alternative

The High Growth Alternative would increase personnel at USAGFG by up to 5,000 and would require the renovation and/or construction of up to 850,000 square feet (sf) of facilities on up to 1,700 acres of land.

This level of growth would cover the stationings associated with the CWB as well as additional growth to support ARCYBER and other units located on USAGFG.

2.1.2 Alternative 2: Low Growth Alternative

The Low Growth Alternative would increase personnel at USAGFG by up to 2,000 and would require the renovation and/or construction of up to 350,000 sf of facilities on up to 800 acres of land.

This Low Growth Alternative is consistent with the anticipated workforce required for the CWB, and would cover the stationings and realignments associated with the CWB.

2.2 NO ACTION ALTERNATIVE

In accordance with CEQ NEPA Regulations and 32 CFR 651, the No Action Alternative must be taken into consideration in the NEPA analysis. This alternative provides a baseline against which the action alternatives can be measured. In this PEA, the No Action Alternative assumes that the ARCYBER Command and Control Facility currently under construction and the already approved stationings will be completed by FY 2020, and these stationings and associated development are included in the baseline numbers for this PEA. It also assumes that the traffic improvement projects identified as mitigation in the ARCYBER EA and Road to Growth (RTG) PEA will be implemented.

Under the No Action Alternative, no additional stationings due to Cyber Growth actions would occur, and as a result, no renovations and/or construction would be required for new facilities for these personnel.

Implementing the No Action Alternative would not satisfy the purpose and need to provide additional personnel or the needed space for an increased workforce.

2.3 EVALUATION OF ALTERNATIVES

This PEA will only evaluate the potential impacts of the High Growth Alternative and No Action Alternative for each resource area. If the High Growth Alternative is expected to produce less-than-significant impacts to a resource area, then it is assumed that the Low Growth Alternative would produce less-than-significant impacts as well. Therefore, the Low Growth Alternative will only be evaluated if significant adverse impacts are anticipated from the High Growth Alternative.

During the scoping process of this PEA, areas of developable land within the cantonment area were identified and categorized based on any known environmental or other constraints. The

categories used were Green, Amber, and Red Development Categories, and together, these three development areas will make up the study area for resource analyses associated with this PEA. The descriptions of these categories are as follows:

- *Green* – areas having no or minor environmental or other constraints

- *Amber* – areas having minor to moderate environmental or other constraints that could be mitigated for or overcome through design or engineering solutions

- *Red* – areas having major environmental or other constraints that would require major changes to land use or existing facilities, or that would have significant impacts without extensive mitigation measures

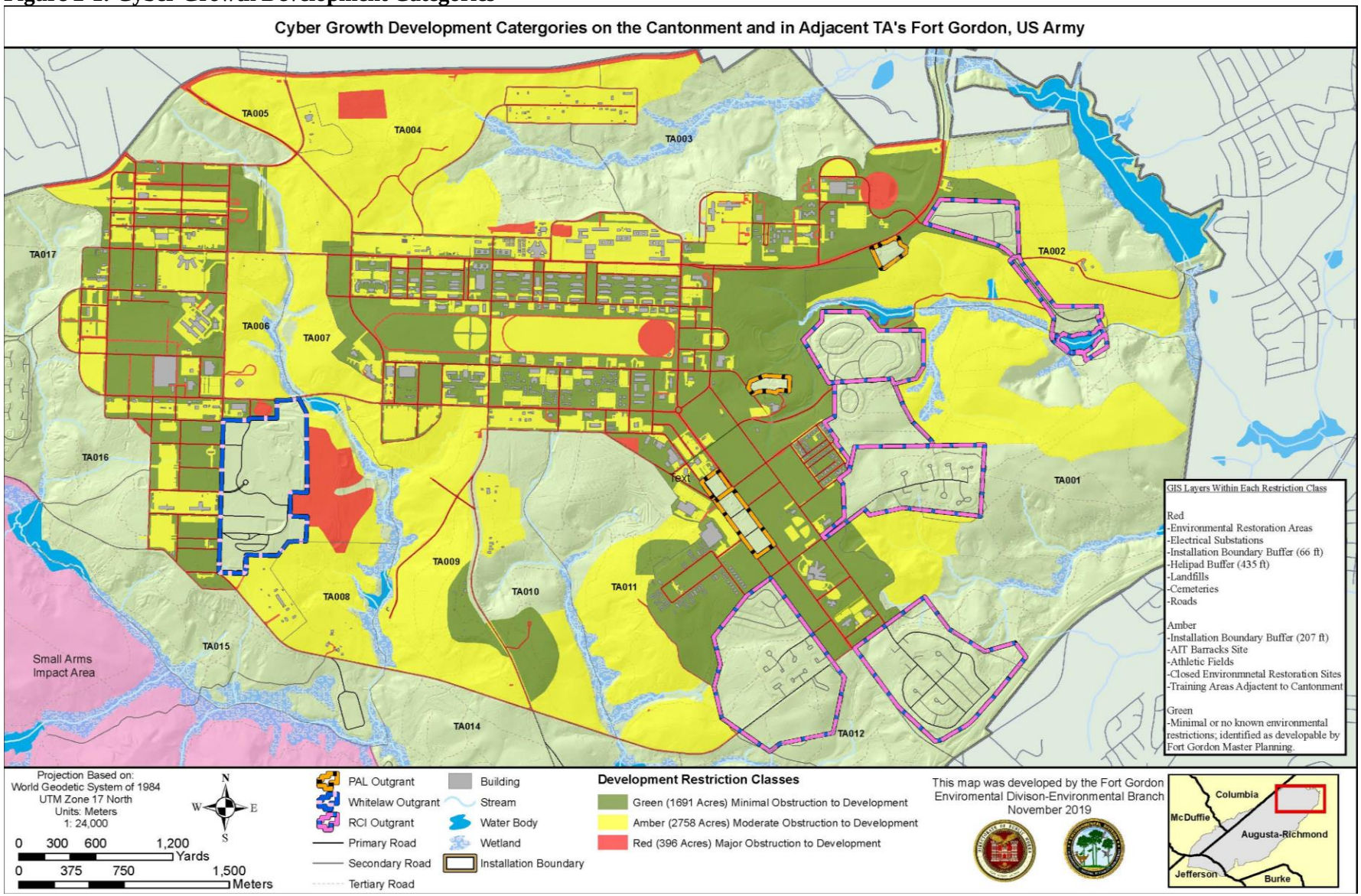
The development categories will be used to help select sites for future projects as needed to support cyber growth. A tiered approach would be used to choose sites for new construction, with Green areas being utilized first, then Amber areas if space constraints or other requirements prevent use of the Green areas, and Red areas as a last resort. Figure 2-1 shows the breakdown of development categories in the cantonment area and surrounding TAs.

The potential site locations for the new construction and/or building renovations needed for the CWB and its associated soldier support facilities will be determined using the above mentioned development categories.

2.4 PREFERRED ALTERNATIVE

The Preferred Alternative is the High Growth Alternative.

Figure 2-1: Cyber Growth Development Categories



3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section describes the environment that would be affected by establishing and operating a CWB facility and other supporting facilities at USAGFG as a result of planned staffing increases. The affected environment focuses on those features of the environment that could potentially be impacted from implementing the Proposed Action. Therefore, the region of influence (ROI) delimits the geographic extent of the affected environment and subsequent environmental effects analysis, which is included in Section 3.0. For this PEA, the ROI encompasses the immediate vicinity of the Proposed Action alternative site locations as well as the immediate surrounding vicinity. For selected environmental resource topics (i.e. air quality, cultural resources), the ROI may differ to reflect the physical or geographic area in which effects of the Proposed Action may reasonably be anticipated to occur.

Each environmental, cultural, and social resource category typically considered in a PEA was reviewed for its applicability to the project to be covered under the Proposed Action. Through this screening analysis, resource categories clearly not applicable to the alternatives were excluded from further detailed evaluation, as summarized in Table 1-2. Coastal zone analysis was excluded from this PEA because the Proposed Action is not located within a designated coastal zone; and HTRS analysis was excluded because there are no known HTRS within the study area, so there would be no expected adverse impacts. Any fuels and other materials would be stored in appropriate containers and spill containment measures would be enacted to prevent spills. During construction, contractors would perform daily equipment inspections to ensure no equipment leaks occur. Any project plans that require use or storage of HTRS would require supplemental NEPA documentation.

Those resources potentially affected by the Proposed Action are discussed further in this section and analyzed for potential impacts.

3.1 LAND USE

3.1.1 Affected Environment

3.1.1.1 *On-Post Land Use*

USAGFG encompasses approximately 55,600 acres. Approximately 50,000 acres are used for training missions: 49 TAs occupy approximately 37,000 acres and two restricted impact areas (small arms and artillery) occupy approximately 13,000 acres (Figure 3-1). The remaining 5,590 acres are occupied by cantonment areas, which include military housing, administrative offices, community facilities, medical facilities, industrial facilities, maintenance facilities, supply/storage facilities, lakes and ponds, recreational areas, and forested areas.

Land use on USAGFG is classified as improved, semi-improved, and unimproved. The Inventory of Installation Land Use at USAGFG classifies 4.3 percent of the installation as improved, 1.7 percent as semi-improved, and 94 percent as unimproved. Improved grounds are those where intensive development and maintenance measures are performed (e.g., cantonment, housing areas,

golf courses, and cemeteries). Semi-improved grounds are those that undergo periodic maintenance for operational and aesthetic reasons (e.g., antenna facilities, rifle ranges, and ammunition storage ranges). Unimproved grounds are those that are usually not mowed more than once a year (e.g., forest lands, grazing lands, and weapons ranges) (USAGFG, 2019c).

The installation operates 14 live-fire ranges, one dud impact area, one demolition pit, one indoor shoot house, one convoy live fire familiarization course, two military operations on urban terrain (MOUT) site/building clearings and one nuclear, biological, and chemical (NBC) chamber. Training primarily consists of advanced individual signal training and unit employment of tactical communications/electronics operations. Additionally, artillery demolition, aerial gunnery load master drop zone, and airborne troop training are conducted on USAGFG.

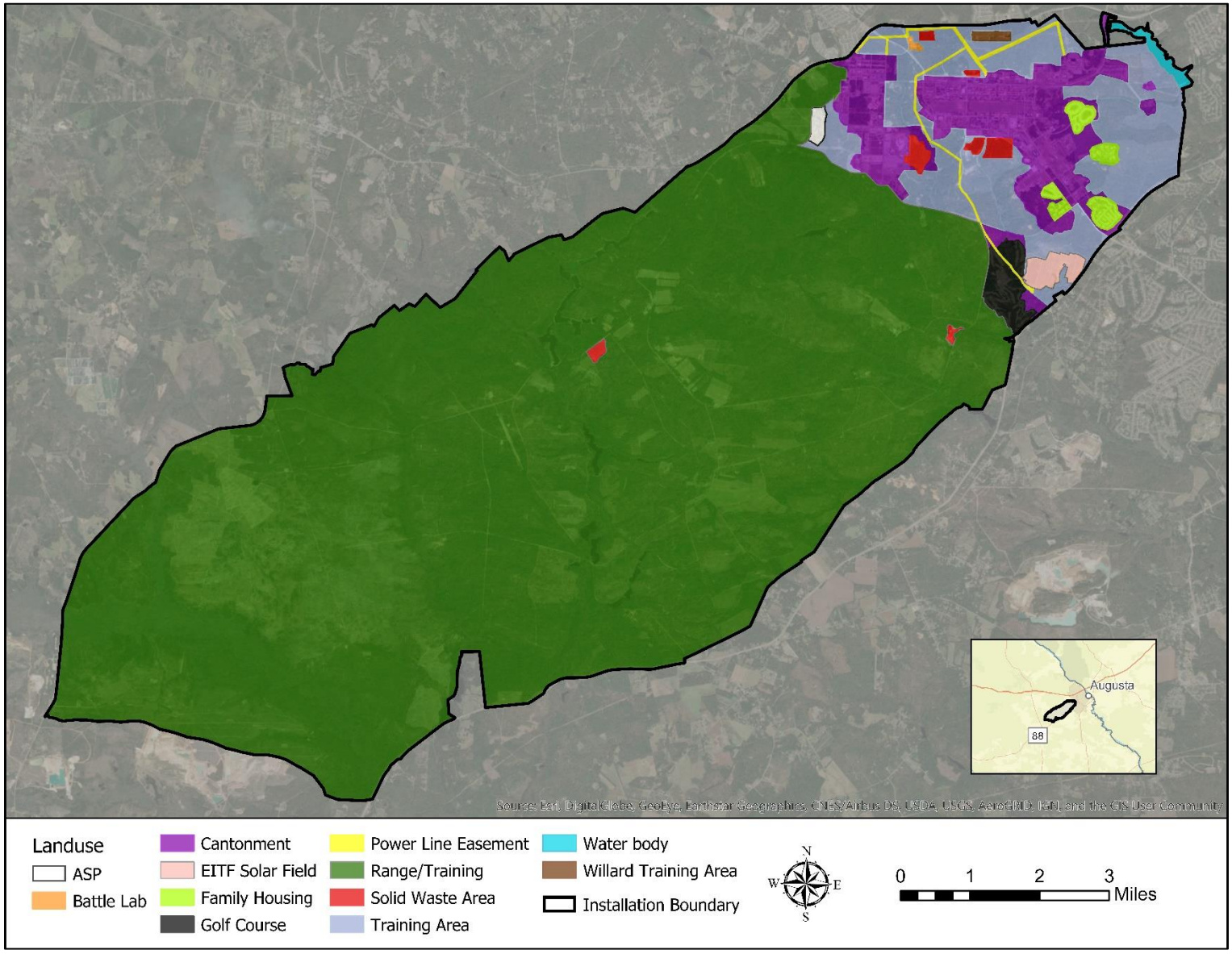
The installation also provides multiple-use recreation opportunities including camping, horseback riding, picnicking, water sports, archery, boating, hiking, and nature education. Hunting and fishing on the installation is authorized for active and retired military, active and retired civilian Federal government employees, base operations contractors with multi-year contracts, reserve and national guard soldiers, and a limited number of public access permits offered through a lottery draw. Approximately 43,516 acres on-post are managed for hunting. Fishing areas on USAGFG include 28 lakes managed for fisheries and 74 square miles of drainage from streams and creeks. Access to hunting is covered in the Army Signal Center and USAGFG Regulation 420-5, *Hunting, Fishing, Trapping, and Horseback Riding Regulations*. USAGFG allows hunting and fishing in most TAs. Some areas are restricted for safety reasons (i.e., impact areas) or their location near a permanent training site or the cantonment area (USAGFG, 2019c).

Forest land on USAGFG falls under two classifications: reimbursable (commercial) and non-reimbursable (non-commercial). Reimbursable forest land (RFL) covers approximately 45,000 acres of USAGFG, and this land is managed and capable of producing industrial wood crops in excess of 20 cubic feet per acre per year. These areas are also not programmed for future uses that would prevent forest development. The remaining forested areas on USAGFG are non-reimbursable forest land (NRFL), and these areas include the cantonment areas, golf course, other designated recreational areas, and impact and known dud areas in the TAs (USAGFG, 2016).

3.1.1.2 *Off-Post Land Use*

Land use within one mile of USAGFG varies from semi-urban to rural. The area east and northeast of USAGFG is developed and makes up the Central Savannah River Area. The major land use east of the installation along U.S. Highway 1 and north of the installation along U.S. Highway 78/Gordon Highway is commercial. Land use south of the installation along U.S. Highway 1 to the west of Gate 5 in western Richmond County is agricultural. In Columbia County, land use closest to Fort Gordon is mixed, with single-family residential and some mobile home development. Some multi-family development is also scattered throughout the area. Suburban areas are concentrated in the Evans-Martinez area and in the City of Grovetown. Land use adjacent to USAGFG in Jefferson and McDuffie counties is agricultural. More than 88 percent of Jefferson County's land is devoted to agriculture and forestry.

Figure 3-1: Installation Land Use



Land use planning in Richmond, Columbia, McDuffie, and Jefferson counties is conducted by local governmental entities through land development policies they enact for the benefit of their communities. No local governments currently have zoning or land use programs that directly affect USAGFG; however, allowing certain land uses adjacent to USAGFG's boundaries may impact the installation's use of its lands. Richmond, Columbia, McDuffie, and Jefferson Counties each have land use development plans, and worked with USAGFG to develop an initial Joint Land Use Study (JLUS) in 2005. As a result of this study, these four counties have agreed to direct development in ways that should allow USAGFG's mission to continue without conflicts with land use outside the installation. The JLUS concluded that projected growth rates identified in local comprehensive plans would not raise compatibility issues with USAGFG (CSRA Alliance Fort Gordon, 2019b). In 2015 USAGFG and its four surrounding counties began an update of the 2005 JLUS, and a draft version of the report was released in June 2019. This JLUS is expected to become final in early 2020 (CSRA Alliance Fort Gordon, 2019b).

3.1.2 Environmental Consequences

Threshold of Significance for Land Use: A significant impact would occur if the project would:

- physically divide an established community;
- conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project; or
- conflict with any applicable habitat conservation plan or natural community conservation plan.

3.1.3 High Growth Alternative

3.1.3.1 *On-Post Land Use*

There would be minor adverse impacts to on-post land use with the High Growth Alternative. Any growth within the Green area would remain consistent with the current land use plans and uses, creating negligible impacts. New construction in the Amber or Red areas could produce training land impacts should they involve displacing existing missions. The displaced missions would require relocation to another portion of the installation; however, the cantonment area of USAGFG is already highly developed. Any possible buildings that would be constructed to accommodate relocated or displaced missions would likely be in an area that has already been developed.

If forest land currently managed for timber collection is used for mission development, the funding provided to manage the land would have to be redistributed. Current Federal law and DoD/U.S. Army policy prohibits the use of reimbursable forestry funds for activities that cannot reasonably be expected to produce forest revenues or in areas that are classified as non-harvestable areas. A decrease in harvestable acreage would increase the need for other funds to cover forest ecosystem management and protection activities, which historically have been paid for with reimbursable forestry funds. Natural resource management and outdoor recreation impacts could also result if areas currently managed for fishing, hunting, and other forms of outdoor recreation are withdrawn from management due to construction and operation of Cyber Growth facilities.

Based on these factors, implementing the High Growth Alternative could result in minor impacts to on-post land use. The installation has sufficient space in buildings that could be renovated to accommodate the influx of additional personnel, or has sufficient land available to build the facilities needed for Cyber Growth stationing actions. The installation also has sufficient land to accommodate the missions, natural resource management, and outdoor recreation that might be displaced by the Cyber Growth development.

3.1.3.2 *Off-Post Land Use*

The High Growth Alternative would have minor adverse impacts to off-post land use. With a 5,000 person increase in personnel at USAGFG, there would be a higher demand for off-post housing. In addition, some barracks may need to be renovated to accommodate an increase in single or unaccompanied active duty personnel. An increase of personnel of that size at USAGFG would fuel new construction in the Grovetown area northwest of the installation, where many USAGFG personnel live, and other high-growth areas adjacent to the installation. This new construction could include single family and multi-family housing, commercial development, and recreational development.

There are compatibility issues with off-post residential and commercial development adjacent to the TAs or habitat management areas on the installation, and the High Growth Alternative will potentially increase the occurrence of more of those issues. The JLUS aids the local community in planning for this off-post growth and aims to prevent further impacts to the installation and the surrounding communities from incompatible development.

3.1.4 No Action Alternative

Under the No Action Alternative, there would be no construction or renovations associated with Cyber Growth activities, so there would be no changes to land use on or off post as a result of this alternative. There would be no short- or long-term, significant, moderate, or minimal impacts to land use under this alternative.

3.2 VISUAL RESOURCES AND AESTHETICS

3.2.1 Affected Environment

Visual resources are the natural and human-made features on the installation landscape. They can include landforms of particular beauty or significance, water surfaces, or vegetation. Together, these features form the overall impression that a viewer receives of the area or its landscape.

USAGFG's topography ranges from the gentle undulating sand hills of the south and middle sections, to areas of steep slopes and near-bluffs adjacent to some of the streams, which are characteristically small and bordered by heavy hardwood swamp areas. The elevation of USAGFG ranges from 221 to 561 feet above mean sea level (msl), with the majority of the installation having an elevation between 378 and 489 feet above msl (USAGFG, 2019c). The cantonment area is built on relatively level ground with low-lying areas scattered throughout. Buildings vary in size and style, having been constructed from the 1940s to the present. Open grassy areas separate the

buildings, along with some ornamental trees and landscaping around the structures (USAGFG, 2019c).

3.2.2 Environmental Consequences

Threshold of Significance for Visual Resources and Aesthetics: A significant impact would occur if the project would:

- diminish the aesthetic character and value of the landscape; or
- eliminate public viewing opportunities of physical features.

3.2.3 High Growth Alternative

Minor adverse impacts to visual resources would be expected under the High Growth Alternative due to the presence of construction vehicles, and disturbances related to construction and renovation activities. These impacts would only be expected during construction. Green development areas, which primarily encompass the cantonment area and are already developed, would be prioritized for construction associated with the High Growth Alternative. Any development in the Amber areas would largely take place in current TAs and would have greater impacts to vegetated areas; however, these TAs are not currently publicly accessible, so visual resources impacts in these areas would still be minor. Development under this alternative would retain existing trees and vegetated areas where possible. Additionally, views of USAGFG are limited to personnel, contractors, and civilians working on or visiting the installation, and these viewers are aware of the missions that occur at or near USAGFG.

3.2.4 No Action Alternative

No effects on visual resources or aesthetics would occur under the No Action Alternative. No addition in personnel, military training, demolition, renovation, or construction would occur beyond the baseline conditions established in this EA, so visual conditions and aesthetics would not be changed.

3.3 AIR QUALITY

3.3.1 Affected Environment

Air pollution occurs when harmful substances, including solid particles and gases, are introduced into the earth's atmosphere. It can cause harm to the natural environment, including humans, animals, and plants. Air quality refers to the pollution-free ambient air. The lower the air quality the more polluted the air, and the higher the quality the more pollutant-free the air. In the following sections, air quality in the vicinity of the Cyber Growth study area is described, applicable laws and regulations are explained, and potential impacts are assessed.

3.3.2 National Ambient Air Quality Standards

3.3.2.1 *Air Quality*

The U.S. Environmental Protection Agency (USEPA) established National Ambient Air Quality Standards (NAAQS) for specific pollutants determined to be of concern with respect to the health and welfare of the general public. Ambient air quality standards are classified as either "primary" or "secondary." The major pollutants of concern, or criteria pollutants, are carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), particulate matter less than 10 microns in diameter (PM_{10}), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), and lead (Pb). NAAQS represent the maximum levels of background pollution that are considered safe, with an adequate margin of safety, to protect the public health and welfare. The NAAQS are included in Table 3-1.

Table 3-1: National Ambient Air Quality Standards

NAAQS 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	
Nitrogen Dioxide (NO_2)	Primary	1-hour	100 ppb	98th percentile, 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-hr concentration, averaged over 3 years
Particular Matter ($PM_{2.5}$)	Primary	Annual	12 µg/m^3	Annual mean, averaged over 3 years
	Secondary	Annual	15 µg/m^3	Annual mean, averaged over 3 years
	Primary and secondary	24-hour	35 µg/m^3	98th percentile, averaged over 3 years
Particular Matter (PM_{10})	Primary and secondary	24-hour	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
Lead (Pb)	Primary and secondary	Rolling 3-month average	0.15 µg/m^3	Not to be exceeded
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

Notes: ppm – parts per million, ppb – parts per billion, µg/m^3 – micrograms per cubic meter

Areas that do not meet these NAAQS are called non-attainment areas; areas that meet both primary and secondary standards are known as attainment areas. The Federal Conformity Final Rule (40 CFR 51 and 93) specifies criteria or requirements for conformity determinations for Federal projects. The Federal Conformity Rule was first promulgated in 1993 by the USEPA, following the passage of amendments to the CAA in 1990. The rule mandates that a conformity analysis must be performed when a Federal action generates air pollutants in a region that has been designated as a nonattainment area for one or more NAAQS. A conformity analysis is the process used to determine whether a Federal action meets the requirements of the General Conformity Rule. It requires the responsible Federal agency to evaluate the nature of a proposed action and associated air pollutant emissions, and to calculate emissions resulting from the Proposed Action. If the emissions exceed established limits, known as *de minimis* thresholds, the proponent is required to implement appropriate mitigation measures.

USAGFG is within the Augusta (Georgia) – Aiken (South Carolina) Interstate Air Quality Control Region (AQCR) (40 CFR 81.114). This AQCR is in attainment for all NAAQS criteria pollutants (U.S. Environmental Protection Agency [USEPA], 2019). Since the ROI is in attainment for all criteria pollutants, a formal conformity determination under Section 176(c) of the CAA, or a Record of Non-Applicability (RONA) for CAA conformity, is not required for the Proposed Action. The General Conformity Rule only applies to criteria pollutants in the ROI which are in non-attainment or maintenance for the NAAQS. Therefore, *de minimis* thresholds for the ROI are not applicable. New Source Review (NSR) thresholds are 250 tons per year (tpy) of any pollutant. For planning purposes, the NSR thresholds are used in the absence of applicable *de minimis* thresholds.

Army operations at USAGFG are covered under a Georgia Part 70 Operating Permit (Title V) (9711-245-0021-V-01-0; originally issued October 21, 2003; 9711-245-0021-V-03-0; issued April 8, 2016; updated June 6, 2017) for air emissions (Georgia Department of Natural Resources [GADNR], 2016). The permit requirements include annual periodic inventory for all stationary sources of air emissions and covers monitoring, record-keeping, and reporting requirements. Primary stationary emission sources at USAGFG include boilers, generators, degreasers, chemical use and painting operations, and other operational and maintenance activities. Total emissions from significant sources at USAGFG for 2018 (the most recent year for which data were readily available) are shown in Table 3-2. These totals exclude construction and vehicle emissions, which are temporary and not regulated by Title V of the CAA, and emissions from stationary sources that are not significant under Title V and/or are not otherwise subject to permit terms or restrictions.

Table 3-2: Emissions for Permitted Stationary Sources

Pollutant	**Actual Annual (tons per year, for 2018)**
Sulfur Oxides (SO_x)	12.87
Nitrogen Oxides (NO_x)	22.98
Particulate Matter <10 microns (PM_{10}, $PM_{2.5}$)	0.015
Volatile Organic Compounds (VOC)	0.577

Source: Georgia Environmental Protection Division [GAEPD], 2019

3.3.2.2 *Hazardous Air Pollutants (HAPs)*

Based on the emission rates reported in the 2018 USAGFG air report (GAEPD, 2019), USAGFG is not a major source for HAPs. It is noted that Fort Gordon is not required to report HAP emissions.

3.3.2.3 *Greenhouse Gases and Climate Change*

Greenhouse gases (GHGs) are compounds that contribute to the greenhouse effect. The greenhouse effect is a natural phenomenon where gases trap heat within the surface-troposphere (lowest portion of Earth's atmosphere) system, causing heating at Earth's surface. The primary long-lived GHGs directly emitted by human activities are CO_2, methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

The heating effect from these gases is considered the probable cause of the global warming observed over the last 50 years (National Aeronautics and Space Administration [NASA], 2018). Global warming and climate change can affect many aspects of the environment. In the past, the USEPA has recognized potential risks to public health or welfare and signed an endangerment finding regarding GHGs under Section 202(a) of the CAA (74 Federal Register 66496, December 15, 2009), which found that the current and projected concentrations of the six key well-mixed GHGs—CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6—in the atmosphere threaten the public health and welfare of current and future generations. To estimate global warming potential (GWP), all GHGs are expressed relative to a reference gas, CO_2, which is assigned a GWP equal to 1. All six GHGs are multiplied by their GWP and the results are added to calculate the total equivalent emissions of CO_2 (CO_2e). The dominant GHG gas emitted is CO_2, accounting for 82.2 percent of all GHG emissions as of 2017, the most recent year for which data are available (USEPA, 2019).

It is noted that EO 13783 rescinded the final guidance issued on August 5, 2016 by the CEQ that had previously required Federal agencies to consider GHG emissions and the effects of climate change in NEPA reviews. On June 26, 2019, CEQ published draft guidance on how NEPA analysis and documentation should address GHG emissions (Federal Register, Vol. 84, No. 123). The draft guidance states, "Agencies should attempt to quantify a proposed action's projected direct and reasonably foreseeable indirect GHG emissions when the amount of those emissions is substantial enough to warrant quantification" and that "Agencies should consider whether quantifying a proposed action's projected reasonably foreseeable GHG emissions would be practicable and whether quantification would be overly speculative." The guidance does not address what a "substantial" amount of GHG emissions would be, but states that "agencies should address effects when a sufficiently close causal relationship exists between the proposed action and the effect." However, EO 13693, issued on March 19, 2015, *Planning for Federal Sustainability in the Next Decade*, outlined policies intended to ensure that Federal agencies evaluate climate change risks and vulnerabilities, and to manage the short-term and long-term impacts of climate change on their operations and mission. EO 13693 specifically required agencies within the DoD to measure, report, and reduce their GHG emissions from both their direct and indirect activities. Additionally, DoD has committed to reduce GHG emissions from non-combat activities 42 percent by 2025 (Department of Defense [DoD], 2016). Accordingly, estimated CO_2e emissions associated with the High Growth Alternative are provided in this PEA for informative purposes.

3.3.3 Environmental Consequences

Threshold of Significance for Air Quality: A significant impact would occur if the project would:

- violate any NAAQS;
- increase the number or frequency of violations;
- contribute substantially to an existing or projected air quality violation;
- conflict with or obstruct implementation of any air quality plans;
- result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment;
- expose sensitive receptors to substantial pollutant concentrations; or
- create objectionable odors affecting a substantial number of people.

Sensitive receptors are those populations who are more susceptible to the effects of air pollution than the population at large. Sensitive receptors located at or near USAGFG include health care facilities, retirement homes, schools, playgrounds and child-care centers.

3.3.4 High Growth Alternative

The Army has considered net emissions generated from all direct and indirect sources of air emission that are reasonably foreseeable. *Direct emissions* are emissions that are caused or initiated by a Federal action and occur at the same time and place as the action. *Indirect emissions* are defined as reasonably foreseeable emissions that are caused by the action but might occur later in time and/or be farther removed in distance from the action itself, and that the Federal agency can practicably control.

Based on the thresholds of significance listed above in Section 3.2.3, only minor adverse impacts to air quality are expected for both construction and operation activities associated with this alternative.

Construction. There are no anticipated indirect emissions associated with construction activities. Construction activities associated with the High Growth Alternative could occur through FY 2025, but would not necessarily be continuous over this period. Construction activities may involve earthwork for land clearing; grading; renovation of existing facilities, construction of new facilities, construction and/or improvements to existing roadways and parking areas, and associated improvements to infrastructure such as stormwater management systems and utilities to support the built environment.

Off-road construction equipment associated with site preparation and renovation/new construction would include a mixture of graders, dozers, loaders, backhoes, water trucks, and paving equipment. On-road construction vehicles that would be active during the construction phase include material delivery trucks, tractor trailers used for transporting off-road heavy equipment, and workers commuting daily to and from the job site in their personal vehicles. These construction vehicles and equipment are generally defined as mobile sources of air pollutant emissions.

Air emissions are generated from operating diesel-fueled combustion engines. Particulates are also a primary air pollutant of concern from construction projects. Construction activities could generate both coarse and fine particulate emissions, primarily during land clearing and grading. The amount of particulate emissions can be estimated from the amount of ground surface exposed, the type and intensity of activity, soil type and conditions, wind speed, and dust control measures used. Fugitive dust could also be generated from construction activities and vehicles traveling on unpaved areas.

Emissions associated with construction of the High Growth Alternative were estimated on an annual basis. A summary of construction-related emissions is presented in Table 3-3. Detailed calculations and assumptions regarding equipment types, durations of use, and other factors are presented in Appendix C. Emission estimates utilized emission factors for year 2022, which approximates when construction activities could begin and be at peak levels.

As shown in Table 3-3, the estimated annual emissions associated with construction of the High Growth Alternative would be below the *de minimis* levels for CAA conformity. Therefore, a formal conformity determination under Section 176(c) of the CAA would not be required. Additionally, construction emissions would be below the NSR threshold of 250 tpy for each regulated chemical.

To further minimize emissions from construction activities, particularly from combustion of diesel fuel, engine idling would be limited to less than five minutes, and USEPA-recommended diesel controls would be implemented to the extent practicable, including the use of clean diesel through add-on control technologies such as diesel particulate filters and diesel oxidation catalysts, repowers, or newer, cleaner equipment. Additionally, the Proposed Action would incorporate the following measures to further reduce fugitive dust emissions:

- Implement dust suppression methods to include application of water and construction scheduling (avoid earthwork during extremely windy and dry periods or when there is an emergency weather advisory).
- Stabilize exposed soil with native, non-invasive vegetation or mulching to minimize erosion and potential dust generation.
- Construction vehicles traveling on paved roads within USAGFG and local roadways would follow posted speed limits to minimize dust generated by vehicles and equipment during transit.
- On unpaved surfaces at the construction site, vehicle speeds would be maintained at lower speeds to prevent dust generation of any exposed soil. Additionally, should any vehicles transport soil to or from the construction site, the soil would be covered with haul tarps.
- Construction activities would be visually monitored on a daily basis, particularly during extended periods of dry weather when there is increased potential for dust generation. During these periods, dust control measures would be implemented more frequently, if warranted.

This listing is not all-inclusive; construction workers involved with the High Growth Alternative construction activities would receive training to ensure their compliance with all applicable

Federal, state, and local air pollution control regulations. Therefore, construction would have a short-term, minor adverse impact on air quality.

Table 3-3: Construction Emissions Associated with the High Growth Alternative

	Construction Emissions (tons per year)						
Equipment Type	**CO**	**NOx**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**Volatile Organic Compound (VOC)**	**CO_2e (metric tons)**
Heavy Duty Diesel Truck Construction Equipment Emissions (year 2022)	0.042	0.112	0.003	0.003	0.000	0.011	36.921
Construction Worker Vehicle Emissions (year 2022)	1.616	0.090	0.003	0.003	0.001	0.128	156.313
Light Duty Diesel Trucks Construction (year 2022)	0.140	0.007	0.000	0.000	0.000	0.005	14.630
Off-Road Construction Equipment	4.248	4.147	0.193 (PM_{10} and $PM_{2.5}$)		0.010	0.642	870.096
Fugitive Dust Emissions	N/A	N/A	15.300	2.295	N/A	N/A	N/A
Total Emissions	**6.046**	**4.356**	**17.800 (PM_{10} and $PM_{2.5}$)**		**0.011**	**0.786**	**1077.960**
de minimis threshold	100	100	100	100	100	50	N/A
NSR threshold	250	250	250	250	250	250	N/A
Draft CEQ threshold	N/A	N/A	N/A	N/A	N/A	N/A	25,000

See Appendix C for calculations and equipment types and frequencies.

Operations. The High Growth Alternative would likely require multiple megawatts of backup generator power to maintain the operations in the event of a significant power loss in addition to standard life-safety generators. Fort Gordon's Title V permit would be revised to account for any additional generator emissions. The type of generators and the total number of generators needed would be dependent on a number of factors that are not finalized at this time to include the design of the facilities, number of personnel in each facility, and the operations that would require backup power. Operating the emergency generators would contribute air emissions (CO, VOCs, and NOx), however, these emissions would be temporary, localized, infrequent, and would not contribute substantial emissions. Additionally, USAGFG would comply with the requirements of 40 CFR 60, *Standards of Performance of New Stationary Sources*, under terms of its Title V permit to ensure emissions from new emergency generators are properly accounted for. The Title V permit would need to be modified to accommodate the additional backup generator power.

Operational emissions would also be generated from personally owned vehicles (POV) traveling to and from USAGFG. Currently, approximately 32,595 personnel are located at the installation. For the purposes of this PEA, the High Growth Alternative air emissions estimate was calculated using the following assumptions:

- The number of new POVs traveling to and from USAGFG was calculated using the number of new proposed personnel (5,000), less a 0.6 conversion factor to account for commuting/ride sharing;
- annual operation is assumed to be 12 months total (260 days after subtracting weekends);
- POVs were assumed to be gasoline-powered passenger vehicles; and
- POV distance traveled per day was estimated to be 30 miles.

As shown in Table 3-4, estimated annual operational emissions for the High Growth Alternative would be below the CAA *de minimis* thresholds and the NSR thresholds. Detailed emissions calculations are provided in Appendix C. Therefore, while implementation of the High Growth Alternative would result in air emissions, the emissions would be minor and would not result in significant adverse impacts to air quality. Emissions of pollutants for which an area is in attainment are exempt from conformity analyses and *de minimis* levels for CAA conformity do not apply. Since the ROI is in attainment for all criteria pollutants, a formal conformity determination under Section 176(c) of the CAA, and a RONA for CAA conformity would not be required.

Table 3-4: Operational Emissions Associated with the High Growth Alternative

	Operation Emissions (tons per year [tpy])						
Emissions source	**CO**	**NOx**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**VOC**	**CO_2e (metric ton)**
POV emissions	72.74	4.07	0.15	0.13	0.05	5.76	7,753.6
de minimis threshold	100	100	100	100	100	50	N/A

See Appendix C for calculations.

3.3.5 No Action Alternative

Under the No Action Alternative, no short- or long-term changes in emissions quantities or types would occur associated with Cyber Growth activities. Therefore, under the No Action Alternative, current baseline air emissions would continue for the foreseeable future. There would be no short-term or long-term, direct or indirect, significant, adverse or beneficial impacts to air quality.

3.4 NOISE

3.4.1 Affected Environment

The primary source of noise at USAGFG is military training activities. Other sources of noise include operation of civilian and military vehicles, lawn and landscape equipment, construction

activities, and vehicle maintenance operations. The Army recognizes three Noise Zones (NZs) (Table 3-5) to aid in land use planning on and near installations (USAGFG, 2000). NZs II and III are mostly contained within the boundaries of the installation (Figure 3-2).

Table 3-5: Noise Levels

Noise Zone	Population Highly Annoyed	Transportation (A-weighted[1]) Day-Night Average Sound Level	Impulsive Large Caliber (C-weighted[2]) Day-Night Average Sound Level	Small Arms (Decibels A-weighted)
I	<15%	<65 dBA	<65 dBA	<62 dBA
II	15-39%	65-75 dBA	65-75 dBA	62-70 dBA
III	>39%	>75 dBA	>75 dBA	>70 dBA

[1]A-weighting filters out the low frequencies and slightly emphasizes the upper middle frequencies around 2-3 kilohertz.
[2]By comparison, C-weighting is almost unweighted, or no filtering at all.
dBA = A-weighted decibel

Noise from construction activities varies with the types of equipment used and the duration of use. Stationary sources of construction equipment include pumps, generators, and compressors; these sources are considered nonimpact-type noises. Stationary sources of construction equipment considered impact-type noises include pile drivers, jackhammers, pavement breakers, and blasting operations. Mobile sources include bulldozers, scrapers, graders, etc. Table 3-6 provides a representation of construction noise levels associated with new construction. Use of heavy equipment occurs sporadically throughout the daytime hours.

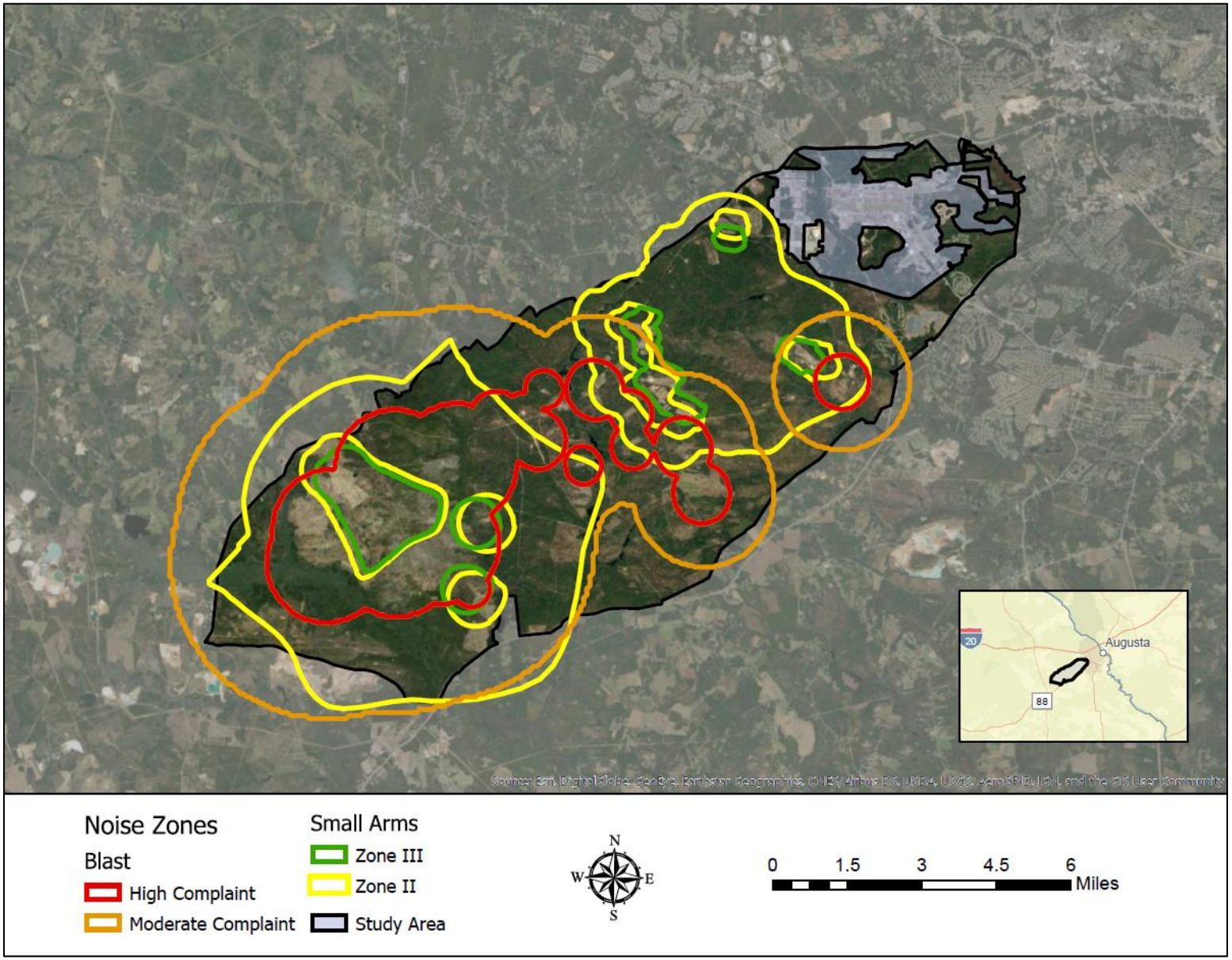
Under the Proposed Action, noise levels that would be generated during the earth moving phase (site clearing activities involving pieces of equipment) could range from 72 to 98 dBA when measured 50 feet from the equipment.

Table 3-6: Typical Noise Levels of Construction Equipment

Construction Equipment Type	Noise Level at 50 feet (dBA)
Bulldozer	85
Backhoe	80
Jackhammer	85
Crane	85
Dump Truck	84
Pickup Truck	55

Source: U.S. Department of Transportation (USDOT), 2006

Figure 3-2: Noise Contours at USAGFG



3.4.2 Environmental Consequences

Threshold of Significance for Noise: A significant impact would occur if the project would require reclassification of NZs to NZ II or III around sensitive receptors (e.g., residences, schools, hospitals, churches, or daycares).

3.4.3 High Growth Alternative

Under the High Growth Alternative, minor adverse impacts from noise would be expected. Temporary noise from construction equipment could impact military and civilian personnel working, using recreation areas on-post, and residents in military housing. However, this increase would be short-term and would occur during normal working hours. Because USAGFG is a military training facility, noise from small arms, artillery, and vehicles is heard regularly. It is not anticipated that the short-term increase in ambient noise levels from implementation of the High Growth Alternative would cause significant adverse impacts on the surrounding population. Long-term impacts from noise associated with an increase in traffic traveling to and from the installation would be expected. However, impacts from this incremental increase would be considered minor as the installation already receives a large volume of traffic. Therefore, there would be minor impacts with the implementation of the Proposed Action regardless of whether the actions occur in Green, Amber, or Red development areas.

3.4.4 No Action Alternative

The No Action Alternative would not be expected to change noise levels generated at USAGFG. No addition in personnel, military training, demolition, renovation, or construction associated with Cyber Growth would occur beyond the baseline conditions established in this EA.

3.5 GEOLOGY AND SOILS

3.5.1 Affected Environment

3.5.1.1 *Geology*

USAGFG is located near Augusta, Georgia, in the Southeastern Coastal Plain physiographic province near the Fall Line transition with the underlying bedrock of the Piedmont physiographic province (Frost, 1981). In this zone of Fall Line transition, the topography ranges from the gentle undulating sand hills of the south and middle sections to areas of steep slopes and near-bluffs adjacent to some of the streams, which are characteristically small and bordered by heavy hardwood swamp areas. The elevation of USAGFG ranges from 221 feet to 561 feet above msl, and the majority of the land area (35,852 acres) is between 378 feet and 489 feet above msl.

Sedimentary rock of the Fall Line Region is composed primarily of two formations, the Barnwell Formation of the Jackson Group formed during the Eocene Period, and the Tuscaloosa Formation of the Cretaceous Period. Geologic components associated with the Tuscaloosa Formation include phyllite, quartzose, arkosic sands, kaolin, quartz gravel, and glint kaolin (Frost, 1981).

3.5.1.2 *Soils*

The majority of the installation is overlain by well-drained medium to fine sands in upland areas. There are scattered areas near the central and southwestern portion of the installation that consist of moderately well-drained to well-drained fine sands over sandy silts or sandy clays. The areas bordering drainage ways consist mainly of poor to moderately well-drained fine silty sands over sandy silts or sandy clays. Twenty-six soil classes have been identified on the installation; these soils are further classified by slope and content detail. These classifications include such common soil series as Ailey, Bibb, Dothan, Lakeland, Lucy, Orangeburg, Osier, Troup, and Vaucluse (Figure 3-3). These and other soil series can be grouped into associations based on similarities of soils, relief, and drainage (Frost, 1981; Paulk, 1981). Creek drainages are characterized by well-drained soils such as Troup-Vaucluse-Ailey associations. Low-lying, poorly drained soils within drainages typically consist of Bibb-Osier associations. These soils are generally dominated by bottomland hardwood communities. Dry, upland habitats are characterized by Troup and Ailey sand series, and are generally dominated by pine/scrub oak communities. Common soil types occurring within the Cyber Growth study area can be found in Table 3-7.

Twelve of the soil types found on USAGFG are considered Prime Farmland under the FPPA of 1980 and 1995 (Public Law 97-98, 7 USC 4201). According to 7 USC 4201(c)(1)(A), Prime Farmland is defined as "land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oil, seed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, labor, and without intolerable soil erosion." Additionally, six of the soil types found on USAGFG are considered Farmland of Statewide Importance. Farmland of Statewide Importance is defined as "land that is important for the production of food, feed, fiber, forage, and oilseed crops. It economically produces good yields if the soils are drained or are drained and protected against flooding, if erosion control practices are installed, or if additional water is applied to overcome droughty conditions." Soils considered either Prime Farmland or Farmland of Statewide Importance are protected under the FPPA. Approximately 5,091 and 2,652 acres of USAGFG are considered Prime Farmland or Farmland of Statewide Importance, respectively (USAGFG, 2019c).

Figure 3-3: Soils at USAGFG

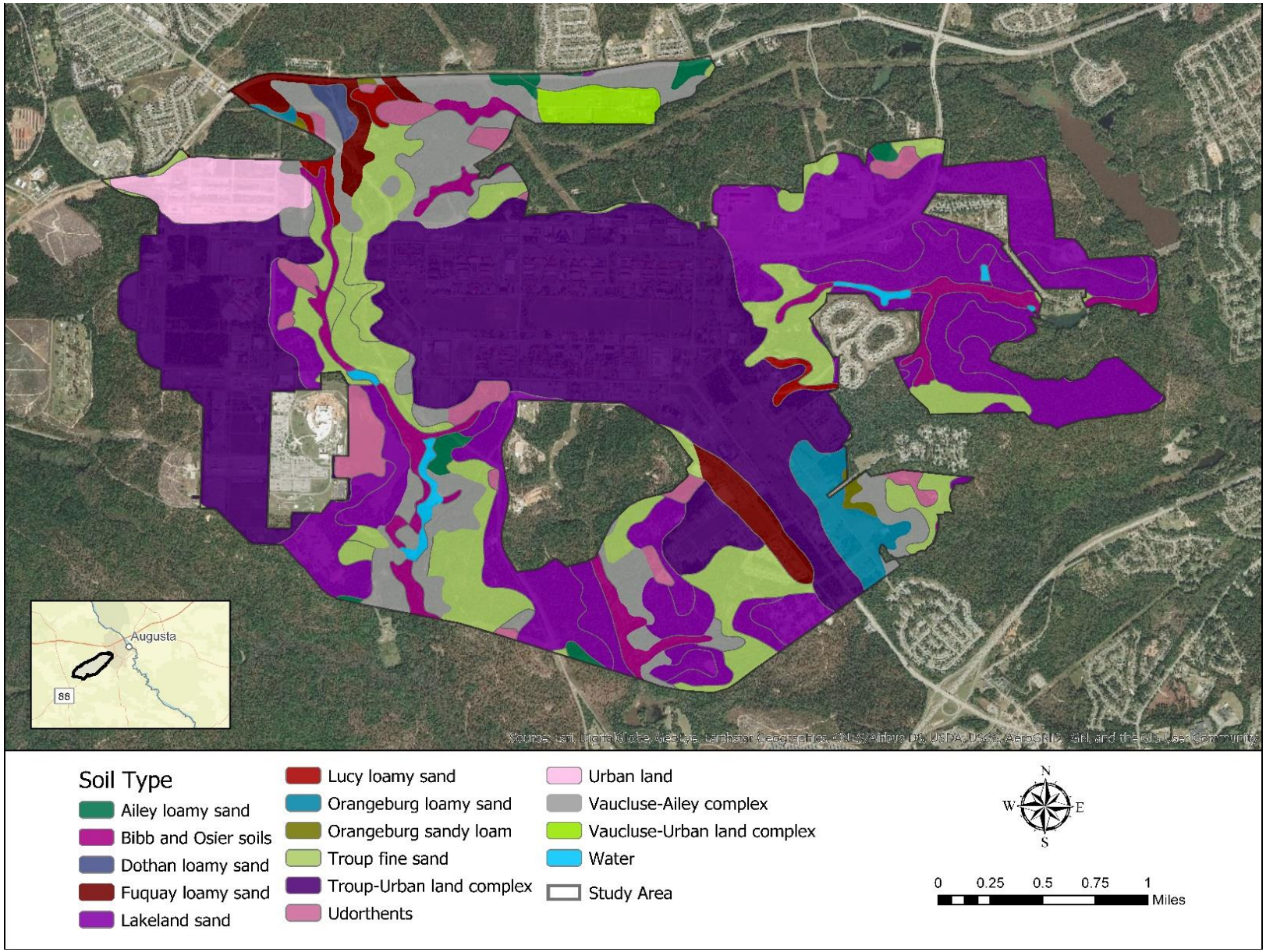


Table 3-7: Common Soil Series Occurring in the Cyber Growth Study Area

Soil Series	Characteristics
Troup	Deep, well drained, gently sloping sands, occurring on Coastal Plains ridgetops. Low in natural fertility, strongly acidic, rapid permeability in the surface layer. Slopes typically to 10 percent, up to 17 percent on steep slopes. Moderately suitable for loblolly, longleaf and slash pine; well-suited for most urban uses; not suitable for recreational uses.
Lakeland	Deep, excessively drained soils occurring on sand hills, ridgetops, and hillsides. Low fertility, strongly acidic and very permeable. Slopes range from 0 - 10 percent and greater on steep slopes. Moderately suitable for common pine species. Suitable for urban uses but unsuitable for recreational uses.
Orangeburg	Deep, well-drained soils on gently sloping Coastal Plain hillsides. Medium fertility, strongly acidic and moderately permeable. Suitable for loblolly and slash pine and well suited to urban uses.
Lucy	Deep, well-drained, level to gently sloping soils on broad ridgetops and hillsides of the Coastal Plain. Low natural fertility, strongly acidic, and moderately permeable. Moderately suitable to longleaf and slash pine. Suited to urban land uses and limited recreational uses.
Dothan	Deep, well-drained, level to gently sloping soils on broad ridgetops and hillsides of the Coastal Plain uplands. Low natural fertility, strongly acidic, and moderately permeable. Well suited to loblolly and slash pine and urban uses.
Vaucluse-Ailey Complex	Well-drained, gently sloping soils occurring on narrow ridgetops and hillsides of upland Sand Hills and Coastal Plain. Low fertility and strongly acidic. Permeability is slow in Vaucluse soils and the subsurface of Ailey soils, but rapid in the surface layer of Ailey soils. Moderately-suitable for loblolly and slash pine. Well suited to urban uses but too sandy for recreational uses.
Bibb-Osier	Poorly-drained, level, frequently flooded soils of the Coastal Plain floodplains. Strongly acidic with moderate to rapid permeability. Moderately suited to loblolly and slash pine, sweet gum.

Source: Frost, 1981; Paulk, 1981

3.5.2 Environmental Consequences

Threshold of Significance for Geology and Soils: A significant impact would occur if the project would:

- expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death;
- result in substantial soil erosion or loss of topsoil; or

- be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, or collapse.

3.5.3 High Growth Alternative

3.5.3.1 *Geology*

Minor adverse impacts are expected to occur to geology with the High Growth Alternative. If buildings are constructed and require footings to be advanced into bedrock, the geology of the site would be affected. For example, construction of new buildings in a forested area where development has not previously occurred would have higher impacts; however, once competent bedrock is reached, construction would not typically require deeper excavation. While this bedrock would be impacted, the surrounding bedrock would remain unchanged and would not be impacted. Proper construction planning and management would minimize the disturbance to geology.

3.5.3.2 *Soils*

Minor adverse impacts to soils are expected to occur under the High Growth Alternative. Soil disturbance in the form of excavation, grading, earthmoving, and compaction would result from new construction activities. As a result, soils would be compacted; soil layer structure would be disturbed and modified; and soils would be exposed, increasing the overall potential for erosion at the site. Soil productivity (i.e., the capacity of the soil to produce vegetative biomass) would decline in disturbed and developed areas. Adverse impacts to soils from the construction activities would be minimized by proper construction management and planning, and the use of appropriate site-specific best management practices (BMPs) for controlling runoff, erosion, and sedimentation during construction activities. Areas disturbed within the equipment staging area would be reseeded, replanted, and/or re-sodded following construction activities. This would decrease the overall erosion potential of the site and improve soil productivity.

The CWA, Georgia Water Quality Act (Official Code of Georgia [OCGA] § 12- 5-20), and Georgia Erosion and Sedimentation Control Act (OCGA § 12-7-1) require erosion and sediment controls during projects that disturb one acre or more of land. Erosion and Sediment Control Plans (ESCP) must be designed and approved prior to construction, and would include measures to protect surface water resources. USAGFG will coordinate with local, state, and Federal agencies to obtain any necessary permits and ensure the protection measures are implemented.

EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, requires that all new construction comply with the *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings*. This includes employing design and construction strategies that reduce stormwater runoff. Section 438 of the Energy Independence and Security Act of 2007 (EISA) requires that any development or redevelopment project involving a Federal facility with a footprint exceeding 5,000 square feet shall, to the maximum extent technically feasible, use site planning, design, construction, and maintenance strategies to maintain or restore the predevelopment hydrology of the property with regard to temperature, rate, volume, and duration of flow. Compliance with this requirement can be met through the implementation of

Low Impact Development (LID) technologies. LID techniques would maintain or restore natural hydrologic functions of a site and achieve natural resource protection. Examples include, but are not limited to, minimizing total site impervious areas, directing building drainage to vegetative buffers, using permeable pavements where practical, and breaking up flow directions from large paved surfaces. Where possible, pervious pavers will be used in parking lots to minimize stormwater runoff.

With implementation of the protective measures described above, implementing the High Growth Alternative would have minor impacts on geology and soils whether the activity occurs in Green, Amber, or Red development areas.

3.5.4 No Action Alternative

Under the No Action Alternative, there would be no impacts to geology or soils. No addition in personnel, military training, demolition, renovation, or construction associated with Cyber Growth activities would occur beyond the baseline conditions established in this PEA.

3.6 WETLANDS AND WATER RESOURCES

3.6.1 Affected Environment

3.6.1.1 *Groundwater*

USAGFG is located in the Coastal Plain hydrogeologic province of Georgia, whose principal groundwater source is the Southeastern Coastal Plain aquifer system. This aquifer is composed of interbedded sand and clay of Cretaceous age and locally includes sand and clay of early Tertiary age. The Dublin–Midville aquifer system consists of two aquifers, separated by a confining unit. The sediments of the Upper Cretaceous age correlate to the Lower Dublin and Upper and Lower Midville aquifers, undifferentiated. The top of this aquifer occurs at approximately 340 feet above msl. The overlying Huber Formation correlates to the Lower Dublin confining unit, with the top of the unit occurring at approximately 380 feet above msl. Depth to groundwater for this hydrogeologic group varies from approximately 56 feet to 0 feet below ground surface at seeps discharging to surface water along floodplains and creeks. Natural discharge from the aquifer is into the Oconee, Savannah, and Ocmulgee Rivers. USAGFG lies within the recharge area and the aquifer is relatively thin; therefore, there is limited storage capacity and only moderate supplies of potable water from groundwater are available within the installation. Typical yields in this area range from 29,000 to 72,000 gallons per day (gpd). Wells installed at USAGFG and screened within the aquifer supply potable water to the range, training, and recreation areas. Because of the high content of dissolved carbon dioxide, pH values can range from 3.8 to 7.4, with a mean of 5.8. Potable water to the cantonment area is provided by Augusta-Richmond County through the public water supply system (USAGFG, 2013).

3.6.1.2 *Surface Water*

The study area lies within two watersheds: Butler Creek (hydrologic unit code [HUC] 030601060503) and Spirit Creek (HUC 030601060801). Butler Creek originates north of the

installation boundary and drains southeastward into the Savannah River. Spirit Creek flows just to the southwest of the study area, and several tributaries originate in the study area and flow southward into Spirit Creek (Figure 3-4). There are four reservoirs/impoundments within the study area (Table 3-8), and two on-post just outside the study area – Butler Reservoir and Boardman Lake (Figure 3-5). These are considered deepwater habitat for aquatic species and all but Scout Lake and Experimental Lake are managed for recreational fishing (USAGFG, 2019c).

Table 3-8: Reservoirs and Impoundments within the Study Area

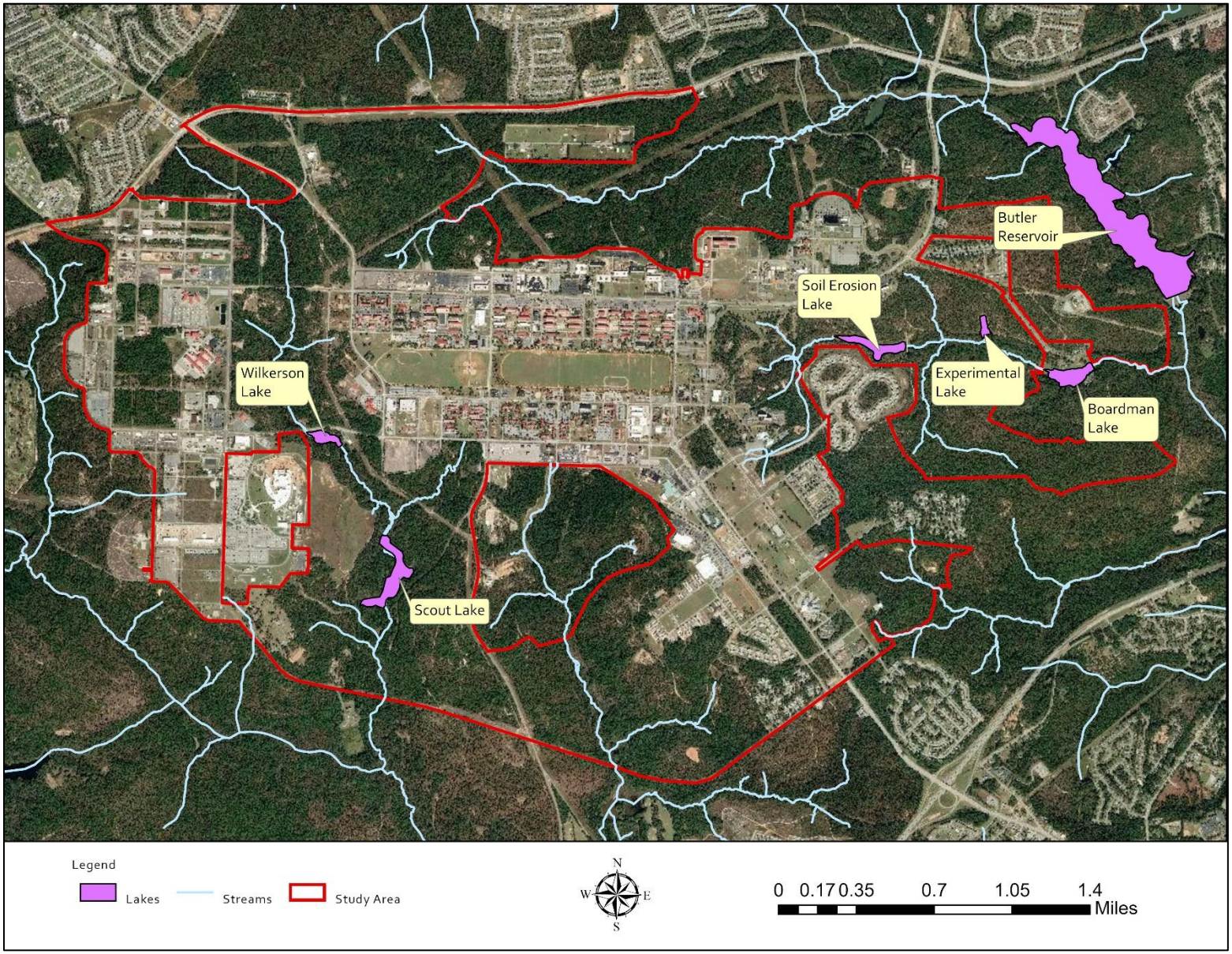
Name	Area (Acres)	Volume (Acre-feet)
Experimental Lake[1]	1.7	11
Soil Erosion Lake	8.3	121
Wilkerson Lake	4.3	20
Scout Lake[1]	5.6	285

[1]Dam failure, no water impounded at this time
Source: USAGFG, 2019c

Water quality standards are issued by the GAEPD, Watershed Protection Branch and by the USEPA under the Georgia Water Quality Control Act, the Federal Safe Drinking Water Act, and the CWA. Section 303(d) of the CWA requires states to identify and develop a list of impaired waterbodies where technology-based and other required controls have not provided attainment of water quality standards. Section 305(b) of the CWA requires states to assess and report the quality of their waterbodies. The state of Georgia has combined its 303(d) and 305(b) lists into one report referred to as the 305b/303d Integrated Report which it publishes every 2 years. This report details the quality of water in the streams, lakes, and reservoirs of all major river basins in the state and identifies those waterbodies that are impaired and do not meet designated uses and describes total maximum daily loads (TMDLs) for the pollutants of concern. TMDLs established by GAEPD define allowable pollutant loadings or parameters for a waterbody through a watershed management approach and allows water quality controls to be developed to reduce pollution and to restore and maintain water quality. The allowable load established by a TMDL suggests stream water quality would improve over time at such a level to maintain the stream's designated use. Water quality of all lakes and streams at USAGFG are periodically monitored to determine if management actions are required. Water is monitored for pH, color, point and nonpoint source pollution, total hardness, and turbidity. Additionally, heavy metals or other toxic materials that bioaccumulate in fish tissues are monitored. Several sampling points have been established on the installation's streams and creeks. The 2018 305(b)/303(d) Integrated Report identified one impaired stream that flows through the study area, Butler Creek (Figure 3-4). The stretch of Butler Creek starting on-post at Boardman Pond heading southeast to Phinizy Ditch, is impaired due to fecal coliforms. The suspected causes of impairment are urban runoff and nonpoint source pollution from an unknown source (GADNR, 2018).

Figure 3-4: Wetlands and Streams

Figure 3-5: Lakes at USAGFG



3.6.1.3 *Stormwater*

The stormwater drainage system at USAGFG is a series of pipes and paved and channeled drainage ditches. USGAFG has approximately 20 miles of drainage pipes ranging in size from 10 to 108 inches in diameter, and approximately 39 miles of roadside ditches and open channels. Most of the stormwater pipes are reinforced concrete pipes or corrugated metal pipes, although other materials such as PVC and vitrified clay are used. Much of the infrastructure is original to the installation and is nearing the end of its life cycle. The 2017 Infrastructure Capacity Assessment recommended roughly 350 upgrades to stormwater pipes, along with several "green "stormwater infrastructure projects, in order to alleviate stress on the stormwater system. No deadlines were associated with these projects; rather, they were recommended for implementation as permitted by budget (USAGFG, 2017a).

Additionally, nearly 70 industrial facilities are included in USAGFG's National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges. These industrial facilities lie mostly within the cantonment area; however, there are outlying industrial sites scattered across the installation. These industrial facilities typically have buildings and impervious surfaces that can create stormwater runoff. The stormwater runoff is controlled by conveyances such as ditches, pipes, and swales that direct the water to monitored outfalls that feed various receiving waters. In addition, there are natural or constructed drainage basins that may or may not be associated with an industrial area. These, too, have monitored outfalls (USAGFG, 2017b).

Stormwater runoff associated with construction activities is regulated by the GAEPD General NPDES Permit. Also, Fort Gordon is regulated under the Municipal Separate Storm Sewer System (MS4) permitting program, for municipalities and entities serving a population of less than 100,000. Fort Gordon's MS4 permit covers all new and existing point source discharges of stormwater from their small MS4 to the waters of the state of Georgia (USAGFG, 2017b).

3.6.1.4 *Wetlands*

Wetlands are protected as a subset of the "waters of the United States" under the CWA. The term "waters of the United States" has a broad meaning under the CWA and incorporates deepwater aquatic habitats and special aquatic habitats (including wetlands). Jurisdictional wetlands are those wetlands subject to regulatory protection under Section 404 of the CWA and EO 11990. USACE defines wetlands as "those areas that are inundated or saturated with ground or surface water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (33 CFR 328). Important wetland functions include water quality improvement, groundwater recharge and discharge, pollution mitigation, stormwater attenuation and storage, sediment detention, and erosion protection.

Approximately 4,395 acres of wetlands occur on USAGFG. These consist of both alluvial and non-alluvial wetlands. Alluvial wetlands are associated with stream channels and depend on the flooding regime of the stream system. Approximately 168 acres of wetlands are within the study

area for the Cyber Growth PEA, and the majority of these are alluvial wetlands. With the exception of Brier Creek, the floodplain of most alluvial wetlands on USAGFG is inconspicuous due to rolling topography. These streams fit the description of "small stream swamps" where separate fluvial features and associated vegetation are too small or poorly developed to distinguish (USAGFG, 2019c).

Non-alluvial wetlands are located in areas where groundwater emerges or precipitation is held close to the soil surface. Non-alluvial wetlands on USAGFG include seepage areas and isolated wetlands. Seepage areas occur on saturated soils where the water table remains immediately below the soil surface. Plant species associated with these types of wetlands include, but are not limited to sweet bay magnolia (*Magnolia virginiana*) in the mid-story and sweet gum (*Liquidambar styraciflua*) and yellow poplar (*Liriodendron tulipifera*) in the overstory. Isolated wetlands include small isolated ponds with grasses and herbs as dominant vegetation. Where present, the overstory consists primarily of sweet gum and black gum (*Nyssa sylvatica*) (USAGFG, 2019c). The distribution of wetlands within the study area is shown in Figure 3-4.

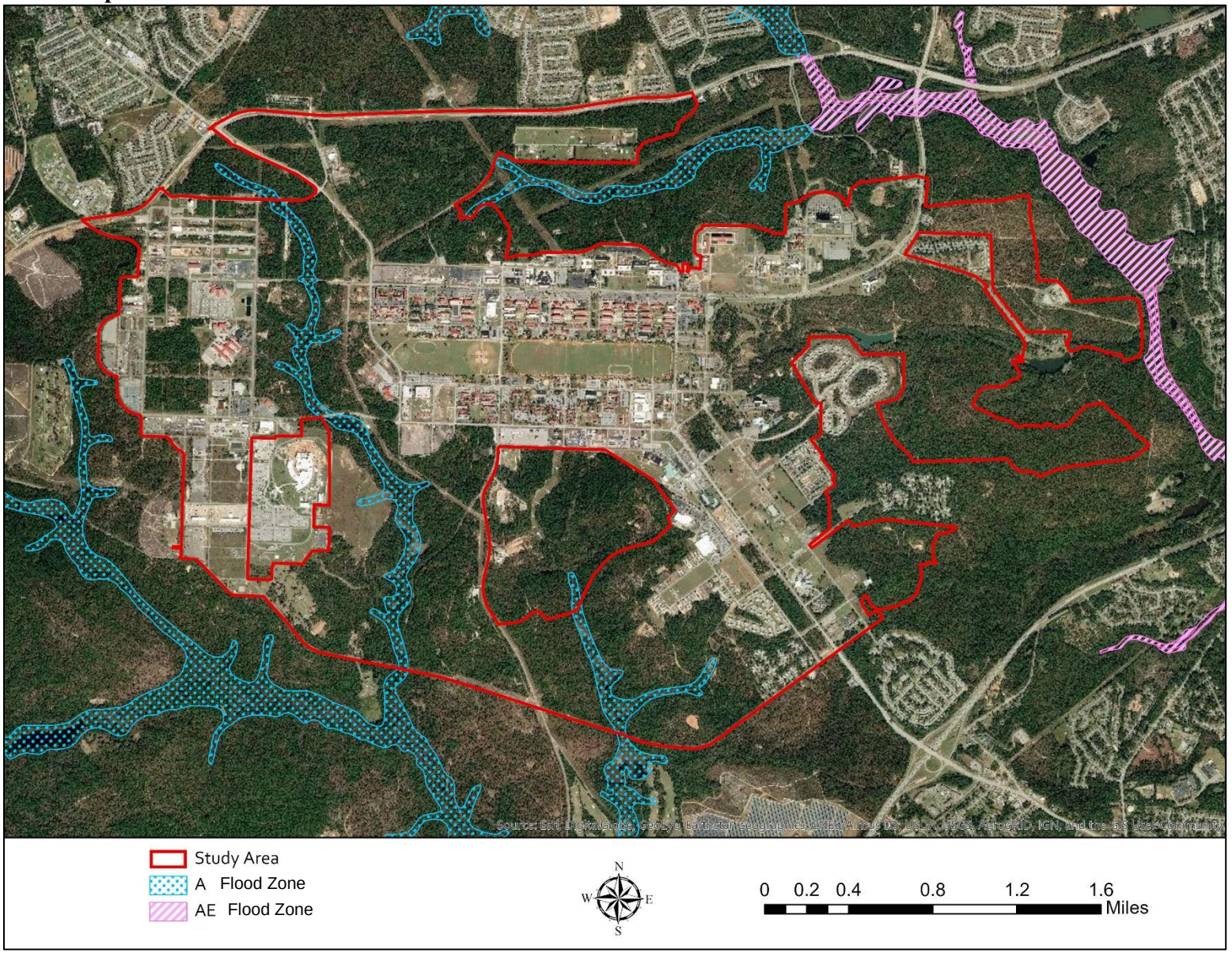
3.6.1.5 *Floodplains*

Surface waters (such as streams and creeks) that are periodically subject to flooding during intervals of overbank flow create a relatively broad and flat valley area immediately adjacent to the waterbody, known as a floodplain. Floodplain areas are divided into two types: 1-percent-annual-chance flood hazard zones (also known as 100-year floodplains or A flood zones) and 0.2-percent-annual-chance flood hazard zones (also known as 500-year floodplains or B flood zones). The 1-percent-annual-chance flood hazard zone is regulated by the Federal Emergency Management Agency (FEMA) and is defined as typically dry land that has a 1 percent or greater chance of flooding each year. The 0.2-percent-annual-chance flood hazard zone is defined as land that has a 0.2 percent chance of a flooding each year.

Within the study area, there are no 0.2-percent-annual-chance flood hazard zones, but there are several 1-percent-annual-chance flood hazard zones, primarily along the creeks within the TAs. A map of floodplains within the study area is located in Figure 3-6. Several AE flood zones are also shown just outside of the study area. These areas are also 1-percent-annual-chance flood zones, and they are the base floodplains where base flood elevations are provided.

EO 11988, *Floodplain Management*, requires Federal agencies to determine whether a proposed action would occur within a floodplain. This determination typically involves consultation of appropriate FEMA Flood Insurance Rate Maps (FIRMs), which contain enough general information to determine the relationship of the project area to nearby floodplains. EO 11988 directs Federal agencies to avoid floodplains unless the agency determines that there is no practicable alternative to undertaking the action in a floodplain. Where the only practicable alternative is to locate in a floodplain, a specific step-by-step process must be followed to comply with EO 11988. This "eight-step" process is detailed in FEMA's, *Further Advice on EO 11988 Floodplain Management*.

Figure 3-6: Floodplains



3.6.2 Environmental Consequences

3.6.2.1 *Water Resources*

Threshold of Significance for Water Resources: A significant impact would:

- violate any water quality standard or waste discharge requirement;
- substantially deplete groundwater supplies or interfere substantially with groundwater recharge;
- substantially alter the existing drainage pattern of the site in a manner which would result in substantial erosion or siltation on-site or off-site;
- substantially increase the rate or amount of surface runoff in a manner that would result in flooding on-site or off-site;
- create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;
- otherwise substantially degrade water quality; or
- have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act.

3.6.3 High Growth Alternative

Study actions in Green, Amber, and Red areas would have negligible impacts to stormwater, wetlands, and floodplains; and minor impacts to groundwater and surface water as a result of new construction.

3.6.3.1 *Groundwater*

The High Growth Alternative would be expected to cause minor adverse impacts to groundwater resources due to potential impacts to groundwater recharge. None of the proposed construction would occur in the outlying areas of the installation that use wells for potable water. Some of the organizations at USAGFG may use TAs where potable water is obtained from groundwater supply wells, but those activities would not appreciably increase water use. The potential for groundwater contamination (e.g., by accidental spills of hazardous materials or hazardous waste) from activities would be prevented through implementation of the installation's existing hazardous waste management procedures (e.g., spill prevention, control, and countermeasures). Groundwater recharge could be affected by study actions. Local streams are recharged by perched aquifer tables. As impervious surface is constructed it would reduce the amount of on-site recharge. Any adverse impacts would be reduced through mitigation using LID and artificial recharge technologies.

3.6.3.2 *Surface Water*

The High Growth Alternative would be expected to produce minor adverse impacts to surface water resources, including one Section 303(d) listed stream (Butler Creek) that flows through a small portion of the study area. The streams in the study area are all headwaters. Construction of impervious surface in this area could increase velocity of discharge of stormwater and could increase downstream flooding. Adverse impacts to surface waters would be reduced to a moderate

level through mitigation using BMPs under CWA NPDES permitting. To minimize any potential short-term impacts, an ESCP and a Stormwater Pollution Prevention Plan (SWPPP) would be designed and approved prior to each new construction, which would include measures to protect surface water resources. USAGFG will coordinate with local, state, and Federal agencies to obtain any necessary permits. Adverse impacts to waterways from the construction activities would be minimized by proper construction management and planning, and the use of appropriate site-specific BMPs for controlling runoff, erosion, and sedimentation during construction activities.

3.6.3.3 *Stormwater*

Assuming USAGFG adheres to the ESCP and NPDES permit and implements appropriate LID methodology, expected impacts to stormwater would be negligible. Stormwater and wastewater discharges are regulated by the USEPA under Sections 401 and 402 of the CWA permitting requirements through the Georgia NPDES. New construction may result in over one acre of land disturbance, thereby requiring a NPDES general permit from GAEPD prior to construction. In addition, USAGFG must comply with Section 438 of the EISA of 2007, which directs Federal agencies sponsoring development or redevelopment of over 5,000 sf in size to use site planning, design, construction, and maintenance strategies to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of water flow.

Implementation of LID is the preferred methodology to meet Section 438 of the EISA and DoD policy regarding stormwater management. Army LID guidance requires the installation to design projects to minimize the effects on stormwater drainage systems. To comply with regulatory Stormwater Phase II requirements for MS4, the post-construction site runoff is required to be the same as pre-construction runoff coefficients, so it does not impact the existing watershed conditions.

Adherence to the ESCP and NPDES permit, along with implementation of project-specific BMPs and LID practices, would minimize impacts to water quality. Both LID practices and BMPs for erosion and sedimentation control would be implemented in accordance with the guidelines in the *Georgia Stormwater Management Manual/Coastal Stormwater Supplement*, EISA Section 438, and the *Manual for Erosion and Sediment Control in Georgia*. BMPs specified in the ESCP could include erosion control matting, silt fencing, brush barriers, construction exits, temporary and permanent seeding, the application of mulch, buffer zones, and dust control. The application of any or all of these BMPs would depend upon precise, specific ground conditions in the areas disturbed by construction. The use of BMPs and LID principles would be required in order to comply with Section 438 of the EISA (post-construction runoff must not exceed pre-construction runoff).

3.6.3.4 *Wetlands*

The High Growth Alternative would be expected to have negligible impacts to wetlands. Planning level survey maps (created using National Wetland Inventory maps, hydric soils maps and color infrared digital orthophotography) were used to eliminate wetland areas from consideration for development. In the event a project is identified that potentially impacts wetlands, additional

NEPA analysis will be required and appropriate CWA Section 401/404 permitting requirements will be met.

3.6.3.5 *Floodplains*

Negligible impacts to floodplains would be expected to occur as a results of the High Growth Alternative. Planning level survey maps were used to identify and eliminate floodplains from consideration for development. Indirect impacts could occur if stormwater hydrology is substantially changed by development such that base flood elevations are modified, or stormwater cannot infiltrate into the ground or follow discharge pathways, resulting in induced flooding. These impacts could be reduced through mitigation including BMPs, engineering controls, and LID principles.

3.6.4 No Action Alternative

No impacts to wetlands, floodplains, groundwater, surface water, or stormwater would occur under this alternative. No addition in personnel, military training, demolition, renovation, or construction would occur beyond the baseline conditions established in this PEA.

3.7 BIOLOGICAL RESOURCES

3.7.1 Affected Environment

Biological resources include native or naturalized plants and animals and the habitats (i.e., wetlands, forests, and grasslands) in which they live. Factors considered in the analysis of potential impacts to biological resources include disruption to normal wildlife behavioral patterns or disturbance to habitat at a level that would substantially impact biological resources on USAGFG.

USAGFG manages wildlife and biological resources under a comprehensive INRMP. As part of the 2019-2023 INRMP, an Endangered Species Management Component (ESMC) was prepared to provide guidance on habitat management and conservation measures associated with endangered species known to exist on USAGFG.

3.7.1.1 *Vegetation*

USAGFG encompasses approximately 55,600 acres. Approximately 51,152 acres (92 percent) are forested, of which approximately 46,145 acres (83 percent) is managed forest. Common on-site plant species include longleaf pine (*Pinus palustris*), loblolly pine (*Pinus taeda*), southern wiregrass (*Aristida stricta*), white oak (*Quercus alba*), hickory (*Carya* spp.), dogwood (*Cornus florida*), blueberry (*Vaccinium* spp.), water oak (*Quercus nigra*), and broomsedge (*Andropogon virginicus*) (USAGFG, 2019c).

Eight distinctive vegetative communities have been identified within USAGFG, as described below in decreasing order of area covered (USAGFG, 2019c):

1. **Pine Forest** (50 percent of the installation) – Overstory dominated by loblolly pine, longleaf pine, shortleaf pine (*Pinus echinata*), and slash pine (*Pinus elliottii*) with an

understory consisting of immature pines, honeysuckle (*Lonicera japonica*), scrub oak (*Quercus ilicifolia*), sumac (*Rhus* spp.), and short grasses.

2. **Pine Plantation** (19 percent of the installation) – A result of reforestation practices on USAGFG. The primary species of this planted community include loblolly pine and slash pine with an understory of sumac, rhododendron (*Rhododendron* spp.), wax myrtle (*Myrica cerifera*), and short grasses.

3. **Pine/Scrub** (8 percent of the installation) – Dominant overstory species include longleaf pine, loblolly pine, shortleaf pine, scrub oak, wax myrtle, greenbrier (*Smilax* spp.), sumac, honeysuckle, and short grasses. The largest stand occurs within the Artillery Impact Area.

4. **Bottomland Hardwood Forest** (7 percent of the installation) – Overstory species include white oak, American beech (*Fagus grandifolia*), hickory, red maple (*Acer rubrum*), ash (*Fraxinus* spp.), black gum (*Nyssa sylvatica*), swamp chestnut oak (*Quercus michauxii*), willow oak (*Quercus stellata*), and yellow poplar (*Liriodendron tulipifera*). The medium to dense understory includes wax myrtle, sumac, scrub oak, and honeysuckle.

5. **Scrub Oak** (4 percent of the installation) – This community primarily consists of scrub oak, but associated species include blackjack oak (*Quercus marilandica*), turkey oak (*Quercus laevis*), wax myrtle, honeysuckle, sumac, and short grasses. The largest stands occur within the Small Arms Impact Area.

6. **Streamside Forest** (3 percent of the installation) – Common on seasonal wetlands along Brier Creek in the southwestern portion of the installation. Dominant species include black willow (*Salix nigra*), river birch (*Betula nigra*), swamp cottonwood (*Populus heterophylla*), willow oak, and water oak with an understory of greenbrier, honeysuckle, and alder (*Alnus* spp.).

7. **Mixed Pine/Hardwood Forest** (1 percent of the installation) – Found in scattered small tracts in the western portion of the installation. Dominant species include loblolly pine, sweet gum (*Liquidambar styraciflua*), yellow poplar, and black gum, although longleaf pine, white oak, red oak, honeysuckle, wax myrtle, sumac, and scrub oak are also present.

8. **Grassland** (1 percent of the installation) – Consists of broomsedge, southern wiregrass, Johnson grass (*Sorghum halepense*), and crab grass (*Digitaria* spp.), and many other species of grasses, sedges, and composites. This community is isolated to clearings in forested areas, and in the understory of open forest types.

Vegetation found in Red portions of the study area is predominantly landscaped interspersed with small pockets of natural areas. The Green portions are either landscaped like Red areas or larger forested areas. The Amber areas are primarily forested land.

3.7.1.2 *Fish and Wildlife*

USAGFG is inhabited by a wide variety of wildlife species. Approximately 136 species of birds have been identified on the installation. It is estimated that approximately 31 species of mammals and approximately 67 species of reptiles and amphibians inhabit USAGFG. These species are dispersed throughout the various habitats on the installation (USAGFG, 2019c).

Common mammal species found on the installation include, but are not limited to: white-tailed deer (*Odocoileus virginianus*), raccoon (*Procyon lotor*), eastern grey squirrel (*Sciurus carolinensis*), Virginia opossum (*Didelphis virginiana*), red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargenteus*), striped skunk (*Mephitis mephitis*), eastern cottontail rabbit (*Sylvilagus floridanus*), and coyote (*Canis latrans*). Common bird species found on USAGFG include, but are not limited to, northern bobwhite quail (*Colinus virginianus*), turkey vulture (*Cathartes aura*), pileated woodpecker (*Dryocopus pileatus*), northern mockingbird (*Mimus polyglottos*), red-eyed vireo (*Vireo olivaceus*), tufted titmouse (*Parus bicolor*), and Carolina chickadee (*Poecile carolinensis*) (USAGFG, 2019c).

Common reptile and amphibian species found on the installation include, but are not limited to: eastern box turtle (*Terrapene carolina*), eastern mud turtle (*Kinosternon subrubrum subrubrum*), southern fence lizard (*Sceloporus undulatus undulatus*), brown water snake (*Nerodia taxispilota*), eastern kingsnake (*Lampropeltis getula getula*), southern toad (*Bufo terrestris*), and bullfrog (*Rana catesbeiana*).

White-tailed deer, red fox, eastern gray squirrel, raccoon, eastern cottontail rabbit, wood duck (*Aix sponsa*), eastern wild turkey (*Meleagris gallopavo silvestris*), northern bobwhite quail, and mourning dove (*Zenaida macroura*) are actively managed for sport hunting on USAGFG.

Approximately 56 species of fish are known to occur in waters at USAGFG, including the bluebarred pygmy sunfish (*Elassoma okatie*) (the only known occurrence of this state protected species in Georgia), the Savannah darter (*Etheostoma fricksium*), and sawcheek darter (*Etheostoma serrifer*). These three species have been found in several locations on the installation, including McCoys Creek, a tributary of Spirit Creek, which flows through the Cyber Growth study area (USAGFG, 2019c; Rohde, Hoover and Killgore, 2004).

3.7.1.3 *Protected Species*

Protected biological resources include plant and animal species listed by the State of Georgia as unusual, rare, threatened, or endangered or by the U.S Fish and Wildlife Service (USFWS) as threatened or endangered. Special concern species are not afforded the same level of protection, but their presence is taken into consideration by resource agency biologists involved in reviewing projects and permit applications.

The Sikes Act provides for cooperation by the Department of the Interior and DoD with state agencies in planning, development and maintenance of fish and wildlife resources on military reservations throughout the United States. Table 3-9 provides a list of Federal and state protected

Table 3-9: Federal/State Protected Species Known to Occur on USAGFG

Scientific Name	Common Name	Federal Status	State Status	Description of Habitat
Mammals				
Corynorhinus rafinesquii	Rafinesque's big eared bat	NL	R	Roosts in buildings, bridges, and culverts in forested areas. Forages in both upland pine stands and hardwood stands.
Birds				
Aimophila aestivalis	Bachman's sparrow	NL	R	Pine savannahs or abandoned fields with scattered shrubs, pines, and oaks.
Falco sparverius paulus	Southeastern American kestrel	NL	R	Breeds in open or partly open habitats with scattered trees and in cultivated or urban areas
Haliaeetus leucocephalus	Bald eagle[a]	NL	T	Inland waterways and estuarine areas.
Mycteria americana	Wood stork[a]	E	E	Feeds primarily in fresh and brackish wetlands and nests in cypress or other wooded swamps.
Picoides borealis	Red- cockaded woodpecker	E	E	Nests in open mature pines with low understory vegetation; forages in open pine stands.
Reptiles/Amphibians				
Gopherus polyphemus	Gopher tortoise[b]	C	T	Well-drained, sandy soils in forested and grassy areas; associated with pine overstory.
Heterodon simus	Southern hognose snake[b]	NL	T	Open, sandy woods, fields, and floodplains.
Fish				
Elassoma okatie	Bluebarred pygmy sunfish	NL	E	Heavily vegetated creeks, sloughs, and roadside ditches.
Plants				
Ceratiola ericoides	Sandhill rosemary	NL	T	Dry, openly vegetated scrub oak sandhills and river dunes with deep white sands of the Kershaw soil series.
Chamaecyparis thyoides	Atlantic white cedar	NL	R	Wet sandy terraces along clear streams and in acidic bogs.
Cypripedium acaule	Pink ladyslipper	NL	U	Upland oak-hickory-pine forests.
Macbridea caroliniana	Carolina bogmint	NL	R	Bogs, marshes, and alluvial woods.
Nestronia umbellula	Indian olive	NL	R	Dry open upland forest of mixed hardwood and pine.
Sarracenia rubra var. *rubra*	Sweet pitcher-plant	NL	T	Acid soils of open bogs, sandhill seeps, Atlantic White Cedar swamps, and wet savannahs.

Scientific Name	Common Name	Federal Status	State Status	Description of Habitat
Stewartia malacodendron	Silky camelia	NL	R	Steepheads, bayheads, and edge of swamps.
Stylisma pickeringii var. *pickeringii*	Pickering's morning glory	NL	T	Coarse white sands on sandhills near the Fall Line and on a few ancient dunes along the Flint and Ohoopee Rivers.

[a]Transient presence on Fort Gordon
[b]Army Species At Risk
Status Key: E = Endangered; T = Threatened; C = Candidate; R = Rare; NL = Not Listed; U = Unusual
Source: Fort Gordon Natural Resources Branch

species that are potentially found at USAGFG. A map of known locations of protected species on USAGFG can be found in Figure 3-7.

The MBTA, implemented in 1918, makes it illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued pursuant to Federal regulations. The migratory bird species protected by the MBTA are listed in 50 CFR 10.13.

3.7.2 Environmental Consequences

Threshold of Significance for Biological Resources: A significant impact would occur if the project would:

- have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies or regulations by the Georgia Department of Natural Resources (GADNR) or the USFWS;
- have a substantial adverse effect on any sensitive or unique natural community identified in local or regional plans, policies or regulations by GADNR or USFWS;
- interfere substantially with the movement of native resident or migratory fish or wildlife, obstruct wildlife corridors, or harm wildlife nursery sites;
- conflict with local policies ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
- conflict with the provisions of an approved local, regional, or state habitat conservation plan.

Specific significance thresholds for USAGFG include:

- reduction of the installation red-cockaded woodpecker (RCW) population;
- reduction of foraging habitat at active RCW clusters below threshold levels; and direct effect to a living RCW or active cavity tree.

3.7.3 High Growth Alternative

The High Growth Alternative is expected to have minor adverse impacts to biological resources. This alternative has the possibility of affecting biological resources in the Green, Amber, and Red portions of the Cyber Growth study area (Figure 2-1), including portions of TAs adjacent to the

cantonment area, but does not include the RCW or gopher tortoise habitat management units (HMUs). Suitable habitat for the RCW occurs within development plan areas, particularly the western portion of USAGFG. Development of this area will require compliance with ESA guidelines to avoid incidental takes. Additionally, McCoys Creek, which is known to contain the state endangered bluebarred pygmy sunfish, flows through the Cyber Growth study area, thus there is potential for adverse impacts to these species if a Cyber Growth project would affect water quality or other relevant environmental parameters important to these species, such as dissolved oxygen, pH level, and turbidity.

In addition, several protected plant species also occur within the Cyber Growth study area. The Cyber Growth projects would be designed to avoid impacting protected species. Any project that would remove pines that could be potential RCW nesting or foraging habitat or that would occur in potential gopher tortoise or protected plant habitat must be surveyed to verify these species are not present at the project site. If species are present, avoidance measures would be implemented to minimize adverse impacts associated with implementing the Proposed Action.

Construction/renovation/operations of facilities for Cyber Growth actions could disturb nesting kestrels. Mitigation to prevent impacts to kestrels would include relocating nest boxes away from Cyber Growth facilities outside the breeding season; assuring an activity (e.g., loud noises from operating building equipment such as generators, etc.) located near kestrel boxes will not disturb nesting; and not disturbing nesting boxes during the breeding season with construction activities.

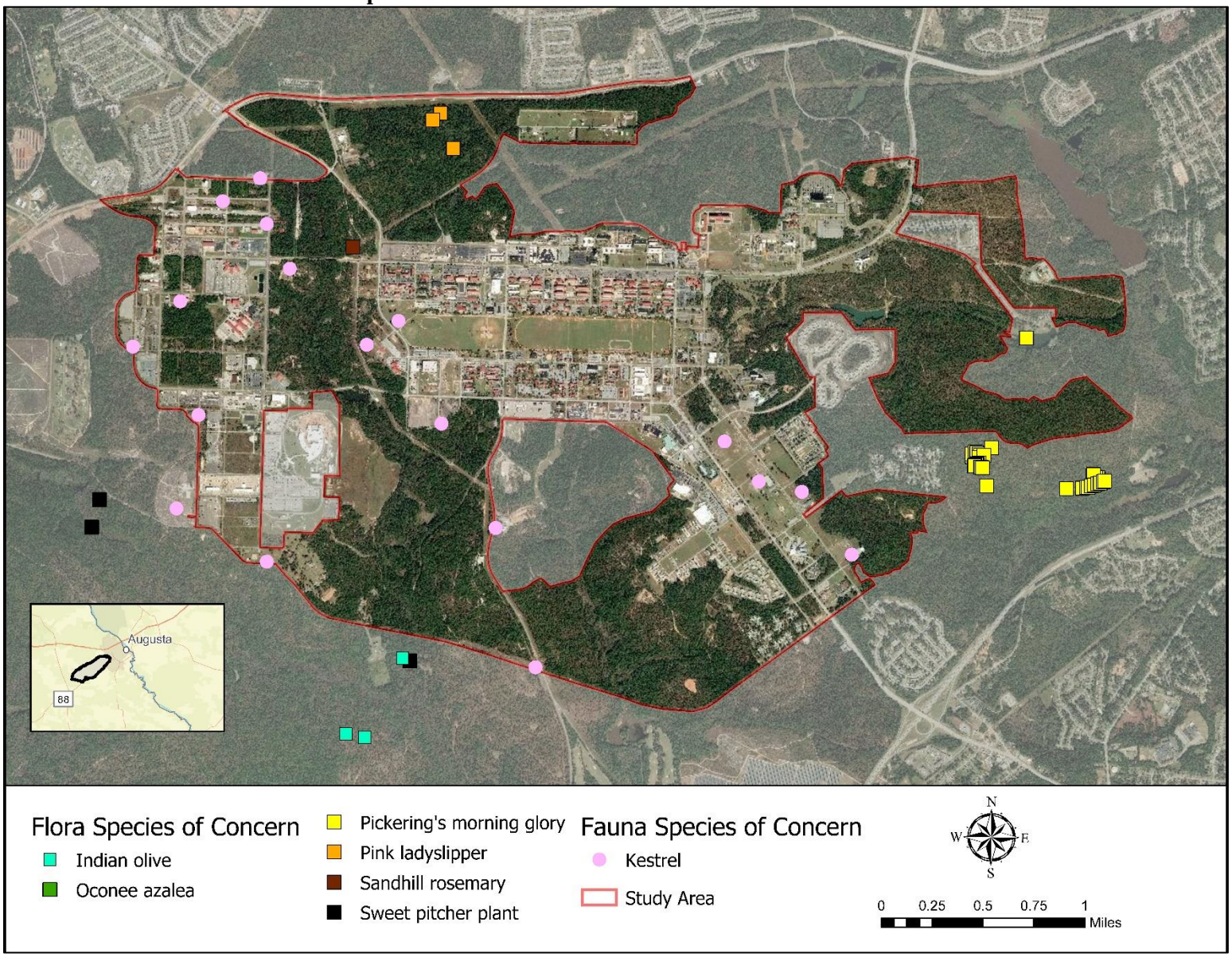
Any construction/renovation, construction staging, and operation of facilities associated with Cyber Growth actions would be conducted such that impacts to protected species would be avoided. This would include ensuring that project personnel are aware of seasonal restrictions on project-related timber and brush removal in order to limit impacts to migratory bird species. To the extent feasible, land clearing will also be scheduled outside of the nesting season (April 1 through July 31 for most species).

Cyber Growth actions would not result in removal of habitat in the RCW or gopher tortoise HMUs or decrease the installation's RCW recovery goal. Cyber Growth actions in Green and Red areas would have negligible impact on biological resources; actions in Amber areas would have minor adverse impacts through effects described above in this section.

3.7.4 No Action Alternative

No impacts would occur to biological resources under the No Action Alternative. No addition in personnel, military training, demolition, renovation, or construction would occur beyond the baseline conditions established in this PEA. The biological resources on the installation would continue to be managed in accordance with the installation's INRMP.

Figure 3-7: Known Locations of Protected Species



3.8 CULTURAL RESOURCES

3.8.1 Affected Environment

The USAGFG ICRMP (USAGFG, 2011) includes:

- detailed information on applicable cultural resources regulatory frameworks;
- regional prehistoric and historic background;
- the history of USAGFG;
- cultural resources investigations and recorded properties; and
- installation-specific standard operating procedures for managing and protecting important sites.

This and other ICRMP information are incorporated here by reference and, therefore, are not repeated. In addition to the ICRMP, USAGFG has a *Programmatic Agreement among the United States Army and the Georgia State Historic Preservation Officer* to help manage its cultural resources (USAGFG, 2006b). USAGFG has determined that the stationing actions are a Federal undertaking with the potential to adversely affect historic properties, as defined under 36 CFR 800.16(y), and, thus, is governed by Section 106 of the NHPA and the implementing regulations at 36 CFR 800.

3.8.1.1 *Archaeological Resources*

USAGFG has completed archaeological surveys on 47,619 acres, or 86 percent of the total land area of the installation. Areas that have not been surveyed include portions of the heavily disturbed cantonment area, impact areas that contain or are likely to contain unexploded ordnance (UXO), and lake bottoms. As of 2015, 1,153 archaeological sites had been identified on USAGFG. Of those, 998 are not eligible for listing on the National Register of Historic Places (NRHP), 114 are potentially eligible, and 41 are eligible for listing on the NRHP. Phase II testing to evaluate the NRHP eligibility of archaeological sites has been completed at 29 sites. A majority of the prehistoric sites are adjacent to water features such as drainages. Many of the historic sites are relict mill sites and homesteads that were razed after the Army purchased the land (USAGFG, 2017b).

3.8.1.2 *Historic Architecture*

USAGFG completed an installation-wide architectural survey in 2005. Through the survey, no buildings or structures were determined to be eligible or potentially eligible for listing on the NRHP. However, on the basis of the recommendation of the Georgia SHPO, Building 33500, Woodworth Library, is considered eligible for the NRHP under Criteria C for the architectural significance of its New Formalism style and Criterion Consideration G for a building less than 50 years old because few buildings of this style remain intact in Georgia. Forty-three structures including the Signal School Campus have been recommended for re-evaluation upon reaching 50 years of age. A re-evaluation survey was conducted in 2015, and the Signal School historic district, Eisenhower Hospital historic district, and Building 36300 were all found to be eligible for listing in the NRHP (USAGFG, 2017b).

3.8.1.3 *Native American Resources*

USAGFG has held on-site consultation meetings and sends out consultation requests for individual actions that could affect archaeological resources or that have widespread effects, such as cultural resource or natural resources management plans, to nine Native American tribes with some ancestral connection to the area. The eligible Native American archaeological sites in the study area will be off limits to development.

3.8.1.4 *Cemeteries*

There are 44 known historic (family) cemeteries at USAGFG that date before the installation's establishment in 1941. Two prisoner of war (POW) cemeteries are on USAGFG near Gate 2. German and Italian POWs who died while in captivity from 1944 through the end of World War II (WWII) were buried in those cemeteries. Families associated with the family cemeteries are allowed new burials if space is available within the original cemetery footprint. No new burials are allowed in the POW cemeteries. USAGFG provides grounds maintenance for all of the cemeteries. The NHPA specifically excludes most cemeteries for consideration for listing on the NRHP.

3.8.2 Environmental Consequences

Threshold of Significance for Cultural Resources: A significant impact would occur if the project would:

- alter the viewshed of historic buildings or districts;
- cause a significant adverse change in the significance of a historical or archeological resource as defined in the NHPA;
- directly or indirectly destroy a unique paleontological resource or site of unique geologic feature; or
- disturb any human remains, including those buried outside of formal cemeteries.

3.8.3 High Growth Alternative

Negligible impacts on cultural resources would be expected to occur from implementing the High Growth Alternative. Cultural resources sites would be avoided when selecting locations for projects. Archaeological materials inadvertently discovered or disturbed during construction, renovation, or demolition activities would be protected in accordance with USAGFG policies, the ICRMP, and Federal regulation, and the treatment of such resources would be coordinated through the installation Cultural Resources Manager, SHPO, and other parties (e.g., Native American or Tribal Historic Preservation Officers) as appropriate. Adverse effects on historic architecture are possible if any project involves renovation of, or new construction affecting, Woodworth Library or the Signal School Campus. Any actions that may impact these structures would need additional evaluation to avoid negative impacts on eligible resources or historic district eligibility. Per the NHPA, such actions would undergo Section 106 consultation if determined to be appropriate for any such proposal.

The only potential sensitive viewsheds that could be impacted by the High Growth Alternative are the potentially historic buildings on USAGFG – Woodworth Library (Building 33500), Hospital District (Buildings 300, 302, and310), Wells Fargo Building (Building 36300), and the Signal School Campus. These buildings are primarily located in the northeastern part of the cantonment area surrounded by primarily Amber development areas, so they will not be prioritized for development. As long as new construction in these viewshed areas is avoided, adverse impacts to visual resources would be minor.

3.8.4 No Action Alternative

No effects on cultural resources would occur under the No Action Alternative. No addition in personnel, military training, demolition, renovation, or construction would occur beyond the baseline conditions established in this EA.

3.9 TRAFFIC AND ROADWAYS

As part of the 2014 RTG PEA, a traffic study was prepared to evaluate the potential traffic-related effects associated with three separate proposed growth projections (3,000, 4,000, and 6,000 combined new personnel) within USAGFG (PrimeAE, 2014). The findings presented in the RTG PEA are relevant to the current Cyber Growth PEA and thus are incorporated herein.

3.9.1 Affected Environment

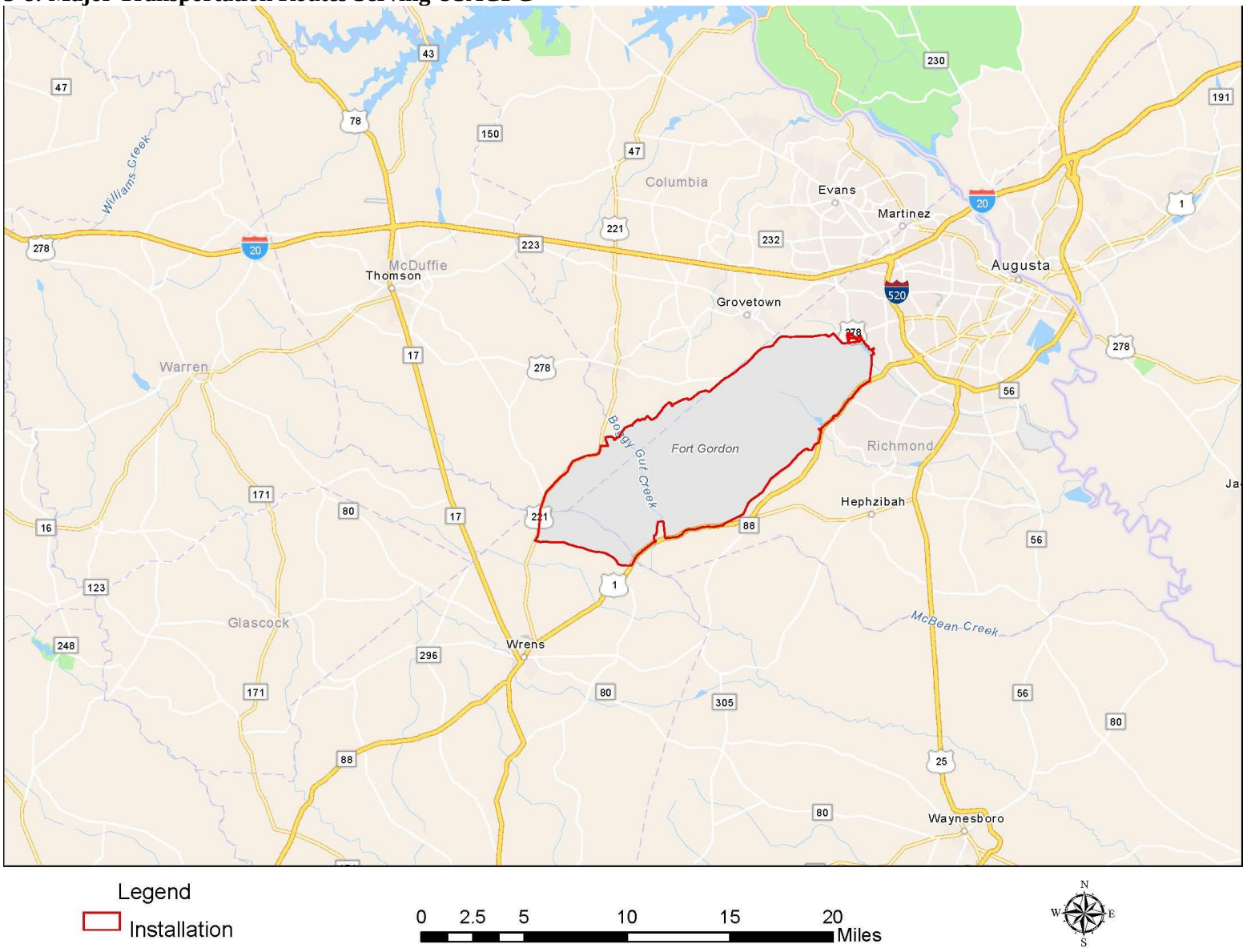
For the purposes of this PEA, traffic and roadways include the highways that provide local and regional access to the cantonment area. The ROI for traffic and transportation encompasses the 22 major intersections within the vicinity of the cantonment area at USAGFG. The operations of intersections (signalized, unsignalized, and roundabouts) are measured by Level of Service (LOS), and the amounts of delay experienced per vehicle during peak commuting hours. LOS describes the operational condition of an intersection and usually falls into one of six categories, A through F. LOS A represents operating conditions with relatively little traffic and no congestion, while LOS F represents relatively high traffic and unpredictable operating conditions including high delay and driver discomfort. Generally, a facility operating at or better than LOS D is considered acceptable.

USAGFG is bounded on the north by U.S. Highway 78/State Highway 10 (Gordon Highway), on the west by U.S. Highway 221, and on the south by U.S Highway 1. Interstate 20 (I-20), located two miles north of the installation, and Interstate 520 (Bobby Jones Expressway), located two miles east of Gate 1, provide access to the installation. Figure 3-8 shows the major transportation routes serving USAGFG.

The transportation system within USAGFG is government owned and maintained. Roadways throughout USAGFG are predominantly asphalt paved. There are no public roads or highways on the installation. Traffic primarily travels east-west through the cantonment using the exterior Chamberlain Avenue and Lane Avenue corridors and interior Barnes Avenue and Brainard Avenue corridors. Traffic primarily travels north-south using Kilbourne Street, Rice Road, 25th

Street, 19th Street, 15th Street, and 10th Street. Four public entrances serve the installation: Gate 1, Gate 2, and Gate 3 (delivery gate) on U.S. Highway 78/Gordon Highway; and Gate 5 on U.S.

Figure 3-8: Major Transportation Routes Serving USAGFG



Highway 1 at Tobacco Road. Visitor access to USAGFG is provided through the Visitor Control Center (VCC) located at Gate 1, and vendors and contractors are provided access through Gate 3. Table 3-10 provides hours and accessibility information for each access point.

Table 3-10: USAGFG Access Gate Information

Gate	Access	Hours
1 - Main Gate	Accessible to all vehicles; Right lane to VCC; Alternate Commercial Gate after 1400 and weekends	24-hours daily
2 – Gordon Highway at Robinson Avenue	Accessible to DOD Common Access Card (CAC) holders and valid visitor passes	Monday-Friday; 0445 - 2000
3 – Gordon Highway	Accessible to all vehicles, but Primarily Commercial Entrance	Monday-Friday 0600 - 1400 Non-Commercial Inbound and POV Inbound/Outbound 1400 – 1800
5 – Tobacco Road	Accessible to all vehicles	0430 - 0100 daily

Source: USAGFG, 2019e

USAGFG employees and visitors who enter the installation at Gates 1 and 2 experience congestion and delays during peak commuting hours (USAGFG, 2016). This congestion frequently affects the flow of traffic on Gordon Highway, the installation, and throughout the Grovetown area. Planned workforce expansion at USAGFG is projected to exacerbate the traffic situation in these areas and potentially hinder emergency access (USAGFG, 2016).

As stated in the EA for the New Access Control Point, during peak traffic times, traffic backs up (i.e. queues) on Gordon Highway and into Grovetown on East Robinson Avenue due to the lack of stacking space on USAGFG (i.e. sufficient space for queued-up vehicles between the installation entrance and the access control point (ACP) where driver's credentials are inspected) (USAGFG, 2016). Congestion also occurs on USAGFG between the existing ACPs and critical mission support locations during peak traffic times. In addition, the existing VCC is too small to accommodate the number of visitors that are processed on a typical weekday. Gate 3 also experiences safety concerns and extensive delays as a result of the increased amount of commercial traffic that uses this gate. There is insufficient stacking space for large commercial trucks between the Gate 3 check point and Gordon Highway. In addition, the Gate 3 vehicle search area and trailer used for background checks are both insufficiently sized for the amount of commercial traffic using this gate (USAGFG, 2016).

USAGFG further analyzed traffic conditions within the cantonment area in a November 2017 study (USAGFG, 2017c). The study included establishment of current baseline traffic volumes, anticipated changes to major transportation infrastructure elements over the next 10 years, projected changes in traffic volumes over the 10-year period, and short-term and long-term transportation projects needed to safely provide for existing and future transportation demands. The traffic study concluded that traffic volumes throughout USAGFG will grow between 10 percent and 35 percent over the 10-year planning horizon and recommended a traffic improvement

plan that identified several projects to mitigate deficiencies at several intersections within the cantonment (USAGFG, 2017c).

Accordingly, the Army approved the traffic improvement plan and it is being implemented in order to mitigate these adverse traffic effects at USAGFG. Improvements include 2.4 miles of widening and reconstruction on Gordon Highway from the future site of USAGFG's new Gate 6 to Robinson Avenue (Central Savannah River Area [CSRA] Alliance Fort Gordon, 2019c). This project will create a new signalized intersection to accommodate anticipated increased traffic volume and changes to USAGFG's access plan. The anticipated completion date is June 2021. The new Gate 6 will be located six miles west of Gate 1 and would establish an access point onto USAGFG that would reduce traffic congestion on roadways servicing USAGFG and provide a shorter, more direct route to on-post areas that would experience the greatest growth (USAGFG, 2016). Further, the new Gate 6 would accommodate mission expansions and personnel increases at USAGFG, improve traffic flow in and out of the installation, and allow for more effective processing of both visitors and commercial vehicles. It would greatly reduce, and potentially eliminate, queuing along East Robinson Avenue toward Grovetown. In turn, this would help ensure public safety, and enhance emergency access to the installation and other areas north of the post (USAGFG, 2016).

3.9.2 Environmental Consequences

Threshold of Significance for Traffic and Roadways: A significant transportation impact would occur if the Proposed Action would:

- Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system;
- cause 50 percent or more of the intersections evaluated in the ROI to decline from LOS D or better to LOS E or F;
- substantially increase hazards due to a design feature;
- noticeably hinder emergency access; or
- overwhelm existing parking capacity.

In addition, a project may contribute toward a substantial cumulative effect if its traffic, when taken together with traffic from past, present and reasonably foreseeable future projects, causes intersection LOS to decline from LOS D or better to LOS E or F.

3.9.3 High Growth Alternative

The High Growth Alternative is expected to have minor adverse impacts on traffic and roadways. Under the High Growth Alternative, it is anticipated that a majority of development would occur in the Gordon West District (proximate to Gate 3, 9th Street, and 15th Street). Thus, a majority of new operational traffic would occur in this area. Up to 5,000 new personnel are projected under the High Growth Alternative by FY 2025. Despite this, the number of POVs traveling to and from USAGFG would be anticipated to increase over baseline levels by only 3,000 vehicles per weekday; this number accounts for a 0.6 commuting factor (e.g. more than one person per vehicle).

As stated in the RTG PEA, a total of 11 intersections would have significant adverse traffic conditions (LOS E or F) under an alternative with up to 6,000 new personnel (USAGFG, 2014).

As previously described, the management and mitigation measures identified in the 2017 traffic improvement plan, along with the new Gate 6, would be implemented under the current High Growth Alternative to ensure LOS D or better. Additionally, parking areas would be constructed or expanded to account for the increase in POVs in the West District.

Once Gate 6 is operational, USAGFG will monitor traffic conditions and will complete another traffic study and additional traffic mitigation, should it be required as additional Cyber Growth projects are completed.

3.9.4 No Action Alternative

Under the No Action Alternative, there would be no staffing increases associated with the High Growth Alternative. Thus, baseline traffic conditions would remain as previously discussed; however, the new Gate 6 would still be implemented and, once operational, would further reduce traffic congestion for the existing population traveling to and from the installation. Additionally, USAGFG would continue to implement the 2017 traffic improvement plan necessary to mitigate the significant adverse traffic impacts identified in the RTG PEA, including improvements at 11 of 22 intersections within USAGFG identified as having significant adverse traffic conditions (LOS E or F) (USAGFG, 2014). These improvements are projected to improve these intersections to LOS D or better (USAGFG, 2014).

3.10 INFRASTRUCTURE AND UTILITIES

3.10.1 Affected Environment

3.10.1.1 *Potable Water*

USAGFG's potable water system was privatized to the City of Augusta Utilities Department (AUD) in 2006. AUD is responsible for the operation and maintenance of the city's water systems. AUD's water is supplied from two sources – the Savannah River provides water for the Surface Water Treatment Plant and the Cretaceous Aquifer provides water for the Ground Water Treatment Plant (Augusta Utilities Department [AUD], 2012). In an April 23, 2012, letter, the Augusta Planning and Development Department indicated that the existing potable water system to the installation can accommodate substantial growth.

3.10.1.2 *Domestic and Industrial Wastewater*

USAGFG's wastewater system was also privatized to AUD in 2006. AUD is responsible for the operation and maintenance of the city's wastewater systems. AUD's main Wastewater Treatment Plant (WWTP), the James B. Messerly WWTP, located near the Augusta Airport, has a permitted average design flow of 46.1 million gallons per day (mgd) and currently treats approximately 34 mgd (AUD, 2009; USEPA, 2006; and USEPA, 2009). AUD also operates a smaller treatment plant, the Spirit Creek WWTP, located south of Tobacco Road, which is permitted to treat approximately 2.24 mgd (AUD, 2009).

The USAGFG WWTP has been taken offline and the base connected to the Augusta-Richmond County system. Demolition of the WWTP was completed in 2011. USAGFG's WWTP had a design capacity of 5 mgd, although daily flow is approximately 2 mgd (USAGFG, 2010). Treated wastewater was discharged into Spirit Creek under NPDES permit No. GA0003484 which expired in November 2011. The gravity sewer collection system is in good condition and provides adequate service for all portions of the cantonment area. Three projects were recommended based on the findings of a 2017 Infrastructure Capacity Analysis in order to accommodate growth on the installation – upgrades to the North Trunk Sewer, 15th Street Collector Sewer, and Cross Basin Sewer Force Main (USAGFG, 2017a). One of these projects, the North Trunk Sewer, has already been completed, and the other two are scheduled to be completed in FY 2020. Septic tanks are used to treat sanitary wastewater at remote locations of the installation not served by the sanitary sewer system (USAGFG, 2006a). The septic systems remain Army-owned and maintained.

3.10.1.3 *Electric and Gas*

USAGFG's electrical service was privatized in February 2007, and is owned and operated by Georgia Power Company. The system receives 115 kilovolts (kV) primary input at two jointly owned and operated substations (main and hospital), which provide electrical power to the entire installation (USAGFG, 2017a).

Natural gas is provided by Atlanta Gas and Light Company, which owns the main natural gas distribution piping on USAGFG and all system piping and components downstream of the regulators up to the facilities. An 8-inch diameter main runs through USAGFG along a dedicated 10-foot easement for the 8.5 miles of pipe (USAGFG, 2006a). Natural gas is supplied to heating and cooling plants, housing, barracks, medical facilities, academic facilities, and other facilities (USAGFG, 2017a).

3.10.1.4 *Telecommunications*

The Army owns and operates the on-post business telecommunication system. The switchboard has a capacity of 14,200 lines, of which 5,300 lines are in use. BellSouth provides commercial telephone service for the family housing, guest house, and bachelor officer's quarters (USAGFG, 2017a). All telecommunications are distributed throughout the installation by buried cable and overhead lines (USAGFG, 2006a).

3.10.1.5 *Solid Waste Management*

USAGFG operates one active landfill, the Fort Gordon Landfill on Gibson Road, which is permitted by Georgia under Permit 121-014D (SL). The landfill accepts nonhazardous demolition debris from the installation that cannot be recycled; however, use of the landfill is restricted and must be coordinated through the Directorate of Public Works (USAGFG, 2017a). The Fort Gordon Landfill receives approximately 2,736 cubic yards of waste per year and has 121,873 cubic yards of capacity remaining, which is equivalent to approximately 45 years of capacity (Georgia Department of Community Affairs [GADCA], 2012).

Other solid waste is disposed of at the Augusta-Richmond County Landfill on Deans Bridge Road by third-party vendors (USAGFG, 2017a). The landfill operates under Georgia Permit 121-018D (MSWL). The landfill receives approximately 406,536 cubic yards of waste per year and has approximately 65,857,376 cubic yards of remaining capacity, or 162 years (GADCA, 2012).

USAGFG actively participates in recycling/waste minimization efforts. Metals and paper/cardboard are collected for off-post recycling. Yard wastes and woody debris from grounds maintenance are processed at the on-post compost facility/mulch pit located in TA 17 (USAGFG, 2006a).

3.10.2 Environmental Consequences

Threshold of Significance for Infrastructure and Facilities: A significant impact would occur if the project would result in a substantial increase in any utility consumption to the extent that an existing or planned capacity is exceeded, based on currently available projections, or unacceptable demands are placed on infrastructure supply and distribution system.

3.10.3 High Growth Alternative

3.10.3.1 *Potable Water*

The High Growth Alternative is expected to have minor adverse impacts to potable water. The potable water demand under the High Growth Alternative is expected to increase by approximately 350,000 gpd, assuming an average potable water use of 70 gpd per person and an increase of 5,000 personnel. This would amount to a 21 percent increase in potable water use, from 1.9 mgd to 2.3 mgd. The Highland Avenue Water Treatment Plant has a capacity of 60 mgd and an average convention flow rate of 24 mgd. The existing potable water delivery system at USAGFG is sufficient enough to support the High Growth Alternative. Improvements have been made as needed over the past years, and USAGFG has current and future plans to update their facilities, mainly focusing on replacing outdated water mains (USAGFG, 2017a).

3.10.3.2 *Domestic and Industrial Wastewater*

The High Growth Alternative is expected to have minor adverse impacts to wastewater. Under the High Growth Alternative, assuming average wastewater generation of 13 gpd per person and an increase in personnel of 5,000, there would be an increase of 65,000 gpd of wastewater on USAGFG. These only take domestic usage into consideration, as no potential buildings have been designed yet and the wastewater requirements have not been determined. Additional wastewater needs could be identified at that time, and would be addressed in supplemental NEPA documentation, as needed.

USAGFG typically discharges 1.6 to 1.7 mgd of wastewater, with a peak flow of 2.0 to 3.8 mgd. The maximum discharge rate for the AUD's sanitary sewer system is 4.8 mgd. The discharge flow rate causes surcharge of 4.0 mgd that overflows into the Spirit Creek Interceptor. To limit surcharge, the force main operates cyclically; however, an increase in development and usage of the wastewater system would increase the surcharge into the Spirit Creek Interceptor.

Based on the 2017 Infrastructure Capacity Analysis, three upgrades to the wastewater system were recommended to accommodate growth on USAGFG - North Basin Sewer, 15th Street Collector Sewer, and Cross Basin Sewer Force Main. All three of these upgrades will have been completed by the end of FY 2020, so the existing wastewater conditions should be adequate to support the existing infrastructure on USAGFG and the projected growth associated with the High Growth Alternative.

3.10.3.3 *Electric and Gas*

The High Growth Alternative is expected to have minor adverse impacts to the electric and natural gas systems. The main current substation consists of two 40 megavolt-ampere (mVA) transformers that serve the main post cantonment area. The electricity demand in 2017 was 33.7 mVA, 38 percent of the current capacity of utility transformers.

The electric system is in good operating condition and is capable of supporting a High Growth Alternative. To accommodate for an increase in electric usage at the Proposed Action sites, demands could be shared with the NSA substations. However, a new facility may need to be constructed to accommodate the growth from the Proposed Action.

The natural gas system's current capacity is 400 to 500 thousand cubic feet per hour (mcfh) with a peak demand of 150 to 200 mcfh. There is a 50-70 percent remaining capacity in natural gas usage, so adverse impacts to natural gas availability are expected to be minor. There is the potential for a new central utility plant (CUP) – CUP West – on USAGFG to accommodate growth. Should this proposed plant be built, there is the potential for the plant and its backup power to require natural gas capacity upgrades, but those would be addressed in separate NEPA documentation should that project be implemented.

3.10.3.4 *Telecommunications*

The High Growth Alternative is expected to have minor adverse impacts to telecommunications. The existing telecommunication lines are in good condition. Updates are being planned by USAGFG to further improve the telecommunications system.

3.10.3.5 *Solid Waste Management*

The High Growth Alternative is expected to have minor adverse impacts to solid waste management. The landfill being utilized by USAGFG is in good operating condition. Additionally, no new types of wastes are anticipated to be generated.

3.10.4 No Action Alternative

Under the No Action Alternative there would be no adverse impacts to infrastructure and utilities because all utilities are currently operating at an adequate level to accommodate the existing infrastructure as well as the potential Cyber Growth projects.

3.11 SOCIOECONOMICS, ENVIRONMENTAL JUSTICE, AND PROTECTION OF CHILDREN

3.11.1 Affected Environment

The socioeconomic conditions evaluated for this PEA include the economic and demographic environment within a geographic ROI that could be impacted by the Proposed Action and No Action Alternative. The majority of the installation and the entire cantonment area are located in Richmond County, Georgia. A small portion of the TAs are in Columbia, Jefferson, and McDuffie Counties. The majority of the current USAGFG workforce resides in Richmond and Columbia Counties. For these reasons, the ROI for socioeconomic effects for the Proposed Action includes Richmond and Columbia Counties. For comparative purposes, socioeconomic data are presented for the state of Georgia and the United States, where applicable.

The socioeconomic impact analysis focused on construction costs and the local economic benefits consequent to increases in personnel. Economic impacts are defined to include direct effects, such as changes to employment and expenditures that affect the flow of dollars into the local economy and indirect effects, which result from the "ripple effect" of spending and re-spending in response to the direct effects. Induced impacts are the result of spending of the wages and salaries of the direct and indirect employees on items such as food, housing, transportation, and medical services. This spending creates induced employment in nearly all sectors of the economy, especially service sectors, and can flow outside of the region of influence.

The analysis presented in the current PEA also addresses potential disproportionately high and adverse impacts to minority and/or low income populations consistent with EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, and environmental health and safety risks to children consistent with EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*.

3.11.1.1 *Population*

USAGFG has approximately 16,000 service members (including active duty, national guard and reserve) and another 9,000 civilian employees, and supports a population of roughly 80,000, including military families, contractors, retirees and others (USAGFG, 2019c). Approximately 13,000 people are expected to move to the region over the next 5 years (CSRA Alliance Fort Gordon, 2019a). Additionally, population projections for the Richmond-Augusta area indicate a 4.67 percent increase from the year 2020 through 2040. Estimated growth is expected to occur near the northeastern boundary of USAGFG (CSRA Alliance Fort Gordon, 2019a).

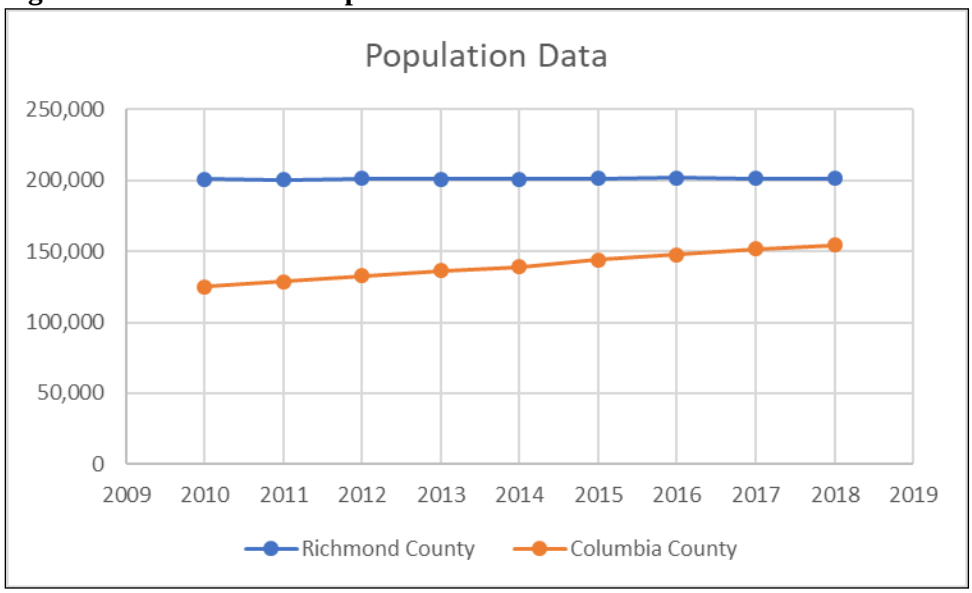
The ROI population is approximately 355,000 (Table 3-11 and Figure 3-9) (U.S. Census Bureau, 2019). The population in Richmond County remained relatively unchanged from 2012 to 2018, while populations in Columbia County and Georgia increased by approximately 16 percent and 6.8 percent, respectively, over this same period (U.S. Census Bureau, 2019).

Table 3-11: ROI Population Data

Geography	Population Estimates				
	2010	2012	2014	2016	2018
Richmond County, Georgia	200,917	201,572	201,166	201,801	201,554
Columbia County, Georgia	124,977	132,560	139,151	147,477	154,291
State of Georgia	9,711,810	9,901,496	10,069,001	10,304,763	10,519,475

Source: U.S. Census Bureau, 2019

Figure 3-9: ROI Annual Population Estimates



Source: U.S. Census Bureau, 2019

3.11.1.2 *Demographics*

As shown in the summary of demographic information for the ROI in Table 3-12, the population of Richmond County is 56 percent Black or African American Alone, 38 percent White Alone, and 4.8 percent Hispanic or Latino (U.S. Census Bureau, 2019). The population of Columbia County is 70 percent White Alone, 15.4 percent Black or African American Alone, and 5.8 percent Hispanic or Latino. The population of Georgia is 58 percent White Alone, 30.4 percent Black or African American Alone, and 9 percent Hispanic or Latino. 14.1 percent of the people in Georgia speak a non-English language (U.S. Census Bureau, 2019).

Table 3-12: ROI Demographic Information

Ethnicity	Georgia	Richmond County	Columbia County
White alone	58%	38%	70%
Black or African American alone	30.4%	56.0%	15.4%
American Indian and Alaska Native alone	0.3%	0.2%	0.4%

Ethnicity	Georgia	Richmond County	Columbia County
Asian alone	3.7%	1.8%	3.7%
Native Hawaiian and Other Pacific Islander alone	0.0%	0.2%	0.0%
Some Other Race alone	2.7%	1.1%	0.9%
Two or More Races	2.3%	2.5%	2.9%
Hispanic or Latino (of any race)	9.0%	4.8%	5.8%
White alone, Not Hispanic or Latino	52.0%	35.5%	65.3%

Source: U.S. Census Bureau, 2019

3.11.1.3 *Employment and Income*

USAGFG is the largest employer in the ROI, with approximately 32,595 military, civilian and contractor employees. Calculations by others using a conservative Department of Commerce multiplier of 2:1 have estimated that 63,748 community jobs are supported as a result of this employment at USAGFG (CSRA Alliance Fort Gordon, 2019a). The estimated total economic impact of activities at USAGFG is over $2.4B annually (CSRA Alliance Fort Gordon, 2019a).

In 2017, Richmond County had a median household income of $39,430 (U.S. Census Bureau, 2019). Between 2016 and 2017, Richmond County's median household income grew from $38,595 to $39,430, a 2.16 percent increase. The economy of Richmond County employs approximately 78,000 people. The largest industries in Richmond County are Health Care & Social Assistance (13,782 people), Retail Trade (10,724 people), and Accommodation and Food Services (8,077 people), and the highest paying industries are Utilities ($51,652), Professional, Scientific, & Technical Services ($41,390), and Transportation, Warehousing, and Utilities ($37,656). The Richmond County population below the poverty level was 21.9 percent in 2018 (U.S. Census Bureau, 2019).

In 2017, Columbia County had a median household income of $74,162 (U.S. Census Bureau, 2019). Between 2016 and 2017, Columbia County's median household income grew from $71,962 to $74,162, a 3.06 percent increase. The economy of Columbia County employs approximately 63,000 people. The largest industries in Columbia County are Health Care & Social Assistance (10,887 people), Retail Trade (7,569 people), and Educational Services (6,013 people), and the highest paying industries are Mining, Quarrying, and Oil and Gas Extraction ($110,875), Utilities ($92,500), and Transportation, Warehousing, and Utilities ($69,577). The Columbia County population below the poverty level was 7.1 percent in 2018 (U.S. Census Bureau, 2019).

In 2017, Georgia had a median household income of $56,183, which is less than the median annual income of $60,336 across the entire U.S. (U.S. Census Bureau, 2019). Between 2016 and 2017, Georgia's median household income grew from $53,559 to $56,183, a 4.9 percent increase. The population in Georgia below the poverty level was 14.3 percent in 2018 (U.S. Census Bureau, 2019).

3.11.1.4 *Housing*

The median property value in Richmond County was $100,200 in 2017, which is 0.46 times (or 46 percent of) the national average of $217,600 (U.S. Census Bureau, 2019). Between 2016 and 2017, the median property value decreased by 0.4 percent, from $100,600 to $100,200. In 2017, the homeownership rate in Richmond County was 53.1 percent, which is lower than the national average of 63.9 percent. In 2017, 53.1 percent of the housing units in Richmond County were occupied by their owner, up slightly from 52.6 percent in 2016 (U.S. Census Bureau, 2019).

The median property value in Columbia County was $183,800 in 2017, which is 0.85 times (or 85 percent of) the national average of $217,600 (U.S. Census Bureau, 2019). Between 2016 and 2017, the median property value increased by 4.2 percent, from $176,400 to $183,800. In 2017, the homeownership rate in Columbia County was 78.5 percent, which is higher than the national average of 63.9 percent. In 2017, 78.5 percent of the housing units in Columbia County were occupied by their owner, up slightly from 77.9 percent in 2016 (U.S. Census Bureau, 2019).

The median property value in Georgia was $173,700 in 2017, which is 0.8 times (or 80 percent of) the national average of $217,600 (U.S. Census Bureau, 2019). Between 2016 and 2017, the median property value increased from $166,800 to $173,700, a 4.14 percent increase. In 2017, the homeownership rate in Georgia was 62.9 percent, which is lower than the national average of 63.9 percent. In 2017, 62.9 percent of the housing units in Georgia were occupied by their owner. This percentage grew from the previous year's rate of 61.5 percent (U.S. Census Bureau, 2019).

3.11.1.5 *Schools*

Area school districts receive over $1.2M annually in impact aid, which is funding provided by the Department of Education to compensate for Federal employees who do not pay property or Georgia state taxes because they live in government housing or are out-of-state residents (CSRA Alliance Fort Gordon, 2019a).

Children of personnel assigned to USAGFG typically attend public schools in either Richmond or Columbia County (USAGFG, 2014). Elementary and middle school students living on the installation attend Freedom Park Elementary School, a Richmond County Board of Education (BOE) school located on USAGFG. High school students living on the installation attend Richmond Academy High School. Transportation is provided by Richmond County.

Outside of USAGFG, the Richmond County School System (RCSS) serves approximately 32,000 students in 56 schools, making it the 10th largest school district in Georgia (Richmond County School System [RCSS], 2019). With over 4,000 employees, RCSS is the third largest employer in Augusta-Richmond County (RCSS, 2019). The Columbia County School District (CCSD) serves approximately 27,520 students in 32 schools, making it the 15th largest district in Georgia (Columbia County School District [CCSD], 2019). The Columbia County School District is the largest employer within Columbia County, with nearly 3,500 employees (CCSD, 2019).

3.11.1.6 *Public Health and Safety*

USAGFG has its own 911 call center, fire, and emergency services. The installation maintains mutual aid agreements regarding emergency services with Richmond and Columbia Counties.

Police. The USAGFG Police Department, part of the Directorate of Emergency Services, provides law enforcement and property protection at USAGFG. Police functions include protecting life and property, enforcing criminal law, conducting investigations, regulating traffic, providing crowd control, and performing other public safety duties. City, county, and state police departments provide law enforcement in the ROI.

Fire. The USAGFG Fire Department, part of the Directorate of Emergency Services, provides emergency firefighting and rescue services at USAGFG. Fire prevention is another service provided by the USAGFG Fire Department. Fire prevention activities include providing fire safety advice and ensuring that structures are equipped with adequate fire precautions to ensure that in the event of a fire, people can safely evacuate the premises unharmed.

Medical. The DDEAMC is located on USAGFG and provides healthcare services for military personnel, military dependents, and military retirees and their dependents (DDEAMC, 2019). DDEAMC services include audiology/speech pathology, dermatology, dietetics, emergency services, family medicine, internal medicine, obstetrics/gynecology, occupational therapy, ophthalmology, optometry, orthopedics, otolaryngology, pediatrics, physical therapy, psychiatry, surgery, podiatry, psychology, social work, and substance abuse (DDEAMC, 2019).

3.11.1.7 *Family Support Services*

The USAGFG Directorate of Family, Morale, Welfare, and Recreation (DFMWR) seeks to bridge the gap between the garrison and the local community, and contribute to the Army's strength and readiness by offering services that reduce stress, build skills and self-confidence for Soldiers and their families (USAGFG, 2019b). Services provided at USAGFG include childcare, youth programs, and deployment readiness for families, employment readiness, financial readiness, relocation readiness, exceptional family member support, Warrior in Transition support, and survivor outreach.

3.11.1.8 *Recreational Facilities*

USAGFG facilities or programs for recreation include fitness centers, swimming pools, athletic fields, a golf course, a bowling center, a bingo center, and sports teams. USAGFG existing outdoor recreation program and facilities include:

- Tactical Advantage Sportsman's Complex
- Freedom Park and Freedom Park Trail System
- Hilltop Riding Stables
- Leitner Lake
- Wilkinson Lake
- Sandy Run Nature Trail and Wildlife Viewing Area

- Pointes West Army Recreation Area

3.11.1.9 *Environmental Justice and Protection of Children*

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, encourages Federal facilities to achieve "environmental justice" by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations. Accompanying EO 12898 was a Presidential transmittal memorandum that referenced existing Federal statutes and regulations to be used in conjunction with EO 12898. One of the items in this memorandum was the use of the policies and procedures of NEPA, specifically that, "Each Federal agency shall analyze the environmental effects, including human health, economic, and social effects, of Federal actions, including effects on minority communities and low-income communities, when such analysis is required by the NEPA 42 USC, Section 4321, et seq."

To determine whether the ROI contains a disproportionately high minority or low-income population, data for Richmond and Columbia Counties were compared to data for Georgia and the United States.

Within the ROI (Richmond and Columbia Counties combined), approximately 48 percent of the population is considered minority, which is higher than both state (42 percent) and national (23.5 percent) averages (U.S. Census Bureau, 2019). African Americans accounted for the largest minority populations in both Richmond County (56 percent) and Columbia County (15.4 percent).

Within the ROI, approximately 17 percent of the population lived at or below the poverty level in 2018, which is higher than Georgia (14.3 percent) and the national (11.8 percent) average (U.S. Census Bureau, 2019). Poverty rates indicate low-income populations are relatively higher in Richmond County than elsewhere in the ROI (Table 3-13).

Table 3-13: Income and Poverty Data

Category	United States	Georgia	Richmond County	Columbia County
Median household income (in 2017 dollars), 2013-2017	$57,652	$52,977	$39,430	$74,162
Per capita income in past 12 months (in 2017 dollars), 2013- 2017	$31,177	$28,015	$21,464	$31,720
Persons in poverty, percent	11.8%	14.3%	21.9%	7.1%

Source: U.S. Census Bureau, 2019

3.11.2 Environmental Consequences

Threshold of Significance for Socioeconomics: A significant impact would occur if the project would:

- induce a substantial population growth or decline in an area, either directly or indirectly;

- displace substantial numbers of existing housing units or people, necessitating the construction of replacement housing elsewhere;
- produce a regional job decline or regional income decline that exceeds 5 percent according to the Regional Economic Systems (RECONS) economic model;
- produce an impact to the regional economy that would exceed the historical precedent for past economic fluctuation for employment and regional income;
- produce substantial disproportionate adverse environmental, economic, social, or health impacts on minority or low-income populations;
- produce disproportionate environmental health or safety risk to children;
- produce a substantial increased public safety hazard from military operations; or
- produce a long-term substantial loss of recreational opportunities and resources relative to baseline.

This PEA evaluates the economic impacts of the High Growth Alternative using the Regional Economic Systems (RECONS) model. This model has been used by the Army to estimate the economic impacts of base closures and realignments, and is useful in estimating the High Growth Alternative economic impacts. The model was also run for the No Action Alternative to generate a baseline against which the impacts of the High Growth Alternative could be compared. Based on the RTG PEA, the No Action Alternative includes staffing increases of 1,500 with total expenditures of approximately $75 million (adjusted for 2021 dollars).

For each alternative, the model assumed that 65 percent of the personnel increases are military, 35 percent are civilian, and that 100 percent of these new personnel will live off-post. The average salary for military and civilian personnel was estimated at $50,000.

3.11.3 High Growth Alternative

The RECONS model results of economic impact analyses for the High Growth Alternative are positive in nature; benefits increased as the projected number of staff increase annually from 2021 through 2025, when full staffing levels would be achieved. This alternative would result in negligible increases to sales volume and income and significant increases in employment and population.

The expenditures associated with the High Growth Alternative in FY 2025 (when full staffing and facilities construction/renovation is complete) are estimated to be $487,550,000. Of this total expenditure, over $400 million will be captured within the local impact area (Augusta-Richmond County). The remainder of the expenditures will be captured within the state impact area and the nation. These direct expenditures generate additional economic activity, often called secondary or multiplier effects. The direct and secondary impacts are measured in output, jobs, labor income, and gross regional product (value added) as summarized in Appendix D. The regional economic effects are shown for the local, state, and national impact areas. In summary, the Civil Works expenditures $250,000,000 support a total of 2,694.0 full-time equivalent jobs, $163,588,000 in labor income, $224,922,000 in the gross regional product, and $290,901,000 in economic output in the local impact area. More broadly, these expenditures support 4,845.1 full-time equivalent jobs, $293,532,000 in labor income, $410,123,000 in the gross regional product, and $572,201,000 in economic output in the nation.

3.11.3.1 *Housing*

The High Growth Alternative would have minor impacts, some adverse and some beneficial, on housing. The increase in personnel was anticipated to produce a substantial increase in the demand for rentals and purchases of housing off-post, since many personnel would live off-post (USAGFG, 2014). The housing market in the ROI should be able to handle the increased demand generated by an additional 5,000 new workers at USAGFG. Additionally, long-term beneficial impacts to housing are expected in the form of higher occupancy rates of existing rental and purchased housing and increased demand for construction of new housing in the ROI.

This increase in housing demand may lead to an increase in housing costs. According to real estate data analytics firm Zillow, in the Augusta-Richmond County Metro real estate market (encompasses Richmond County), the median home value was $156,600 in 2019, up 4.4 percent over the past year; housing costs are predicted to rise 3.8 percent within the next year, which is below the 1-year Georgia forecast (5.5 percent) but above the national forecast (3.4 percent) (Zillow, 2019). The median rental price in Augusta-Richmond County Metro is $1,185 per month, which is lower than the Georgia median of $1,445 and the national median of $1,588. In Richmond County alone, the median rent price is $945, which is also lower than the larger Augusta-Richmond County Metro median of $1,185 (Zillow, 2019).

In Columbia County, the median home value is $200,400, which represents a 4.3 percent increase over the past year; housing costs are predicted to rise 2.7 percent within the next year, which is below the 1-year forecast for both Georgia (5.5 percent) and nationally (3.4 percent) (Zillow, 2019). The median rental price in Columbia County is $1,295 per month, which is higher than the Augusta-Richmond County Metro median of $1,185, but lower than the average for Georgia ($1,445) and nationally ($1,588) (Zillow, 2019).

3.11.3.2 *Schools*

The High Growth Alternative is expected to have minor impacts, some adverse and some beneficial, to school districts. An estimated 5,760 children would accompany the additional personnel under this alternative and most would be attending schools in the ROI (USAGFG, 2014). If this increase occurred over a relatively short period (e.g. 1-2 years), it could lead to school overcrowding. The anticipated increase in schoolchildren (5,760) under the High Growth Alternative represents a 10 percent increase over current enrollment (56,522 students in Fall 2018) and would require the Richmond and Columbia County school districts to take steps to accommodate the additional students, either by adding classes, expanding existing schools, or constructing additional schools, as well as adding more educational staff. However, an increase could also result in more Title 1 Federal impact aid for the public schools in the ROI, which would be beneficial to the school systems.

3.11.3.3 *Public Health and Safety*

The High Growth Alternative is expected to have minor adverse impacts to public health and safety. Under the High Growth Alternative, personnel levels would increase by approximately 15 percent, from approximately 32,600 personnel to 37,600 personnel. Accordingly, the use of police,

fire, and medical services will increase under the Proposed Action. USAGFG will consider the need for improvements to these services in the long-term master planning process.

3.11.3.4 *Family Support Services*

The High Growth Alternative is expected to have minor adverse impacts to family support services. As the installation population increases under the Proposed Action, DFMWR programs and facilities are expected to be increasingly used by soldiers, civilians, and their families. USAGFG will evaluate the need for increased facilities and/or program availability as the number of personnel increases as part of Cyber Growth activities. Consideration would be given to program and/or infrastructure improvements should the increased personnel levels result in an increased demand for these services that current staffing and facilities could not accommodate.

3.11.3.5 *Recreational Facilities*

The High Growth Alternative is expected to have minor adverse impacts to recreational facilities. Due to the expected increase in personnel under the High Growth Alternative, it is anticipated that recreational facilities would be used by more soldiers, civilians, and their families. Despite increased use of these facilities, the quality of these services is not expected to decline as a result of the Proposed Action. USAGFG will evaluate the need for potential improvements to these services in the long-term master planning process.

3.11.3.6 *Environmental Justice and Protection of Children*

The High Growth Alternative is expected to have minor beneficial impacts to environmental justice and protection of children. Consistent with the findings presented in the RTG PEA, the High Growth Alterative would result in an increase in military contract spending, which would produce beneficial impacts to minority and low-income families in the ROI, particularly in Richmond County where minority populations are highest (U.S. Census Bureau, 2019). Beneficial impacts in the form of additional employment opportunities on- and off-installation and increased Federal assistance to schools would have a long-term beneficial impact on minority and low-income individuals and any children of these families.

3.11.4 No Action Alternative

Under the No Action Alternative, no addition in personnel, or facility construction would occur beyond those associated with Cyber Growth. There would be no impact on housing, schools, public health and safety, family support services, and recreational facilities. The No Action Alternative would not produce disproportionate effects on minority or low-income populations or children.

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4 CUMULATIVE IMPACTS

The requirement to assess cumulative impacts as part of the EA process is set by NEPA (40 CFR 1508.7) and further discussed within the Army context by 32 CFR 651.16, *Environmental Analysis of Army Actions*. Further guidance on this process is provided by the CEQ in its document, *Considering Cumulative Impacts under the National Environmental Policy Act* (Council on Environmental Quality [CEQ], 1997).

Cumulative impacts are considered to be the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time. Informed decision making is served by consideration of cumulative impacts resulting from projects that are proposed, under construction, recently completed, or anticipated to be implemented in the foreseeable future.

4.1 REGION OF INFLUENCE

The scope of the cumulative impacts analysis involves both the geographic extent of the impacts and the time frame in which the impacts could be expected to occur. For this PEA, the ROI delimits the geographic extent of the cumulative impacts analysis. Due to the geographic scope and relatively local environmental interactions that are anticipated, the ROI for this cumulative impacts analysis is the same for each resource as described in Chapter 3.

The time frame for cumulative impacts centers on the timing of the proposed action; specifically, construction activities would begin in FY 2020 and new personnel associated with the High Growth Alternative would begin working at USAGFG in FY 2021. Staffing increases would be complete by FY 2025.

4.2 USAGFG PROJECTS – PAST, PRESENT, AND REASONABLY FORESEEABLE

In addition to the Proposed Action, the following past, present, and reasonably foreseeable actions at USAGFG are considered in the cumulative impacts analysis:

- INRMP Projected Management Actions – include marking and harvesting timber, potentially implementing prescribed burns, and installing RCW recruitment clusters in TA-36 and TA-37 if suitable habitat is present.
- Gate 6 Construction – new access control point to USAGFG, located 6 miles west of Gate 1, including gate and access control road, optimally located to mitigate the installation's expanding traffic requirements.
- Gordon Highway Widening – 2.4 miles of widening and reconstruction on the Gordon Highway from the future site of USAGFG's new Gate 6 to Robinson Avenue by the Georgia DOT. The project will create a new signalized intersection to accommodate anticipated increased traffic volume and changes to USAGFG's access plan. Anticipated completion is March 31, 2021 (CSRA Alliance Fort Gordon, 2019c).

- Development of Electronic Warfare Training at Fort Gordon – the project would consolidate the U.S. Army Cyber School at USAGFG, utilize existing USAGFG facilities for classroom space, and create a 35-acre outdoor training area on the installation (USAGFG, 2019d).
- Demolition of the Signal School and Construction of a New Cyber School – this project would include the removal of most of the existing Signal School buildings (12 buildings determined to be too costly to repair and retrofit); renovation of 4 Signal School buildings; and construction of new Cyber School facilities including state-of-the-art classrooms, offices, laboratories, and conference rooms (USAGFG, 2017b).

4.3 RICHMOND AND COLUMBIA COUNTY PROJECTS – PAST, PRESENT, AND REASONABLY FORESEEABLE

Over the past several decades, Richmond and Columbia Counties have undergone extensive development that modified the area from an agricultural economy into a metropolitan area with a regionally important economy comprised of varied modern industrial and commercial industries. USAGFG plays an important role in this regional economy. Accordingly, both Richmond and Columbia Counties have identified measures in their long-term comprehensive plans to ensure close and mutually beneficial collaborations with USAGFG on issues and projects related to but not limited to education, land use, transportation, environmental protection (Augusta Planning and Development [APD], 2018) (Columbia County, 2015). While neither plan identified specific large-scale future developments, both counties generally anticipate moderate population growth and associated improvements to transportation and utility infrastructure, increases in housing construction, and expanded industrial/commercial growth in the reasonably foreseeable future.

4.4 CUMULATIVE IMPACTS ANALYSIS

4.4.1 High Growth Alternative

Overall cumulative impacts associated with the High Growth Alternative of the Proposed Action, along with the other past, present, and reasonable foreseeable projects on and around USAGFG, are expected to be minor, with some adverse and some beneficial impacts.

4.4.1.1 *Land Use*

The implementation of the High Growth Alternative would have minor adverse on-post impacts to land use – including short-term adverse impacts associated with construction and long-term adverse impacts associated with the potential conversion of some TAs or forested areas into developed cantonment areas. Most of the study area for this Proposed Action is already developed, and could accommodate additional development in these previously disturbed areas. Additionally, USAGFG would avoid wetlands and waterways in the Red Development Categories of the study area.

The High Growth Alternative would have minor adverse off-post impacts to land use, with additional housing and amenities that would be required to support the increasing population surrounding USAGFG as a result of this Proposed Action.

Implementation of the Proposed Action in conjunction with other planned projects on USAGFG and in Richmond and Columbia Counties in the same timeframe would have minor adverse cumulative impacts. The planned projects on post, such as the Gate 6 construction or the new Cyber School construction, could have minor land use impacts, and the Gordon Highway widening could have minor land use impacts off post. All of these projects will be completed in accordance with land use plans and conservation plans to avoid any significant adverse impacts to land use.

4.4.1.2 *Visual Resources and Aesthetics*

Minor adverse impacts to visual resources associated with construction are expected with the High Growth Alternative, as well as other planned projects on and around USAGFG. Since most of these projects are expected to take place in previously disturbed areas with no known historic buildings or districts, the impacts of construction to visual resources are expected to be minor. Additionally, USAGFG plans to retain existing trees and vegetation around these planned projects to the extent practicable.

Therefore, cumulative adverse impacts to visual resources and aesthetics are expected to be short-term and minor.

4.4.1.3 *Air Quality*

Implementing the High Growth Alternative would produce a short-term additive amount of emissions during construction. These impacts would have a minor adverse impact on air quality, most notably within USAGFG and portions of Richmond and Columbia Counties immediately adjacent to USAGFG. Additionally, USAGFG would implement construction BMPs to further reduce estimated construction emissions presented in this PEA. Thus, adverse cumulative air quality impacts during the construction phase are expected to be minor.

Operation of the Proposed Action would increase the number of personnel working at the installation and therefore result in an increase in the number of vehicles traveling to and from USAGFG. These emissions, alone or in combination with other anticipated operational emissions at USAGFG, are not expected to cause the AQCR to be in non-attainment for any of the NAAQS. Thus, while an incremental cumulative impact would result, the emissions would not exceed any regulatory standard; however, it is noted that vehicle emissions that concentrate at ground-level can have an adverse impact on the health of sensitive populations. For example, ground level ozone has been linked to respiratory ailments such as asthma and heart attacks. Thus, until such emissions disperse within the ROI, cumulative operational emissions could have a minor adverse impact on these receptors. To further minimize and avoid this occurrence, Fort Gordon cooperates on a number of regional initiatives to improve air quality and protect environmentally sensitive areas (APD, 2018) (Columbia County, 2015). Therefore, should construction or operational air emissions become a nuisance issue or lead to a marginal attainment of a NAAQS, USAGFG would work with state and county governments to reduce off-site problems related to air quality.

Thus, the cumulative actions are anticipated to have minor adverse impacts on air quality.

4.4.1.4 *Noise*

Minor adverse impacts from noise associated with construction are expected with the High Growth Alternative, as well as other planned projects on and around USAGFG. As the exact timing of these projects has not been determined, the cumulative impacts from noise could be minor to moderate. If the projects are staggered, the noise impacts would remain minor; however, multiple construction projects occurring simultaneously in the same area of the installation could have moderate adverse cumulative noise impacts.

Because there are not expected to be long-term noise impacts associated with the Proposed Action or the other planned facilities, there are no expected long-term cumulative impacts from noise, and all noise impacts are expected to be minor.

4.4.1.5 *Geology and Soils*

Under the Proposed Action, it is anticipated that there would be minor adverse impacts to both geology and soils due to construction activities and the potential for development of previously undisturbed bedrock and overlying soils.

Additional minor adverse impacts could be expected for each of the other development actions proposed by USAGFG and by others in the surrounding areas. Construction of the new Cyber School, widening of Gordon Highway, and construction of Gate 6 could all have minor adverse impacts to geology and soils. When taken into consideration together, these projects could impact soils through an increase in the possibility of runoff or erosion control issues; however these will be mitigated through the erosion and sediment control measures required by the ESCP. Based on the soil types and topography of the area, it is unlikely that any landslides or other major safety concerns would result from these projects, so impacts are expected to be minor. Avoidance of forested areas where geology has been previously undisturbed will help to further minimize impacts to geology and soils.

4.4.1.6 *Wetlands and Water Resources*

The construction to take place under the High Growth Alternative is expected to cause minor adverse impacts to surface water and groundwater resources. It is expected to cause negligible impacts to stormwater, wetlands, and floodplains. The Proposed Action's impacts to wetlands and water resources are anticipated to be minor because surface waters, floodplains, and wetlands will be largely or completely avoided as long as development does not occur in the Red development areas.

Without having the exact footprint of the additional projects expected to take place on and around USAGFG in the coming years, it is possible that there will be moderate cumulative impacts to wetlands and water resources. USAGFG will avoid wetlands and water resources to the extent practicable when implementing these additional projects, but it is not likely that all impacts can be avoided for current foreseeable projects.

For both the Proposed Action and the additional planned projects on and around USAGFG, appropriate avoidance and impact minimization measures will be undertaken for any expected impacts to wetlands, surface waters, or floodplains. Additionally, all appropriate LID measures, stormwater pollution prevention measures, and other BMPs will be implemented to further reduce cumulative adverse impacts to wetlands and water resources.

4.4.1.7 *Biological Resources*

The High Growth Alternative is expected to cause minor adverse impacts to biological resources, with little to no adverse impacts to rare, threatened, and endangered species on the installation. Implementing the Proposed Action in the Cyber Growth study area is not anticipated to impact habitats associated with the RCW, gopher tortoise, or Southeastern American kestrel. Only development within the Amber areas is likely to impact flora species of concern.

Cumulative adverse impacts to biological resources are expected to be minor. These adverse impacts would be caused by actions including prescribed burns, timber harvests, and construction activities, all of which would take place in areas that could disturb RCW or kestrels. All actions will be undertaken in a manner consistent with the ESMC for the RCW, and mitigation measures will be used, where practicable, to avoid or relocate nesting boxes.

With these types of mitigation measures in place and USAGFG's adherence to habitat management plans, cumulative adverse impacts to biological resources should remain minor.

4.4.1.8 *Cultural Resources*

Under the High Growth Alternative, impacts to cultural resources are expected to be negligible because existing architectural and archaeological surveys show little to no NRHP-eligible structures or significant archaeological sites within the study area, and any potential cultural sites would be avoided during site selection. Additionally, an inadvertent discovery plan would be implemented to avoid impacts to previously undiscovered cultural resources.

Due to these conditions and management measures for all projects occurring at USAGFG, cumulative impacts to cultural resources will be negligible as well, as USAGFG will avoid impacts to any potential architectural or archaeological sites of significance as determined by the Georgia SHPO.

The one exception is the plan to construct a new Cyber School on the site of the existing Signal School. The Signal School Campus is an NRHP-eligible district based on a 2015 survey. As part of the Cyber School plan, 12 buildings from the Signal School Campus are expected to be demolished and several others renovated, so this action would cause significant adverse impacts to cultural resources. This project could also have long-term impacts to viewshed, as this project is planned for the site of the NRHP-eligible Signal School historic district. These significant impacts will be mitigated to a less-than-significant level based on a mitigation plan which was laid out in a Memorandum of Agreement (MOA) between USAGFG and the Georgia SHPO (USAGFG, 2017b).

4.4.1.9 *Traffic and Roadways*

Construction traffic associated with the High Growth Alternative, in additional to other major projects at and proximate to USAGFG, is anticipated to create temporary moderate adverse impacts to traffic. The timing of these projects is not well-known, but if the projects are staggered, adverse impacts would be negligible to minor; however, even if the projects are not separated in time, the temporary increases in construction-related traffic would not likely result in a long-term disruption to current transportation patterns, nor would it change existing traffic safety as construction trucks would be required to enter and exit USAGFG through designated gates.

Cumulative operational impacts are anticipated to increase the population at and proximate to USAGFG. Increases in population have the potential to also substantially increase the number of vehicles traveling on area roadways to and from USAGFG during peak hours. This would result in moderate adverse impacts at already degraded intersections at USAGFG; however, mitigation for traffic impacts is currently being performed by implementing several of the roadway improvements identified in the RTG PEA traffic study and the 2017 traffic improvement plan, including constructing the new Gate 6 and widening Gordon Highway. Additionally, Columbia County has a long-range transportation plan that includes projects to improve traffic conditions off-post. These projects include arterial widening, new roadways, transportation system management improvements, intersection improvements, and bridge improvements (Columbia County, 2015). Most of the projects involve road widening, usually increasing the number of lanes from two to four. Ramp improvements and the widening of I-20 are proposed as well. Richmond County has a comprehensive plan that includes similar transportation improvement projects that would affect USAGFG (APD, 2018). Several widening projects, such as widening Gordon Highway, Jimmy Dyess Parkway, and Wrightsboro Road, could directly affect and improve traffic entering and leaving USAGFG. Further, the Augusta-Richmond plan indicated there might be an extension of public transit lines, primarily to Hephzibah, USAGFG, and South Augusta. The objective would be to increase the level and frequency of public transportation service to and from these areas (APD, 2018).

The Augusta-Richmond metropolitan area has also improved regional transportation efficiency by implementing the Regional Transportation Control Center (TCC), installing surveillance and communications equipment along I-20, completing intersection improvements, and upgrading traffic signals (APD, 2018). The TCC and related surveillance equipment are part of an Intelligent Transportation System (ITS) planned for the Augusta region. As stated in the APD, an ITS is an advanced application to provide innovative services relating to different modes of transport and traffic management and enable various users to be better informed and make safer, more coordinated, and 'smarter' use of transport networks (APD, 2018).

Therefore, the implementation of these traffic improvements on- and off-post would reduce cumulative adverse impacts to traffic. Post-mitigation impacts to traffic conditions are expected to be minor and would be readdressed as needed in response to the Proposed Action and other future projects.

4.4.1.10 *Infrastructure and Utilities*

It is expected that the development associated with the Proposed Action and other anticipated projects on USAGFG and in the surrounding areas would have minor adverse cumulative impacts.

All utility systems on USAGFG are either in good operating condition with enough additional capacity to support planned growth, or they will be in good condition by the time these future projects are implemented. The wastewater system is the only system that is currently undergoing needed upgrades, but all of these are expected to be completed by the end of FY 2020.

The additional projects proposed on and around USAGFG would add minor additional impacts to infrastructure and utilities, as many of the projects do not involve a significant demand for utilities. The Cyber School will need to connect to all utilities, but because this is replacing the current Signal School, cumulative impacts are not expected to be significant. USAGFG will need to evaluate the capacity of utility systems to support the new Cyber School, and will need to make mitigations and upgrades to the systems as necessary.

4.4.1.11 *Socioeconomics, Environmental Justice, and Protection of Children*

Construction activities associated with the High Growth Alternative, in conjunction with other on-going and proposed future construction occurring over the same period, would be anticipated to have a minor beneficial impact on socioeconomic conditions in the ROI due to an increase in hiring of local workers and spending on construction materials and supplies from local and regional vendors. The construction activities would not result in a substantive increase in the population in the ROI and therefore would not be anticipated to significantly impact housing values or other community resources, such as medical, recreation, or schools.

The August-Richmond County area has developed infrastructure to support the expansion of the cyber industry within the region, including the $60 million Hull McKnight Georgia Cyber Innovation and Training Center in downtown Augusta, estimated to be 167,000 square feet, as well as a $35 million 165,000 square foot incubator facility for technology startup companies and workforce development space on that 17-acre site (APD, 2018). There is also adaptive reuse of buildings along the Augusta Canal to further support the influx of cyber security job demand, including the textile mill, Sibley cyber space and the future redevelopment of King Mill as a mixed-use residential/commercial facility in Augusta. Thus, the cumulative impact of the operation of the Proposed Action and other supporting activities in the ROI is anticipated to result in an influx of employees in the cyber-security field, thereby increasing employment opportunities within the ROI. The cumulative economic impact of these activities within the ROI would minor, but beneficial.

However, the cumulative impact of this population growth has the potential to increase rental housing prices, particularly within 10 miles of USAGFG (APD, 2018). The cumulative impacts of population growth in the ROI also may require expanding educational infrastructure and the potential for additional financial support from the Federal government. Thus, on a cumulative basis, the Proposed Action is anticipated to have a minor adverse impact on housing costs and educational infrastructure, and a minor beneficial impact on employment and economic conditions.

No disproportionate adverse environmental health or safety risks to minority or low-income populations or children are anticipated.

4.4.2 No Action Alternative

Potential cumulative impacts of the No Action Alternative would not likely produce any significant adverse cumulative impacts to any resource area except cultural resources and infrastructure and select utilities. The planned demolition of the Signal School and construction of a new Cyber School would have potential significant adverse impacts to cultural resources because the Signal School is recommended for re-evaluation of its eligibility for NRHP listing when it reaches 50 years old. Select utility systems – natural gas and wastewater – are already strained and would require mitigation even without the addition of the Proposed Action or other projects on USAGFG.

There would be continued growth in Columbia and Richmond Counties and at USAGFG, but this cumulative growth is not anticipated to produce significant impacts to any other resource areas. There would also be changes in land use due to planned construction activities associated with the Gordon Highway widening and Gate 6 construction, and traffic conditions would be moderately impacted as well.

5 CONCLUSION

This Cyber Growth PEA analyzes the potential direct and indirect impacts that could arise from either of the proposed alternatives. The stationings associated with these alternatives could be related to the growing ARCYBER mission, or to various other Army, DoD, or non-DoD missions on USAGFG. The PEA was prepared with the best data and information available at the time of its development; however, details of the construction or renovation of infrastructure needed to support the additional personnel may need to be addressed in subsequent NEPA documentation. Any changes to the project scope or its potential impacts require that the project manager responsible for this project coordinate with the USAGFG NEPA team to re-evaluate this document for consistency and applicability to the revised project. This re-evaluation shall be performed based on the new information and shall result in either a finding of sufficiency between this PEA and the new project scope, or the completion of a supplemental NEPA analysis to assess the potential impacts of the new project scope. All work on the Proposed Action exceeding that described in the PEA shall be halted until the new assessment is completed.

This PEA was prepared in accordance with NEPA and implementing regulations issued by the CEQ and 32 CFR 651.

As a result of the Proposed Action, there would be expected minor adverse impacts to land use, visual resources and aesthetics, air quality, noise, geology and soils, groundwater, surface water, biological resources, infrastructure and utilities, public health and safety, family support services, and recreational facilities from the construction of any of the alternatives; minor impacts, both adverse and beneficial, would also occur to housing and schools; minor beneficial impacts to environmental justice and protection of children; and minor adverse impacts, after mitigation, to traffic would also be expected. There would be negligible impacts to stormwater, wetlands, floodplains, and cultural resources; and minor overall cumulative impacts, both adverse and beneficial, would be expected for any of the proposed alternatives. These expected impacts are summarized in Table 5-1.

Under the No Action Alternative, no additional stationings would occur, and no new construction or building renovation would take place outside of potential renovations related to required health and safety upgrades for the existing workforce. There would be no impacts to any environmental or social resources under this alternative.

Based on the evaluations of potential impacts detailed in Chapters 3 and 4, the Proposed Action will not result in a significant impact to the environment. Therefore, an EIS will not need to be prepared for this Proposed Action, and this conclusion is documented in the FNSI found at the beginning of this report.

Table 5-1: Summary of Expected Impacts to Resource Areas

Resource Area	Potential Impacts	
	High Growth Alternative	**No Action Alternative**
Land Use	Minor adverse impacts	No potential adverse impacts
Visual Resources and Aesthetics	Minor adverse impacts	No potential adverse impacts
Air Quality	Minor adverse impacts	No potential adverse impacts
Noise	Minor adverse impacts	No potential adverse impacts
Geology and Soils	Minor adverse impacts	No potential adverse impacts
Wetlands and Water Resources	Minor adverse impacts to groundwater and surface water; Negligible impacts to stormwater, wetlands, and floodplains	No potential adverse impacts
Biological Resources	Minor adverse impacts	No potential adverse impacts
Cultural Resources	Negligible impacts expected; subsequent NEPA will be completed if adverse impact is determined	No potential adverse impacts
Traffic and Roadways	Minor adverse impacts after mitigation	No potential adverse impacts
Infrastructure and Utilities	Minor adverse impacts	No potential adverse impacts
Socioeconomics, Environmental Justice, and Protection of Children	Minor impacts to public health and safety, family support services, and recreational facilities; Minor impacts, both adverse and beneficial, to housing and schools; Minor beneficial impacts to environmental justice and protection of children	No potential adverse impacts
Cumulative Impacts	Minor overall impacts	No potential adverse impacts

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7 ACRONYMS AND ABBREVIATIONS

ACP	Access Control Point
AIRFA	American Indian Religious Freedom Act
AQCR	Air Quality Control Region
AR	Army Regulation
ARCYBER	Army Cyber Command, 2nd Army
ARPA	Archaeological Resources Protection Act
AUD	City of Augusta Utilities Department
BMP	Best Management Practice
BOE	Board of Education
CAA	Clean Air Act
CAC	Common Access Card
CCSD	Columbia County School District
CEMA	Cyberspace Electromagnetic Activity
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_{2e}	carbon dioxide equivalent
CWA	Clean Water Act
CWB	Cyber Warfare Support Battalion
dBA	A-weighted decibel
DDEAMC	Dwight D. Eisenhower Army Medical Center
DFMWR	Department of Family, Morale, Welfare, and Recreation
DoD	Department of Defense
DOE	Determination of Eligibility
EA	Environmental Assessment
EIFS	Economic Impact Forecast System
EIS	Environmental Impact Statement
EISA	Energy Independence and Security Act
EO	Executive Order
ESA	Endangered Species Act
ESCP	Erosion and Sediment Control Plan
ESMC	Endangered Species Management Component
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FNSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
FY	Fiscal Year
GADNR	Georgia Department of Natural Resources
GAEPD	Georgia Environmental Protection Division
gpd	gallons per day
GWP	Global Warming Potential
HAP	Hazardous Air Pollutant
HFC	hydrofluorocarbon

HMU	Habitat Management Unit
HTRS	Hazardous, Toxic, and Radioactive Substance
HUC	Hydrologic Unit Code
ICRMP	Integrated Cultural Resources Management Plan
INRMP	Integrated Natural Resources Management Plan
INSCOM	Army Intelligence and Security Command
ITS	Intelligent Transportation System
JLUS	Joint Land Use Study
kV	kilovolts
LID	Low Impact Development
LOS	Level of Service
MBTA	Migratory Bird Treaty Act
mcfh	thousand cubic feet per hour
mgd	million gallons per day
MI	Military Intelligence
MOA	Memorandum of Agreement
MOUT	Military Operation on Urban Terrain
MS4	Municipal Separate Storm Sewer System
msl	mean sea level
mVA	megavolt-ampere
NAAQS	National Ambient Air Quality Standard
NAGPRA	Native American Graves Protection and Repatriation Act
NBC	Nuclear, Biological, and Chemical
NCA	Noise Control Act
NCO	Non-Commissioned Officer
NEPA	National Environmental Policy Act
NETCOM	Army Network Enterprise Technology Command
NHPA	National Historic Preservation Act
N_2O	nitrous oxide
NO_2	nitrogen dioxide
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRFL	Non-reimbursable forest land
NRHP	National Register of Historic Places
NSA	National Security Agency
NSAG	National Security Agency Georgia
NSGA	Naval Security Group Activity
NSR	New Source Review
NZ	noise zone
O_3	ozone
OCGA	Official Code of Georgia
PA	Programmatic Agreement
Pb	lead
PEA	Programmatic Environmental Assessment
PFC	perfluorocarbon
$PM_{2.5}$	particulate matter less than 2.5 microns
PM_{10}	particulate matter less than 10 microns

POV	Personally Owned Vehicle
POW	Prisoner of War
ppb	parts per billion
ppm	parts per million
RCRA	Resource Conservation and Recovery Act
RCSS	Richmond County School System
RCW	Red-cockaded woodpecker
RECONS	Regional Economic Systems
RFL	Reimbursable forest land
ROI	Region of Influence
RONA	Record of Non-Applicability
RTG	Road to Growth
sf	square foot (feet)
SF_6	sulfur hexafluoride
SHPO	State Historic Preservation Office
SO_2	sulfur dioxide
SWPPP	Storm Water Pollution Prevention Plan
TA	Training Area
TCC	Transportation Control Center
TMDL	Total Maximum Daily Load
tpy	tons per year
TSCA	Toxic Substance Containment Act
USAGFG	Fort Gordon, Georgia
USC	U.S. Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UXO	Unexploded Ordnance
VCC	Visitor Control Center
VOC	Volatile Organic Compound
WWII	World War II
WWTP	Waste Water Treatment Plant
$\mu g/m^3$	micrograms per cubic meter

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APPENDIX A

COORDINATION

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APPENDIX B

TRAFFIC STUDY

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APPENDIX C

AIR QUALITY CALCULATIONS

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Table of Contents for the Supporting Documentation and Emissions Estimates

List of Tables

1 Emissions Estimations and Methodology

The U.S. Army has considered all foreseeable direct and indirect sources of air emissions associated with the Proposed Action. *Direct emissions* are emissions that are caused or initiated by a federal action and occur at the same time and place as the action. *Indirect emissions* are reasonably foreseeable emissions that are caused by the action but might occur later in time and/or be farther removed in distance from the action itself, and that the federal agency can practicably control. More specifically, project-related direct emissions would result from the following:

- **Construction Emissions.** The use of non-road equipment (e.g., bulldozers, backhoes), worker vehicles, heavy duty diesel trucks on-road material delivery trucks, and fugitive particles from surface disturbances.
- **Operational Emissions.** The emissions from commuting personnel. It is noted the portion of an action that includes major or minor new or modified stationary sources that require a permit under the new source review program (Section 110(a)(2)(c) and Section 173 of the Clean Air Act) or the prevention of significant deterioration program (Title I, Part C of the Clean Air Act) are exempt from the General Conformity Rule (GCR).

2 Total Project Construction Emissions

The total project construction emissions associated with the use of heavy construction equipment (e.g., bulldozers, backhoes), construction workers' vehicles, heavy and light duty diesel-fueled on-road trucks, and fugitive dust from surface disturbances are presented in Table 1. The following sections outline all the calculations and assumptions made to derive the total construction emission estimations in Table 1. As shown in Table 1, the total project emissions are below the GCR *de minimis* emissions levels.

Table 1. Total Emissions from Construction of the Proposed Action

	Construction Emissions (tons per year [tpy])						
Construction Equipment	**CO**	**NOx**	**PM10**	**PM2.5**	**SO_2**	**VOC**	**CO_2e (metric ton)**
Heavy Duty Diesel Truck Construction Equipment Emissions (2022)	0.042	0.112	0.003	0.003	0.000	0.011	36.921
Construction Worker Vehicle Emissions (2022)	1.616	0.090	0.003	0.003	0.001	0.128	156.313
Light Duty Diesel Trucks Construction (2022)	0.140	0.007	0.000	0.000	0.000	0.005	14.630
Off-Road Construction Equipment	4.248	4.147	0.193 (PM_{10} and $PM_{2.5}$)		0.010	0.642	870.096
Fugitive Dust Emissions	N/A	N/A	15.30	2.295	N/A	N/A	N/A
Total Emissions (tpy)	6.046	4.356	17.800 (PM_{10} and $PM_{2.5}$)		0.011	0.786	1077.960

3 Off-Road Construction Equipment

Emissions from off-road diesel-fueled construction equipment were estimated for activities associated with ARCYBER construction at Fort Gordon involving, site clearing and grading, building renovation and construction, asphalt paving, and air compressors for architectural coatings (painting).

Information regarding the numbers and types of construction equipment anticipated to be used on the project, the schedule of equipment use (days of use), and the approximate daily operating time (hours) was calculated using estimates for similar large-scale development projects. This information is provided in Table 2.

Table 2. Schedule of Construction Equipment Use

Equipment	Quantity (number of units)	Days of Use	Hours Used/Day
Building Construction			
Air compressor (painting)	5	250	8
Cranes	2	60	8
Forklifts	5	125	8
Generator Sets	4	250	8
Tractors/loaders/backhoes	2	125	8
Welders	8	250	8
Grading/Site Preparation			
Excavators	2	60	8
Graders	1	30	8
Rubber Tire Dozer	2	30	8
Paving			
Pavers	1	30	8
Other Paving Equipment	1	30	8
Rollers	1	30	8

Emissions factors for the heavy construction equipment listed in **Table 2** were obtained from South Coast Air Quality Management District (SCAQMD) Off Road – Model Mobile Source Emissions Factors for the year 2021 (SCAQMD, 2019). The emission factors are provided in Table 3.

Table 3. Emission Factors for Off-Road Heavy Construction Equipment

Heavy Construction Equipment by Phase	Emission Factors (for year 2021)					
	CO	NOx	PM(10+2.5)	SO_2	VOC	CO_2
	(lbs/hr)					
Building Construction						
Air compressor	0.3051	0.2928	0.0158	0.0007	0.0442	63.6
Cranes	0.3865	0.6033	0.0229	0.0014	0.0846	129
Forklifts	0.2148	0.1459	0.0056	0.0006	0.0294	54.4
Generator Sets	0.2708	0.2978	0.0131	0.0007	0.0363	61
Tractors/loaders/backhoes	0.3606	0.2506	0.0113	0.0008	0.0407	66.8
Welders	0.1788	0.1635	0.0088	0.0003	0.028	25.6
Grading/Site Preparation						
Excavators	0.5113	0.3577	0.0158	0.0013	0.0687	120
Graders	0.5747	0.5213	0.0247	0.0015	0.0861	133
Rubber Tire Dozer	0.7661	1.4661	0.0582	0.0025	0.2015	239
Paving						
Pavers	0.4878	0.5089	0.0325	0.0009	0.0928	77.9
Paving Equipment	0.4062	0.4462	0.0288	0.0008	0.071	68.9
Rollers	0.3816	0.3483	0.0206	0.0008	0.054	67

To determine the heavy construction equipment emissions in tons per year, the following formula was used, with information provided from **Table 2** and **Table 3**:

$$\mathbf{TPY_p = (T_h \times E_{fp} \times N \times D)/C}$$

Where: TPY_p = Tons Per Year of Pollutant

T_h = Time (hours per day of operation)

E_{fp} = Emissions Factor for the given pollutant (information from Table 3)

N = Number of pieces of equipment

D = Days of use of equipment

C = Conversion from lbs to tons

A sample calculation for construction equipment for CO from the use of a grader is depicted as follows:

$$TPY_{CO} = (T_h \times E_{CO} \times N \times D)/C$$

$$TPY_{CO} = (8 \times 0.5747 \times 1 \times 30)/2000$$

$$TPY_{CO} = (137.9)/2000$$

$$TPY_{CO} = 0.06896$$

The annual heavy construction equipment emissions are presented in Table 4 for each pollutant during each phase of construction.

Table 4. Annual Off-Road Heavy Construction Equipment Emissions

By Phase and Equipment	Emissions (tpy)					
	CO	NOx	PM	SO2	VOC	CO2e (metric tons)
Building Construction						
Air compressor	1.525	1.464	0.079	0.0035	0.221	350.53
Cranes	0.185	0.289	0.01099	0.00067	0.04061	68.25
Forklifts	0.537	0.365	0.014	0.0015	0.0735	149.91
Generator Sets	1.083	1.191	0.052	0.0028	0.1452	268.96
Tractors/loaders/backhoes	0.361	0.251	0.0113	0.0008	0.0407	73.63
Welders	1.43	1.308	0.0704	0.0024	0.224	225.75
Grading/Site Preparation						
Excavators	0.245	0.1717	0.00758	0.00062	0.03298	63.49
Graders	0.069	0.0626	0.00296	0.00018	0.01033	17.5926
Rubber Tire Dozer	0.1839	0.3518	0.0139	0.0006	0.04836	63.2275
Paving						
Pavers	0.0585	0.06107	0.0039	0.00011	0.01114	10.3042
Paving Equipment	0.0487	0.0535	0.00346	0.0001	0.00852	9.11376
Rollers	0.0458	0.0418	0.00247	0.0001	0.0065	8.86243
Total Annual Emissions from Off-Road Heavy Construction Equipment (tpy)	**5.773**	**5.6107**	**0.272**	**0.0134**	**0.863**	**1309.6**

4 On-Road Heavy and Light Duty Trucks and Construction Worker Vehicle Emissions

Emissions from on-road heavy and light duty diesel-fueled trucks associated with the delivery and distribution of construction materials and general on-site construction support, as well as those from construction workers' passenger vehicles, were included in this analysis. Emission factors specific to Georgia for emission year 2022 were used for on-road heavy and light duty diesel-fueled trucks, and for gasoline-fueled passenger vehicles (USAF, 2018). Assumptions of travel distance incorporated in the calculations for the different vehicle categories were as follows:

- For on-road heavy duty diesel-fueled trucks, it was assumed there would be five trucks operating per year, each operating for 250 days per year, and each traveling 20 miles per day. This is equivalent to a total of 25,000-miles traveled per year (5 trucks * 250 days * 20 miles).
- For on-road light duty diesel-fueled trucks, it was assumed there would be 10 trucks operating per year, each operating for 250 days per year, and each traveling 20 miles per trip. This is equivalent to a total of 50,000-miles traveled per year (10 trucks * 250 days * 20 miles).

- For construction workers' gasoline-fueled passenger vehicles, it was assumed there would be 50 vehicles operating per year (accounting for a commuting factor of 0.6), each operating for 260 days per year, and each traveling a total of 40 miles per day, at an average speed of 30 miles per hour. This is equivalent to a total of 520,000-miles traveled per year (50 vehicles * 260 days * 40 miles).

Table 5 details the emission factors used in this analysis.

Table 5. On-Road Heavy and Light Duty Trucks and Construction Worker Vehicle Emission Factors

On-Road Vehicle Category	Emissions Factors, lbs/mile						
	CO	**NOx**	**PM10**	**PM2.5**	**SO2**	**VOC**	**CO2e (metric ton)**
Heavy-Duty Diesel-Fueled Truck	0.0034	0.0089	0.0003	0.0003	0.00003	0.0008	3.25
Light-Duty Diesel-Fueled Truck	0.0056	0.0003	0.00001	0.00001	0.000004	0.0002	0.645
Light-Duty Gasoline-Fueled Vehicles (passenger cars)	0.0062	0.0003	0.00001	0.00001	0.000004	0.0005	0.663

Table 6 summarizes the annual on-road construction support vehicle emissions.

On-road heavy duty and light duty diesel-fueled truck emissions were calculated using the following equation:

$$\mathbf{TPY_P = (ME \times EF_P)}$$

Where: TPY_P = Tons Per Year of Pollutant

ME = Total Miles per Vehicle/Year

EF_P = Emission Factor for the given pollutant (lbs/mile)

Construction workers' gasoline-fueled vehicle emissions were determined using the following equation:

$$\mathbf{TPY_P = (ME \times EF_P \times W)/C}$$

Where: TPY_P = Tons Per Year of Pollutant

ME = Miles per Vehicle: number of trips x miles/trip x commuting factor x days

Number of trips = 2; Miles/trip = 20; Commuting factor = 0.6; Total Days = 260

W = Number of Workers

Short-term Workers = 83

EF_P = Emission Factor for the given pollutant (lbs/mile)

C = Conversion from lbs to tons

A sample calculation for CO emissions from construction workers' vehicles is provided below:

$$\mathbf{TPY_{CO} = (ME \times EF_{CO} \times W)/C}$$

$$TPY_{CO} = (6{,}240 \times 0.006217 \times 83)/2{,}000$$

$$TPY_{CO} = 3{,}232/2{,}000$$

$$TPY_{CO} = 1.6164$$

Table 6. Estimated Annual Vehicle Emissions from On-Road Heavy and Light Duty Trucks and Construction Workers' Vehicles

On-Road Vehicle Category	Construction Emissions (tpy)						
	CO	**NOx**	**PM10**	**PM2.5**	**SO_2**	**VOC**	**CO_2e (metric ton)**
Heavy Duty Diesel Truck Construction Equipment Emissions	0.042	0.112	0.003	0.003	0.000	0.011	36.9
Light Duty Diesel Trucks Construction	0.140	0.007	0.000	0.000	0.000	0.005	14.6
Construction Worker Vehicle Emissions	1.616	0.090	0.003	0.003	0.001	0.128	156.3
Total Annual Emissions from On-Road Construction Support and Worker's Vehicles (tpy)	**1.798**	**0.209**	**0.007**	**0.006**	**0.001**	**0.143**	**207.8**

5 Surface Disturbance

The quantity of dust emissions from construction operations is proportional to the area of land being worked and the type of construction activity. The following assumptions were used in the calculations for fugitive dust emissions (USEPA, 1995).

$$\mathbf{E_{10} = (acres \times EF \times CF \times PM_{10}) / C}$$

$$\mathbf{E_{2.5} = E_{10} \times PM_{2.5}}$$

$$\mathbf{E_{total} = E_{10} + E_{2.5}}$$

Where: E_{total} = Tons per year of total Particulate Matter

E_{10} = Tons per year of PM_{10}

$E_{2.5}$ = Tons per year of $PM_{2.5}$

Acres to be disturbed = 1,700 acres

EF = 80 lb TSP/acre

TSP = Total Suspended Particulates

CF = Capture Fraction

CF = 0.5

PM = Particulate matter; specific for PM_{10} and $PM_{2.5}$

PM_{10} = 0.45 lb/TSP

$PM_{2.5}$ = 0.15 lb/PM_{10} lb

C = Conversion from lbs to tons

Thus, the PM emissions from surface disturbance for the Proposed Action are:

$$E_{10} = (\text{acres} \times EF \times CF \times PM_{10})/C$$

$$E_{10} = (1{,}700 \times 80 \times 0.5 \times 0.45)/2{,}000$$

$$E_{10} = 30{,}600/2{,}000$$

$$E_{10} = 15.3$$

$$E_{2.5} = E_{10} \times PM_{2.5}$$

$$E_{2.5} = 15.3 \times 0.15$$

$$E_{2.5} = 2.3$$

$$E_{total} = E_{10} + E_{2.5}$$

$$E_{total} = 15.3 + 2.3$$

$$\underline{E_{total} = 17.5 \text{ tons}}$$

Emissions for the other criteria pollutants are considered to be negligible for this phase of construction, and therefore are reported as non-applicable (N/A) in the associated table.

6 Operational Emissions

ARCYBER operational emissions would be primarily generated from gasoline-fueled passenger vehicles associated with the 5,000 new staff who travel daily to and from Fort Gordon from their residences. Emissions would also be generated from backup emergency generators and operating heating and cooling (H/VAC) systems; however, for the purposes of this analysis, the primary operational emissions were estimated from operational workers' vehicles. Emission factors specific to Georgia for emission year 2022 were used for on-road gasoline-fueled passenger vehicles (USAF, 2018), as shown in Table 7.

Table 7. Operational Emission Factors

On-Road Vehicle Category	Emissions Factors, lbs/mile						
	CO	**NOx**	**PM10**	**PM2.5**	**SO2**	**VOC**	**CO2e (metric ton)**
Light-Duty Gasoline-Fueled Vehicles (passenger cars)	0.0062	0.0003	0.00001	0.00001	0.000004	0.0005	0.663

Operational emissions were determined using the following equation:

$$\mathbf{TPY_P = (ME \times EF_P \times W)/C}$$

Where: TPY_P = Tons Per Year of Pollutant

ME = Miles per Vehicle: number of trips x miles/trip x commuting factor x days

Number of trips = 2; Miles/trip = 15; Commuting factor = 0.6; Total Days = 260

W = Number of Workers

Long-term Workers = 5,000

EF_P = Emission Factor for the given pollutant (lbs/mile)

C = Conversion from lbs to tons

A sample calculation for CO emissions from operational workers' vehicles is provided below:

$$TPY_{CO} = (ME \times EF_{CO} \times W)/C$$

$$TPY_{CO} = (4{,}680 \times 0.006217 \times 5{,}000)/2{,}000$$

$$TPY_{CO} = 145{,}478/2{,}000$$

$$TPY_{CO} = 72.74$$

Operational emissions are presented in Table 8.

Table 8. Operational Emissions

Activity	Construction Emissions (tpy)						
	CO	**NOx**	**PM10**	**PM2.5**	**SO_2**	**VOC**	**CO_2e (metric ton)**
Operational Worker Vehicle Emissions	72.74	4.07	0.15	0.13	0.05	5.76	7,753.6

7 References

SCAQMD, 2019. Off-Road - Model Mobile Source Emission Factors. Year 2021. <http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/off-road-mobile-source-emission-factors>

USEPA, 1995. Compilation of Air Pollutant Emission Factors, AP-42, 5th edition, Vol. I: Stationary Point and Area Sources. January 1995.

USAF, 2018. Emission Estimation Method for Hauling Excavation Materials and Construction Supplies: United States Air Force (USAF) Institute for Environment, Safety and Occupational Health Risk Analysis (IERA) Air Emissions Inventory Guidance Document for Mobile Sources at Air Force Installations (Revised August, 2018). Emissions Factor for the Georgia, Year 2022 (Table 5-25)

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APPENDIX D

SOCIOECONOMIC REPORT

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Introduction

The United States Army Cyber Command (ARCYBER) is proposing to provide infrastructure upgrades to support an increase of up to 5,000 personnel at the U.S. Army Garrison Fort Gordon (USAGFG) in Richmond County, Georgia (with portions extending into Jefferson, Columbia, and McDuffie Counties).

The Augusta-Richmond County, Georgia Core-based Statistical Area (CBSA) was selected as the ROI. This CBSA encompasses USAGFG and Augusta, which is the largest nearby economic hub and is also within Richmond County. The induced impacts presented in this report would flow outside of Richmond County and extend throughout the CBSA.

The purpose of this economic report is to provide estimates of the potential economic impacts of the proposed project on the economic conditions of the CBSA. Analysis in this economic report quantifies economic impacts that would be generated by constructing or renovating approximately 850,00 square feet of physical office space to support up to 5,000 new personnel.

This economic report was prepared using the Regional Economic System (RECONS), which was developed by the U.S Army Corps of Engineers (USACE) Institute for Water Resources, the Louis Berger Group and Michigan State University. RECONS is a regional economic impact modeling tool that estimates regional and national job creation, and retention and other economic measures such as income, value added, and sales. This modeling tool automates calculations and generates estimates of jobs and other economic measures, such as income and sales associated with military spending, annual Civil Work program spending and stem-from effects for Ports, Inland Water Way, FUSRAP and Recreation This is done by extracting multipliers and other economic measures from more than 1,500 regional economic models that were built specifically for USACE's project locations. These multipliers were then imported to a database and the tool matches various spending profiles to the matching industry sectors by location to produce economic impact estimates. RECONS will be used as a means to document the performance of direct investment spending. RECONS will also allow the USACE to evaluate project and program expenditures associated with annual expenditures.

Primary data were estimated using average wage conditions for military and civilian personnel; average costs per square foot for new construction and renovation of commercial buildings; and average costs per square foot for operations and maintenance of constructed commercial buildings. RECONS was used to generate estimates of economic impacts. The impact analysis, however, is essentially a snapshot in time; ongoing planning, scheduling, and federal legislative activities could result in changes to various input assumptions and therefore to the impact conclusions as well. The economic analysis quantifies the following types of impacts on the High Growth Alternative:

- Jobs,
- Labor Income, and
- Economic Output.

1.1 Project Phasing

Impacts are presented on a year-by-year basis. Impacts consider construction renovation activities; labor costs; and operational and maintenance expenses. It is currently expected that the High Growth alternative construction/renovation would begin in 2021 and be completed in 2025. Construction/renovation would occur at a continual rate of approximately 170,000 square feet per year; this rate would support an annual increase in staffing of approximately 1,000 new personnel per year over the same time period. This phasing is summarized in Table 1. Thus, by 2025, approximately 850,000 square feet of new/renovated facilities would be available for up to 5,000 new personnel. During each year from 2021 to 2025, operations and maintenance costs would increase to account for the concurrent increase in facility size. In 2025, it would be expected that construction/renovations would be completed, and operations would be ramping-up to

reach full capacity by year end. Thus, year 2025 would be expected to be the first full year at full operations; this year represents the first year of *steady-state* operations.

Table 1. Phasing for Staffing and Infrastructure Upgrades for the High Growth Alternative, 2021-2025

Category	Year					Steady-state totals by year 2025
	2021	2022	2023	2024	2025	
Staffing, increased by per year (cumulative basis)	1000	2000	3000	4000	5000	5,000 staff
New Construction/ Renovation (sf per year)	170,000	170,000	170,000	170,000	170,000	850,000 sf
Operations and Maintenance, increased by per year (cumulative basis)	170,000	340,000	510,000	680,000	850,000	850,000 sf

Over the course of construction/renovation, staffing buildup, and increased operations and maintenance, economic impacts would grow over time, and stabilize in 2025. The growth rate could vary over this building up period if different rates of staffing or construction/renovation occur compared to the phasing presented in Table 1.

When measured in dollar terms, impacts are presented in constant dollars (year 2020). By presenting impacts in constant dollars, this report implicitly assumes that general economic conditions, during the years for which results are presented, will be similar to current economic conditions. Constant dollar analysis is presented in year 2020 dollars due to the nature of the estimates of expenditures and employment data.

1.2 Primary Data

Primary economic data were extrapolated from information provided in the Road to Growth (RTG) Environmental Assessment (2014). For example, the RTG indicated the average annual salary for military and civilian personnel was $41,830 in 2014. Assuming a 3 percent annual escalation rate, the annual salary value is approximately $50,000 in 2019/2020. It is assumed that all new staff would live off-post. Additionally, it is assumed there would be an increase of 1,000 new staff stationed at USAGFG per year; thus, each year there would an additional 1,000 staff until 2025, when a total of 5,000 staff would be reached. Direct labor expenditures account for professional, scientific, and technical staff performing computer security services. A summary of salary expenditures is presented in Table 2.

As Table 2 indicates, direct operational employment related to ARCYBER would build up from the first year of operations in 2021 until full operational status is reached by 2025. Thus, year 2025 represents the first full year of operations, so the year 2025 total reflects a steady state in which the same number of employees would work at USAGFG absent any unforeseen changes. In addition, direct jobs were not entered into the RECON model because, according to the model, jobs do not generate other jobs. Jobs impacts are generated through increases in economic activity that would be spurred by expenditures that would be associated with new staffing for the High Growth Alternative.

For analysis of the construction/renovation expenditures, it was estimated these activities would cost $100 (one hundred dollars) per square foot for a commercial building (ProEst Estimating Software, 2020). It is assumed that approximately 170,000 square feet of commercial space would be constructed/renovated each year from 2021 to 2025, such that by the end of 2025, approximately 850,000 square feet of space would be available and utilized. A summary of construction/renovation expenditures is presented in Table 3.

Operational and maintenance (O&M) costs, including utilities were estimated at approximately $3.00 (three dollars) per square foot (Facility Services Partners, Inc., 2020). It is estimated that O&M would be

performed during the first year (2021) on 170,000 square feet of commercial facilities within USAGFG. Each subsequent year, another 170,000 square feet of commercial facilities would require O&M. Thus, by 2025, O&M would be performed on 850,000 square feet of commercial facilities, all within USAGFG. The O&M costs account for increased refuse collection, custodial services, pest control, office supplies, wastewater management, and real property management. A summary of O&M expenditures is presented in Table 4.

Table 2. Annual Employment Expenditures for the High Growth Alternative, FY2021-2025

	Year					Steady-state total by year 2025
Category	**2021**	**2022**	**2023**	**2024**	**2025**	
Staffing, increased by per year (cumulative basis)	1,000	2,000	3,000	4,000	5,000	5,000
Annual Employment Expenditure ($)	100,000,000	200,000,000	300,000,000	400,000,000	500,000,000	500,000,000

Table 3. Annual Construction/Renovation Expenditures for the High Growth Alternative, FY2021-2025

	Year					Steady-state totals by year 2025
Category	**2021**	**2022**	**2023**	**2024**	**2025**	
New Construction/ Renovation (sf per year)	170,000	170,000	170,000	170,000	170,000	850,000 sf
Annual Expenditure ($)	17,000,000	17,000,000	17,000,000	17,000,000	17,000,000	85,000,000

Notes: Annual expenditure based on $100 per square for new construction or renovation for commercial buildings.

Table 4. Annual Operational and Maintenance Expenditures for the High Growth Alternative, FY2021-2025

	Year					Steady-state totals by year 2025
Category	**2021**	**2022**	**2023**	**2024**	**2025**	
Operations and Maintenance (sf per year)	170,000	340,000	510,000	680,000	850,000	850,000 sf
Annual Expenditure ($)	510,000	1,020,000	1,530,000	2,040,000	2,550,000	2,550,000

Notes: Annual expenditure based on $3 per square foot for O&M of commercial buildings.

Result Variables and Key Concepts

2.1 Result Variables

Economic impact variables that are presented as results include Jobs, Labor Income, and Economic Output.

2.1.1 Jobs

Jobs impacts represent the number of jobs that would be created or sustained within the ROI as a result of the construction/renovation, operations, and O&M activities associated with the High Growth Alternative.

2.1.2 Labor Income

Labor income impacts represent the income generated through the jobs that would be created or sustained within the ROI as a result of construction/renovation, operations, and O&M activities associated with the High Growth Alternative.

2.1.3 Economic Output

Economic output impacts represent total production and sales volume that would be generated in the ROI as a result of construction/renovation, operations, and O&M activities associated with the High Growth Alternative. Economic output is generated by increases in personal expenditures and non-payroll expenditures.

2.2 Key Concepts

Each of the result variables consists of a direct, an indirect, and an induced element.

2.2.1 Direct Impacts

Direct impacts are associated with the construction/renovation, operations, and O&M activities associated with the High Growth Alternative. Direct jobs include jobs constructing/renovating, operating, and maintaining facilities. Direct labor income is the incomes earned by those workers and direct economic output is associated with initial purchases of local construction materials and supplies, as well as goods and services that would facilitate the operations under the High Growth Alternative.

2.2.2 Indirect Impacts

Indirect impacts are the jobs, income, and economic output generated by the businesses that would supply goods and services to USAGFG under the High Growth Alternative. Indirect jobs include jobs at companies that supply construction materials/supplies or support jobs directly related to the High Growth Alternative. Indirect jobs can extend to include jobs related to the manufacture of products used to construct and operate the facility. Indirect labor income includes the income earned by people working indirect jobs. Indirect output includes the total sales volume related to the supply of goods and services to the suppliers of businesses that would supply USAGFG with construction and operational support under the High Growth Alternative.

ECONOMIC IMPACT RESULTS

3.1 Impacts Associated with Staffing the High Growth Alternative

Table 5 represents the additional job growth that would occur in the CBRA from employee expenditures associated with staffing for the High Growth Alternative. It is important to note that these job totals represent jobs that are anticipated to occur as a result of the additional 5,000 personnel increase under the High Growth Alternative. Table 6 represents labor income associated with these additional jobs. Table 7 represents the additional economic output associated with staffing the High Growth Alternative. The year 2025 represents the first full year of full operations; a maximum of $290 million in economic output would be generated annually in 2025 and every year thereafter for the foreseeable future (on a constant dollar basis) if up to 5,000 new personnel are employed at USAGFG. Detailed RECONS outputs are included in Attachment 1.

Table 5. Additional Operational Job Impacts for the High Growth Alternative, FY2021-2025

Jobs	**2021**	**2022**	**2023**	**2024**	**2025***
Direct Impact	384.50	763.60	1137.40	1505.90	1870.70
Secondary Impact	169.10	335.90	500.40	662.80	823.30
Total Impact	**553.60**	**1,099.50**	**1,637.80**	**2,168.70**	**2,694.00**

*Estimate for 2025 represents steady-state operations. This level of jobs would be expected to continue annually for the foreseeable future.

Table 6. Additional Operational Labor Income under the High Growth Alternative, FY2021-2025

Additional Labor Income	**2021**	**2022**	**2023**	**2024**	**2025***
Direct Impact ($000)	$26,199	$52,399	$249,435	$104,798	$130,997
Secondary Impact ($000)	$6,518	$13,036	$98,280	$26,073	$32,591
Total Impact ($000)	**$32,718**	**$65,435**	**$347,715**	**$130,870**	**$163,588**

*Estimate for 2025 represents steady-state operations. This level of additional labor income would be expected to continue annually for the foreseeable future.

Table 7. Operational Economic Output under the High Growth Alternative, FY2021-2025

Economic Output	**2021**	**2022**	**2023**	**2024**	**2025***
Direct Impact ($000)	$36,379	$72,757	$302,161	$145,515	$181,893
Secondary Impact ($000)	$21,802	$43,603	$298,422	$87,206	$109,008
Total Impact ($000)	**$58,180**	**$116,360**	**$600,583**	**$232,721**	**$290,901**

*Estimate for 2025 represents steady-state operations. This level of economic output would be expected to continue annually for the foreseeable future.

3.2 Impacts Associated with Construction/Renovation for the High Growth Alternative

Table 8 presents job impacts that would result from the construction/renovation of facilities at USAGFG associated with the High Growth Alternative. The number of construction jobs is relatively constant over the period from 2021 to 2025, because the amount of new construction/renovation would be similar for each year in this period. Once full staffing and full construction/renovation is complete by 2025, no new construction/renovation jobs would result. Table 8 summarizes construction jobs under the High Growth Alternative. Table 9 represents labor income associated with these construction/renovation jobs. Table 10 represents the additional economic output associated with construction/renovation activities for the High Growth Alternative. Detailed RECONS outputs are included in Attachment 1.

Table 8. Job Impacts from Construction/Renovation for the High Growth Alternative, FY2021-2025

Jobs	2021	2022	2023	2024	2025	Total FY2021-2025
Direct Impact	125.6	124.4	123.3	122.2	121.4	616.9
Secondary Impact	59	58.5	57.9	57.4	57.1	289.9
Total Impact	**184.6**	**182.9**	**181.2**	**179.6**	**178.5**	**906.8**

Note: Following 2025, no new construction/renovation jobs would be required under this model.

Table 9. Construction/Renovation Labor Income under the High Growth Alternative, FY2021-2025

Labor Income	2021	2022	2023	2024	2025	Total FY2021-2025
Direct Impact ($000)	$6,639	$6,639	$6,639	$6,639	$6,639	$33,195
Secondary Impact ($000)	$2,607	$2,607	$2,607	$2,607	$2,607	$13,035
Total Impact ($000)	**$9,246**	**$9,246**	**$9,246**	**$9,246**	**$9,246**	**$46,230**

Note: Following 2025, no new construction/renovation is included in the model.

Table 10. Construction/Renovation Economic Output under the High Growth Alternative, FY2021-2025

Economic Output	2021	2022	2023	2024	2025	Total FY2021-2025
Direct Impact ($000)	$16,182	$16,182	$16,182	$16,182	$16,182	$80,910
Secondary Impact ($000)	$8,531	$8,531	$8,531	$8,531	$8,531	$42,655
Total Impact ($000)	**$24,714**	**$24,714**	**$24,714**	**$24,714**	**$24,714**	**$123,570**

Note: Following 2025, no new construction/renovation is included in the model.

3.3 Impacts Associated with Facilities Operations and Maintenance for the High Growth Alternative

Table 11 presents job impacts that would be required for O&M of facilities associated with the High Growth Alternative. The number of O&M jobs increase over time, reflecting the concurrent increases in both professional staffing and building square footage each year until 2025. Table 12 represents labor income associated with these additional O&M jobs. Table 13 represents the additional economic output associated with O&M activities for the High Growth Alternative. The year 2025 represents the first full year of full operations; a maximum $2.5 million in economic output would be generated annually in 2025 and every year for the foreseeable future (on a constant dollar basis) if up to 5,000 new personnel are employed at USAGFG and up to 850,000 square feet of facilities are in use and require O&M. Detailed RECONS outputs are included in Attachment 1.

Table 11. O&M Job Impacts for the High Growth Alternative, FY2021-2025

Jobs	2021	2022	2023	2024	2025*
Direct Impact	2.5	5.0	7.4	9.8	12.2
Secondary Impact	1.5	2.9	4.4	5.8	7.2
Total Impact	**4.0**	**7.9**	**11.7**	**15.5**	**19.4**

*Estimate for 2025 represents steady-state operations. This level of jobs would be expected to continue annually for the foreseeable future.

Table 12. O&M Labor Impacts for the High Growth Alternative, FY2021-2025

Labor Income	**2021**	**2022**	**2023**	**2024**	**2025***
Direct Impact ($000)	$64	$128	$192	$256	$320
Secondary Impact ($000)	$63	$125	$188	$251	$313
Total Impact ($000)	**$127**	**$254**	**$380**	**$507**	**$634**

*Estimate for 2025 represents steady-state operations. This level of labor impact would be expected to continue annually for the foreseeable future.

Table 13. O&M Economic Output under the High Growth Alternative, FY2021-2025

Economic Output	**2021**	**2022**	**2023**	**2024**	**2025***
Direct Impact ($000)	$301	$601	$902	$1,203	$1,503
Secondary Impact ($000)	$201	$402	$604	$805	$1,006
Total Impact ($000)	**$502**	**$1,004**	**$1,506**	**$2,007**	**$2,509**

*Estimate for 2025 represents steady-state operations. This level of economic output would be expected to continue annually for the foreseeable future.

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ATTACHMENT 1
RECONS Model Outputs

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