ENVIRONMENTAL ASSESSMENT FOR A SOLAR PHOTOVOLTAIC GENERATING ARRAY SYSTEM

PREPARED FOR:

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DRAFT FINDING OF NO SIGNIFICANT IMPACT

SOLAR PHOTOVOLTAIC GENERATING ARRAY SYSTEM FOR FORT GORDON, GEORGIA

INTRODUCTION

Fort Gordon is situated in east-central Georgia, 9 miles southwest of the City of Augusta. It is located in portions of Columbia, Jefferson, McDuffie, and Richmond counties, but is primarily within Richmond County. Fort Gordon is subdivided into 49 training areas, two restricted impact areas, a main cantonment area, and an industrial cantonment area. Fort Gordon is approximately 55,590 acres, of which 5,590 acres are the main cantonment area, 13,000 acres are impact areas, and 37,000 acres are on-Post maneuver and training areas. In September 2011, the Energy Initiatives Task Force (EITF) was established by the Secretary of the Army to serve as the central management office for partnering with Army installations to implement cost-effective, large-scale renewable energy projects, leveraging private sector financing. The EITF focuses on solar, wind, geothermal, and biomass projects that are 10 megawatts (MWs) or greater and located on Army installations in the U.S. The EITF and Fort Gordon identified solar photovoltaic (PV) as a viable renewable energy technology for development on Fort Gordon.

1. PURPOSE AND NEED

The purpose and need for the Proposed Action is to: (a) achieve renewable electrical energy production on Army land in accordance with 10 United States Code 2911(e), as amended, which requires that the Army produce or procure not less than 25 percent of the total quantity of electrical energy it consumes within its facilities during fiscal year 2025 and each fiscal year thereafter from renewable energy sources; (b) contribute to the Army's goal of generating one gigawatt of renewable electrical energy on Army land by 2025; and (c) contribute to the Energy Policy Act of 2005, requiring the Army's consumption of not less than 7.5 percent of the total quantity of facility electrical energy it consumes within its facilities during fiscal year 2013 and each fiscal year thereafter from renewable energy sources. The Army proposes to help meet this purpose and need at Fort Gordon via the construction, operation, and maintenance of a solar PV generating array system (solar PV system).

2. DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

PROPOSED ACTION: The Army proposes to enter into an approximately 35-year easement with Georgia Power Company (Georgia Power), in which it will allow the use of about 250 acres of land on Fort Gordon for the developer to construct, operate, and maintain an approximately 30 MW solar PV system. The easement will also include a transmission line right of way (ROW) to an electrical substation. PV technology converts sunlight directly into electric current through the use of semiconductors. Semiconductors are usually composed of crystalline silicon wafers, either single crystal or polycrystalline, and thin film amorphous silicon. When semiconducting materials are exposed to light, they absorb some of the sun's energy in the form of photons and emit electrons in the form of direct current electricity. The basic PV cell produces only a small amount of power; therefore, PV cells are wired in a series to form panels. Several PV panels are installed in a rack to form a PV array. The power-producing components of a solar PV system consist of the solar array field (a series of networked PV arrays); the power conditioning system, which contains an inverter to convert the energy produced from direct current to alternating current for use on the electrical grid; and a transformer to boost voltage for feeding the power into the electrical grid.

ALTERNATIVES CONSIDERED AND EVALUATED: Numerous alternatives to the Proposed Action were considered and the following alternatives were carried through for analysis throughout the environmental assessment (EA).

- ***Alternative 1: Site 5 and Transmission Line Right of Way (Preferred Alternative)*:** The Preferred Alternative is to construct an approximately 30 MW solar PV system on an approximately 250 acre parcel of land on the southeastern part of Fort Gordon, near the intersection of Highway 1 and Mirror Lake Road and east of the Gordon Lakes Golf Course. The transmission line route follows Mirror Lake Road and then Range Road in a northerly direction, to 19th street, turning east and following the outside border of the cantonment area to Georgia Power's substation #2, the main Fort Gordon transformer station.

  The proposed solar PV site is heavily wooded with abundant understory. This site offers limited environmental restrictions and is within a four mile radius of the substation. The proposed site is available for military training, although it is infrequently utilized and Fort Gordon has no future plans for increased use of this site. There is a small training site adjacent to the solar PV site that will be excluded from development. There is also a cemetery adjacent to the solar PV site that will be excluded and protected. Access to the training site and the cemetery must be maintained throughout construction and operation of the solar PV system.

  The proposed transmission line route will be predominately located in existing ROWs. However, in several locations the line will cut across wooded, unimproved areas. These areas will require additional timber harvest and site preparation.

- ***No Action Alternative*:** Under the No Action Alternative, the Army will not enter into a lease agreement with a private partner to construct, operate, and maintain a solar PV system on Fort Gordon. An opportunity to work towards the goals of reducing the Army's energy intensity and using an available renewable energy technology will, therefore, be missed.

3. ENVIRONMENTAL ANALYSIS

ENVIRONMENTAL CONSEQUENCES AND COMPARISON OF ALTERNATIVES: The EA, which is attached hereto and incorporated by reference into this Finding of No Significant Impact (FNSI), examined the potential effects of the Preferred Alternative (Alternative 1: Site 5 and Transmission Line ROW) and No Action Alternative on 13 resource areas and areas of environmental and socioeconomic concern: land use and visual resources, airspace, noise, radio frequency and spectrum use, air quality, geology and soils, water resources, biological resources, cultural resources, hazardous materials and waste, socioeconomics, transportation, and utilities.

Implementation of the Preferred Alternative (Alternative 1: Site 5 and Transmission Line ROW) would result in a combination of impacts. The potential impacts identified were primarily minor and associated with the construction of the solar PV system and transmission line. Construction of the array and transmission line have the potential to impact land use and visual resources, geology and soils, water resources, and biological resources. The EA identifies mitigation measures (e.g. avoidance, best management practices (BMPs), and environmental compliance) to minimize potential environmental impacts.

CUMULATIVE IMPACTS: Cumulative impacts result from the incremental effect of separate past, present, and reasonably foreseeable future actions on the environment, regardless of what

agency or person undertakes those actions. They can accrue from individually minor but collectively significant actions taking place over an extended period of time. Taken individually, environmental damage is incremental, occurring one action at a time. However, determining the significance of the collective actions requires an understanding of their effect on the larger environment.

Projects occurring on Fort Gordon (in addition to the Preferred Alternative) would be required to follow the BMPs described in the EA. If these BMPs are properly implemented and maintained for each project, there would be only minor cumulative impacts. When necessary, appropriate state and Federal agencies would be consulted, and impacts on the respective resources would be avoided by following the agency recommendations.

4. PUBLIC REVIEW AND COMMENTS

The Final EA 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 EA and draft FNSI were published in the *Augusta Chronicle*. During the public review and comment period, copies of the EA were made available at the Fort Gordon Public Affairs Office (Bldg. 29801, Nelson Hall, 520 Chamberlain Dr., Fort Gordon, GA), Woodworth Library (Building 33500, Rice Road, Fort Gordon, GA), and the Augusta-Richmond County Library (823 Telfair St., Augusta, GA). During and immediately following this public comment period, the Army collected, logged, and incorporate any comments received into the EA and FNSI as necessary. 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.

5. FINDING OF NO SIGNIFICANT IMPACT

The results of the analysis in the EA, comments received within the public review period, and the needs of Fort Gordon and the EITF have been considered by the Fort Gordon garrison. Based on these factors, the decision to implement the Proposed Action (Alternative 1: Site 5 and Transmission Line ROW) in which the Army proposes to enter into an approximately 35-year easement with Georgia Power. The easement will allow the use of about 250 acres of land on Fort Gordon and the additional transmission line ROW for the construction, operation, and maintenance of an approximately 30 MW solar PV system. Implementation of a solar PV system will not have a significant impact on the quality of human life or natural environment.

This analysis fulfills the requirements of the National Environmental Policy Act of 1969, as implemented by the Council on Environmental Quality regulations (40 CFR 1500-1508), as well as the requirements of the Environmental Analysis of Army Actions (32 CFR 651). Therefore, issuance of a FNSI is warranted, and an Environmental Impact Statement is not necessary.

_____ _____

COL Samuel G. Anderson
Garrison Commander
Fort Gordon

Date

ENVIRONMENTAL ASSESSMENT FOR A SOLAR PHOTOVOLTAIC GENERATING ARRAY SYSTEM

FORT GORDON, GEORGIA

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EXECUTIVE SUMMARY

ENVIRONMENTAL ASSESSMENT FOR A SOLAR PHOTOVOLTAIC GENERATING ARRAY SYSTEM

PURPOSE AND NEED

The purpose and need for the Proposed Action is to: (a) achieve renewable electrical energy production on Army land in accordance with 10 United States Code 2911(e), as amended, which requires that the Army produce or procure not less than 25 percent of the total quantity of electrical energy it consumes within its facilities during fiscal year 2025 and each fiscal year thereafter from renewable energy sources; (b) contribute to the Army's goal of generating one gigawatt of renewable electrical energy on Army land by 2025; and (c) contribute to the Energy Policy Act of 2005, requiring the Army's consumption of not less than 7.5 percent of the total quantity of facility electrical energy it consumes within its facilities during fiscal year 2013 and each fiscal year thereafter from renewable energy sources. The Army proposes to help meet this purpose and need at Fort Gordon via the construction, operation, and maintenance of a solar photovoltaic (PV) generating array system (solar PV system).

PROPOSED ACTION

The Army proposes to enter into an approximately 35-year easement with Georgia Power Company (Georgia Power), in which it will allow the use of about 250 acres of land on Fort Gordon for the developer to construct, operate, and maintain an approximately 30 megawatt (MW) solar PV system. The easement will also include a transmission line right of way (ROW) to an electrical substation.

The Preferred Alternative is to construct an approximately 30 MW solar PV system on an approximately 250 acre parcel of land on the southeastern part of the installation, east of Gordon Lakes Golf Course. Construction will also include a transmission line corridor and associated right-of-way to connect the new solar PV system to Georgia Power's substation #2 in the cantonment area.

NO ACTION ALTERNATIVE

Under the No Action Alternative, the Army will not enter into a lease agreement with a private partner to construct, operate, and maintain a solar PV system on Fort Gordon. An opportunity to work towards the goals of reducing the Army's energy intensity and using an available renewable energy technology will, therefore, be missed.

ENVIRONMENTAL CONSEQUENCES

Based on the Environmental Assessment, it has been determined that implementation of Alternative 1: Site 5 and Transmission Line ROW would have no significant direct, indirect, or cumulative effects on the quality of the natural or human environment. Potential impacts on resources that could be affected by the implementation of the Preferred Alternative are summarized in Table ES-1.

Table ES-1. Summary of Potential Environmental and Socioeconomic Impacts

Resource	Potential Environmental Impacts Resulting from the Preferred Alternative	Mitigation to Negate Impacts from the Preferred Alternative	Summary of Impacts (see Section 3.1.2 for definitions of the types of impacts)	
			Alternative 1: Site 5 and Transmission Line Right of Way (Preferred Alternative)	No Action Alternative
Land Use & Visual Resources				
Land Use & Visual Resources	Direct Impacts: Moderate adverse impacts would occur as a result of the timber harvest prior to construction.		**Moderate**	None
	Indirect Impacts: Minor adverse indirect impacts on land use would occur as a result of the loss of 250 acres of commercial timber production. Once the area is converted to solar panels, Fort Gordon would lose any future timber harvest revenue for at least the next 60 years (35-year lease plus 25 years to grow trees if the lease ends). Archery hunting acreage would also be lost as a result of the timber harvest. Minor adverse indirect impacts on the viewshed would occur as a result of construction and operation. The change in viewshed from a natural wooded area to a cleared area with a solar PV system and transmission line would result in minor adverse impacts.		**Minor**	None
Airspace				
Airspace	Direct Impacts: None		None	None
	Indirect Impacts: None		None	None

Noise				
Noise	Direct Impacts: Noise is expected from timber harvesting in the forested area, vegetation clearing, and construction. Short-term minor adverse effects near the construction sites could result from the use of heavy equipment. Operation of the solar panels would result in no impacts on the noise environment since the PV panels would operate in silent mode.	Heavy construction equipment would operate only during daylight hours and would be maintained to the manufacturer's specifications to minimize noise impacts.	**Minor**	None
	Indirect Impacts: None		None	None
Radio Frequency & Spectrum Use				
Radio Frequency & Spectrum Use	Direct Impacts: The solar PV system array site would have no impact. The transmission line could have minor impacts on communication missions on Fort Gordon.	Transmission line ROW has been adjusted in accordance to the needs of Fort Gordon mission through consultation with stakeholders.	**Minor**	None
	Indirect Impacts: None		None	None
Air Quality				
Air Quality	Direct Impacts: Short-term minor adverse impacts from air emissions during construction and installation. The primary source of air pollutants during construction would be attributed to the movement and operation of construction equipment.	Fugitive dust would be mitigated with water and the covering of open-bodied trucks.	**Minor**	None
	Indirect Impacts: Long-term beneficial effects from indirect reductions in the use of fossil-fuel-based electricity.		**Beneficial**	**Minor**
Geology & Soils				
Geology & Soils	Direct Impacts: Ground disturbance would be necessary to construct the solar PV system and would directly impact soils. Long-term minor adverse impacts would result from the disturbance of surface and near-surface soil horizons through heavy machinery and vehicle traverses associated with construction. During operation, no adverse impacts to geology & soils are anticipated.	The developer would use BMPs for sedimentation and erosion such as soil erosion-control mats, silt fences, straw bale dikes, diversion ditches, riprap channels, water bars, and water spreaders.	**Minor**	None
	Indirect Impacts: During construction, inadvertent releases of chemicals, oils, or solvents into surrounding soils could eventually migrate into the underlying groundwater.	The developer would employ BMPs during construction activities to minimize the potential for contaminants to be released into the soil and the groundwater. The developer would follow procedures required in the Fort Gordon SPCCP and ISCP.	**Minor**	None

Water Resources				
Groundwater	Direct Impacts: Changing 250 acres of forested land to a solar array field could alter site hydrology. Transmission line installation of utility poles and ROW establishment would be negligible impacts to groundwater.	In accordance with the Energy Independence and Security Act, LID practices will be used in order to maintain pre and post development run off coefficients to the greatest extent possible, where technically feasible. Stormwater will be more likely to infiltrate to the recharge area as a result of the installation of LID practices.	**Minor**	None
	Indirect Impacts: During construction, inadvertent releases of chemicals, oils, or solvents into the trench or surrounding soils could eventually migrate into the underlying groundwater.	The developer would employ BMPs during construction activities to minimize the potential for contaminants to be released into the soil and the groundwater. The developer would follow procedures required in the Fort Gordon SPCCP and ISCP.	**Minor**	None
Surface Water	Direct Impacts: None		None	None
	Indirect Impacts: Erosion from soil disturbance and inadvertent releases of chemicals, oils, or solvents during construction could potentially result in runoff into surface water bodies.	The developer would use BMPs for sedimentation and erosion control such as soil erosion-control mats, silt fences, diversion ditches, riprap channels, water bars, and water spreaders. Therefore, anticipated adverse impacts would be temporary and minor.	**Minor**	None
Wetlands	Direct Impacts: There are wetlands within the boundaries of the Preferred Alternative. There are no immediate plans to fill or alter any of these wetlands as a result of the solar PV system construction.	If wetlands impacts are anticipated during the course of developing the site, appropriate permits and mitigation would apply. The transmission line route will cross wetlands, which is covered under Nationwide Permit 12. This permit covers construction, maintenance, and repair of utility lines crossing wetlands.	**Minor**	None
	Indirect Impacts: Erosion from soil disturbance during construction could potentially result in runoff and sediment accumulation in wetlands.	BMPs such as soil erosion-control mats, silt fences, straw bale dikes, diversion ditches, riprap channels, water bars, and water spreaders would be used during construction to minimize erosion, sedimentation, and the potential for contaminants to be released. Therefore, anticipated adverse impacts would be temporary and minor.	**Minor**	None
Floodplains	Direct Impacts: The impacts to floodplains would be during construction and anticipated to be temporary. The transmission line would be stabilized with appropriate vegetative cover at the close of construction.		None	None

	Indirect Impacts: There are floodplains adjacent to Site 5. The transmission line ROW will cross only a small amount of floodplains.	The transmission line ROW impacts to floodplains would be during construction and anticipated to be temporary. Both site 5 and ROW would be stabilized with appropriate vegetative cover at the close of construction.	**Minor**	None
Biological Resources				
Flora	Direct Impacts: Construction would involve clearing and grading approximately 250 acres for the solar PV site with limited vegetation clearing for the transmission line, which would increase the potential for the introduction and spread of noxious weeds.	Fort Gordon has a program to control noxious weeds that includes the stabilization of disturbed areas with native seed or other approved plantings. Therefore, minor adverse impacts would be anticipated.	**Minor**	None
	Indirect Impacts: None		None	None
Fauna	Direct Impacts: The loss of vegetation and habitat would result in the displacement of wildlife species living on the project site. Impacts would be localized and not affect regional wildlife populations.		**Minor**	None
	Indirect Impacts: During construction, inadvertent releases of chemicals, oils, or solvents surrounding soils could eventually migrate into surface water bodies, which could affect wildlife.	The developer would employ BMPs during construction activities to minimize the potential for contaminants to be released into the soil, groundwater, and surface water. The developer would follow procedures required in the Fort Gordon SPCCP and ISCP.	None	None
T&E and other sensitive species	Direct Impacts: The project site is not within the RCW HMU. The site is forested but forestry management practices, such as prescribed burning and timber thinning, have not been applied in recent years. As a result, the area is currently not suitable RCW habitat. Segments of the transmission line will pass through forested areas and one segment will run adjacent to the HMU. There are no known gopher tortoise sites within the area of the project site.	The area must be surveyed to ensure that no active RCW cavities were established. Fort Gordon would follow gopher tortoise management guidelines in Appendix H of the INRMP (USAGFG, 2008a). Seasonal restrictions for tree and brush clearing would limit impacts to migratory bird species. With careful planning and avoiding clearing suitable migratory bird habitat during the nesting season (i.e., April 1 – July 31), adverse impacts would be avoided.	**Minor**	None
	Indirect Impacts: None		None	None

Cultural Resources				
Cultural Resources	Direct Impacts: There is one cemetery, Cemetery 9, located adjacent to the boundary of the project site. There are no known historic structures and there are no archaeological sites that are eligible for the National Register of Historic Places (NRHP) within the boundaries of the project site.	The cemetery is designated as off-limits to development along with a 30 foot buffer around the cemetery. Access to the cemetery must be maintained throughout construction and operation of the solar PV system. Fort Gordon has surveyed the majority of the installation for cultural resources. Although the discovery of unknown cultural resources remains possible, the Installation has procedures in place to deal with inadvertent discoveries.	None	None
	Indirect Impacts: None		None	None
Hazardous Materials & Waste				
Hazardous Materials & Waste	Direct Impacts: There are no IRP sites within the PV Solar Array System field site. However, there are two IRP sites that are near the transmission line ROW and a third site that is under investigation.	To mitigate potential impacts to SWMU site FTGD-46, Georgia Power would maintain a 50-foot buffer between the transmission line and the site. SWMU site FTGD-28 is closed and will be avoided. 19th Street landfill will be engineered to not impact debris field. Contaminant levels were found to be low. Health and safety plan will be implemented during construction.	**Minor**	None
	Indirect Impacts: Minor spills and leaks of fuels and oils could occur from heavy equipment machinery during construction. There would be minimal storage and handling of hazardous materials and waste within the project site during construction only.	Implement preventive measures identified in the SPCCP and follow procedures identified in the Installation Spill Prevention and Response Plan. Storage or handling of hazardous materials and waste would comply with the requirements of the Fort Gordon HWMP..	**Minor**	None
Transportation				
Transportation	Direct Impacts: An increase in traffic is not anticipated due to the nature of the construction and operation of the solar PV system. The Preferred Alternative would not hinder emergency access nor affect parking capacity.		None	None
	Indirect Impacts: None		None	None
Utilities				
Potable Water	Direct Impacts: None		None	None
	Indirect Impacts: None		None	None

Wastewater	Direct Impacts: None		None	None
	Indirect Impacts: None		None	None
Stormwater	Direct Impacts: None		None	None
	Indirect Impacts: Minor adverse impacts to stormwater are anticipated due to timber harvesting, which would result in increased runoff on the highly erodible soils prior to the construction of the solar PV system and transmission line.	The Georgia BMPs for Forestry would be used for mitigation of the timber harvest. BMPs such as soil erosion-control mats, silt fences, straw bale dikes, diversion ditches, riprap channels, water bars, and water spreaders would be used during construction of the solar PV system and transmission line to minimize erosion and sedimentation. The solar PV site would be required to adhere to Fort Gordon's SWPPP for post-construction BMPs. The developer would mitigate natural infiltration through utilization of Low Impact Development (LID).	**Minor**	None
Electricity	Direct Impacts: Fort Gordon could realize a long-term return on investment. Fort Gordon would reduce its fossil-fuel-based energy demand commensurate with the output levels associated with solar PV output.		**Beneficial**	**Minor**
	Indirect Impacts: None		None	None
Solid Waste Management	Direct Impacts: Operational use of solar PV would create small amounts of solid waste during maintenance activities. No adverse impacts are anticipated.		None	None
	Indirect Impacts: None		None	None

Socioeconomics				
Economy	Direct Impacts: Potential temporary beneficial impacts to the local economy.		**Beneficial**	None
	Indirect Impacts: A minor indirect impact on the Fort Gordon Forestry Program is anticipated. The timber harvesting of up to 250 acres of forest land would have to be conducted on an accelerated schedule in order to meet the proposed action schedule. Because of the accelerated schedule, it would be expected that the timber harvest contract would have a lower value compared to what it would be on a normal contract schedule.		**Minor**	None
Environmental Justice	Direct Impacts: None		None	None
	Indirect Impacts: None		None	None
Protection of Children	Direct Impacts: None		None	None
	Indirect Impacts: None		None	None
Cumulative Impacts				
Cumulative Impacts	Direct Impacts: None		None	None
	Indirect Impacts: None		None	None

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ACRONYMS AND ABBREVIATIONS

Acronyms used in this EA include the following:

A

AAFES	Army and Air Force Exchange Service
AC	alternating current
ACHP	Advisory Council on Historic Preservation
AIA	Artillery Impact Area
AIT	Advanced Individual Training
APE	Area of Potential Effect
AQCR	Air Quality Control Region
ARB	Air Reserve Base
Army	United States Army
AS	Air Squadron
ASA IE&E	Assistant Secretary of the Army for Installations, Energy & Environment
AUD	Augusta Utilities Department

B

BMPs	Best Management Practices
BO	Biological Opinion

C

CAA	Clean Air Act
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, & Liability Act
CFR	Code of Federal Regulations
CH_4	methane
CHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CSS	Central Security Service
CWA	Clean Water Act

D

DA	Department of the Army
dB	decibel
dBA	A-weighted decibel
dbh	diameter at breast height
DC	direct current
DNL	day-night level
DoD	Department of Defense
DPW	Directorate of Public Works
DZ	Drop Zone

E

EA	Environmental Assessment
ED	Environmental Division
EIS	Environmental Impact Statement
EITF	Energy Initiatives Task Force
EO	Executive Order
EPAct	Energy Policy Act
ESA	Endangered Species Act

F

FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FICON	Federal Interagency Committee on Noise
FIRM	Flood Insurance Rate Map
FNSI	Finding of No Significant Impact

G

GC	Garrison Commander
GADNR	Georgia Department of Natural Resources
GAEPD	Georgia Environmental Protection Division
GHG	greenhouse gas
GIS	Geographic Information System
GPD	gallons per day
GW	gigawatt

H

HMU	Habitat Management Unit
HWMP	Hazardous Waste Management Plan

I

ICRMP	Integrated Cultural Resources Management Plan
IMCOM	Installation Management Command
INRMP	Integrated Natural Resources Management Plan
IRP	Installation Restoration Program
ISCP	Installation Spill Contingency Plan

J, K

L

LID	Low Impact Development

M

MBTA	Migratory Bird Treaty Act
mg/L	milligrams per Liter
MGD	Million Gallons per Day
MOA	Military Operations Area
MS4	Municipal Separate Storm Sewer System
MSA	Metropolitan Statistical Area
MSL	mean sea level
MTR	Military Training Route
MW	megawatt

N

N_2O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO_2	Nitrogen Dioxide
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NSA	National Security Administration

O

O_3	Ozone

P

PAH	petroleum aliphatic hydrocarbons
PBA	performance based award
PBG	potential breeding group
PCB	polychlorinated biphenyl
PM_{10}	Particulate Matter < 10 Microns
$PM_{2.5}$	Particulate Matter < 2.5 Microns
PV	Photovoltaic
PX	Post Exchange

Q

R

RCRA	Resource Conservation and Recovery Act
RCW	Red-Cockaded Woodpecker
RFI	RCRA Facility Investigation
ROI	Region of Influence
ROW	Right of Way
RPM	Reasonable and Prudent Measures

S

SAIA	Small Arms Impact Area
SHPO	State Historic Preservation Officer
SO_2	Sulfur Dioxide
SPCCP	Spill Prevention Countermeasures Plan
SWMU	Solid Waste Management Unit
SWPPP	Stormwater Pollution Prevention Plan

T

TA	Training Area
T&E	Threatened and Endangered
TSCA	Toxic Substances Control Act

U

USACE	U.S. Army Corp of Engineers
USAGFG	U.S. Army Garrison Fort Gordon
USAPHC	U.S. Army Public Health Command
USC	U.S. Code
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
USFWS	U.S. Fish and Wildlife Service
UXO	Unexploded Ordnance

V

VEC	Valued Environmental Component
VFR	visual flight rule

W

WWTP	Wastewater Treatment Plant

X, Y, Z

1 PURPOSE, NEED, AND SCOPE

1.1 BACKGROUND

The area occupied by Fort Gordon was logged and then used for agricultural purposes prior to its purchase by the War Department in 1941. Construction of Camp Gordon, as it was known then, began in 1941. During World War II, Camp Gordon served as a training base for infantry, mechanized infantry, armored cavalry, and armor; and as a prisoner-of-war compound. In 1948, Camp Gordon became home to the Signal Corps Training Center. Camp Gordon became a permanent United States Army (Army) installation and was re-designated Fort Gordon in 1956. Over the years, Fort Gordon was used for various types of military training, but primarily conducted Signal Corps training (USAGFG, 2011). The current population on Fort Gordon (military and civilian) is approximately 23,000, of which approximately 15,000 are active and reserve military and approximately 8,000 are civilians and contractors (USAGFG, 2013b).

U.S. Army Garrison at Fort Gordon operates the installation on behalf of the Cyber Center of Excellence and the other units and organizations that reside on Fort Gordon. The garrison supports the post through directorates and agencies that provide a full range of city services and quality-of-life functions — everything from facilities maintenance, recreation and family programs to training support and emergency services. The garrison is part of the Atlantic Region of the Installation Management Command (IMCOM). IMCOM operates Army installations around the world. The mission of the U.S. Army Garrison at Fort Gordon is to deliver installation services, facilities, and infrastructure to best support mission readiness and provide an enhanced quality of life for the Soldiers, families, and civilians of Fort Gordon.

Fort Gordon is the home of the newly established U.S. Army Cyber Center of Excellence, which was previously called the Signal Center of Excellence. Fort Gordon is the largest communications training facility in the Armed Forces, and is the focal point for the development of tactical communications, information systems, and cyber security. The installation trains Soldiers with the most sophisticated communications equipment and technology in existence. The Leader College of Information Technology, located at Fort Gordon, is the U.S. Army's premiere site for all automation training and home to the Regimental Non-Commissioned Officer Academy.

Fort Gordon is also the home to the 706th Military Intelligence Group; the Naval Security Group Activity; United States Air Force 480th Intelligence, Surveillance, and Reconnaissance Group; 63rd Signal Battalion; 67th Signal Battalion; the Southeast Region Medical Command; the Southeast Region Dental Command; Southeast Region Veterinary Command; the Dwight D. Eisenhower Army Medical Center; U.S. Army Dental Lab; Regional Training Site-Medical; National Science Center-Army; 35th Signal Brigade (deployable); 513th Military Intelligence Brigade (deployable); and Georgia National Guard Youth Challenge Academy. Additionally, numerous Army Reserve and Georgia and South Carolina National Guard units utilize Fort Gordon's weapons ranges and training areas (USAGFG, 2013a).

1.2 PURPOSE AND NEED FOR THE PROPOSED ACTION

1.2.1 BACKGROUND TO THE PURPOSE AND NEED

In September 2011, the Energy Initiatives Task Force (EITF) was established by the Secretary of the Army to serve as the central management office for partnering with Army installations to implement cost-effective, large-scale renewable energy projects,

leveraging private sector financing. The EITF focuses on solar, wind, geothermal, and biomass projects that are 10 megawatts (MWs) or greater and located on Army installations in the U.S. The EITF and Fort Gordon identified solar photovoltaic (PV) as a viable renewable energy technology for Fort Gordon.

In August 2012, the Assistant Secretary of the Army for Installations, Energy & Environment (ASA IE&E) established energy goal attainment policy for all Active Army Installations, with a target of one gigawatt (GW) of renewable energy by 2025. This aggressive renewable energy target responds to rising energy costs, potential energy supply disruptions, and the need for more secure and clean energy generation and distribution.

1.2.2 PURPOSE AND NEED

The purpose and need for the Proposed Action is to: (a) achieve renewable electrical energy production on Army land in accordance with 10 United States Code (USC) 2911(e), as amended, which requires that the Army produce or procure not less than 25 percent of the total quantity of electrical energy it consumes within its facilities during fiscal year 2025 and each fiscal year thereafter from renewable energy sources; (b) contribute to the Army's goal of generating one GW of renewable electrical energy on Army land by 2025; and (c) contribute to the Energy Policy Act (EPAct) of 2005, requiring the Army's consumption of not less than 7.5 percent of the total quantity of facility electrical energy it consumes within its facilities during fiscal year 2013 and each fiscal year thereafter from renewable energy sources. The Army proposes to help meet this purpose and need at Fort Gordon via the construction, operation, and maintenance of a solar PV generating array system (solar PV system), as described under Section 2.1.2, Proposed Action.

1.3 DECISION TO BE MADE

The proponent for this project is the Garrison Commander (GC) of Fort Gordon. It is the responsibility of the GC to review the information and analyses in this environmental assessment (EA) and decide which alternative to execute.

1.4 PROJECT SCOPING AND PUBLIC INVOLVEMENT

1.4.1 SCOPING LETTER

A scoping letter was sent out on July 8, 2014 to state and Federal agencies listed in Chapter 8. The purpose of this letter was to inform the agencies of the study effort and request:

- any information the agencies had on file that might be pertinent to the analysis,
- information on issues that the agencies felt should be considered in the EA process, and
- identification of additional interested parties that should be contacted.

A sample scoping letter sent to the agencies is in Appendix B.

1.4.2 PUBLIC PARTICIPATION PROCESS

A 30-day public review period would begin once the EA and draft Finding of No Significant Impact (FNSI) are complete. The Army would publish a Notice of Availability for the EA and draft FNSI in the *Augusta Chronicle*. During the public review and comment period, the Army would provide copies of the EA to the Fort Gordon Public Affairs Office (Bldg. 33720, Darling Hall, 307 Chamberlain Ave., Fort Gordon, GA), Woodworth Library (Building 33500, Rice Road, Fort Gordon, GA), and the Augusta-

Richmond County Library (823 Telfair St., Augusta, GA). During and immediately following this public comment period, the Army would collect, log, and incorporate any comments into the EA and draft FNSI as necessary. Once all comments are received, the Army would prepare a final FNSI (and final EA, if necessary) and release it to the appropriate local, state, and Federal repositories.

1.5 SCOPE OF THIS ENVIRONMENTAL ASSESSMENT

The Army is developing this EA in accordance with the National Environmental Policy Act (NEPA) and implementing regulations issued by the Council on Environmental Quality (CEQ) (40 Code of Federal Regulations [CFR] 1500-1508). Title 32 CFR Part 651 (29 March 2002) contains the Army's NEPA regulation. It requires Army installations to consider the environmental impacts of a Proposed Action and its alternatives prior to proceeding with those actions. The purpose of this EA is to inform the decision makers and public of the likely environmental consequences of the Proposed Action and alternatives.

Military construction projects that do not meet the screening criteria listed in 32 CFR Part 651 must undergo an environmental impact analysis to determine whether the Proposed Action may have a significant impact on the environment. The Proposed Action described in this EA would disturb more than five cumulative acres; therefore, it fails to meet the screening criteria for a Categorical Exclusion. An EA is necessary to assess the potential environmental impacts of the Proposed Action.

This EA is limited to assessing environmental and socioeconomic effects that might result from the identified alternatives during the planning, design, construction, and operation of the selected alternative. Construction of the selected alternative is anticipated to begin in Fall 2014 and last approximately eight months.

The Proposed Action assessed in this EA should be viewed as representative of the type and magnitude of activities that would occur at the cited locations on Fort Gordon. If the Proposed Action changes in scope or timing once the EA is completed, the findings presented in this EA would be used to determine if any supplemental environmental documentation is required.

This EA was written with the best data and information available at the time of its preparation. Any changes to the project scope or its potential impacts require that the Army EITF and Georgia Power Company (Georgia Power) coordinate with the Fort Gordon NEPA team to re-evaluate this document for consistency and applicability to the revised project. This re-evaluation would be performed based on the new information and would result in either a finding of sufficiency between this EA 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 action outside of the scope of this EA would be halted until the new assessment is completed. While this EA provides information with which to make a well-informed decision about the Proposed Action, it does not imply project approval or authorization, which is obtained through Fort Gordon.

1.6 SUMMARY OF ENVIRONMENTAL COMPLIANCE REQUIREMENTS

1.6.1 NATIONAL ENVIRONMENTAL POLICY ACT

NEPA is a Federal statute requiring the assessment of potential environmental impacts of proposed Federal actions before those actions are taken. NEPA also established the CEQ that is charged with the development of implementing regulations and ensuring agency compliance with NEPA. CEQ regulations mandate that all Federal agencies use a systematic interdisciplinary approach to environmental planning and the evaluation of

actions that might affect the environment. This process evaluates potential environmental consequences associated with a Proposed Action and considers alternative courses of action. The intent of NEPA is to protect, restore, and enhance the environment through well-informed Federal decisions.

The process for implementing NEPA is codified in 40 CFR Parts 1500–1508, *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act*. CEQ regulations define an EA (40 CFR 1508.9) as a public document for which the Federal agency is responsible that serves to:

- Briefly provide sufficient evidence and analysis for determining whether to prepare an Environmental Impact Statement (EIS) or a FNSI;
- Aid in an agency's compliance with NEPA when no EIS is necessary; and
- Facilitate preparation of an EIS when one is necessary.

1.6.2 INTEGRATION OF OTHER ENVIRONMENTAL STATUTES AND REGULATIONS

To comply with NEPA, the planning and decision-making process for actions proposed by Federal agencies involves a study of other relevant environmental statutes and regulations. The NEPA process, however, does not replace procedural or substantive requirements of other environmental statutes and regulations. According to CEQ regulations (40 CFR 1500.2), the requirements of NEPA must be integrated "with other planning and environmental review procedures required by law or by agency so that all such procedures run concurrently rather than consecutively." Resources analyzed in this EA are those identified as being potentially affected by the Proposed Action, and include applicable critical elements of the human and natural environment whose review is mandated by Executive Order (EO), regulation, or policy (see Appendix A).

2 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 DESCRIPTION OF THE PROPOSED ACTION

2.1.1 LOCATION OF PROPOSED ACTION

Fort Gordon is situated in east-central Georgia, nine miles southwest of the City of Augusta (Figure 1). It is located in portions of Columbia, Jefferson, McDuffie, and Richmond counties, but is primarily within Richmond County. Fort Gordon is subdivided into 49 training areas, two restricted impact areas, a main cantonment area, and an industrial cantonment area. Fort Gordon is approximately 55,590 acres, of which 5,590 acres are the main cantonment area, 13,000 acres are impact areas, and 37,000 acres are on-Post maneuver and training areas.

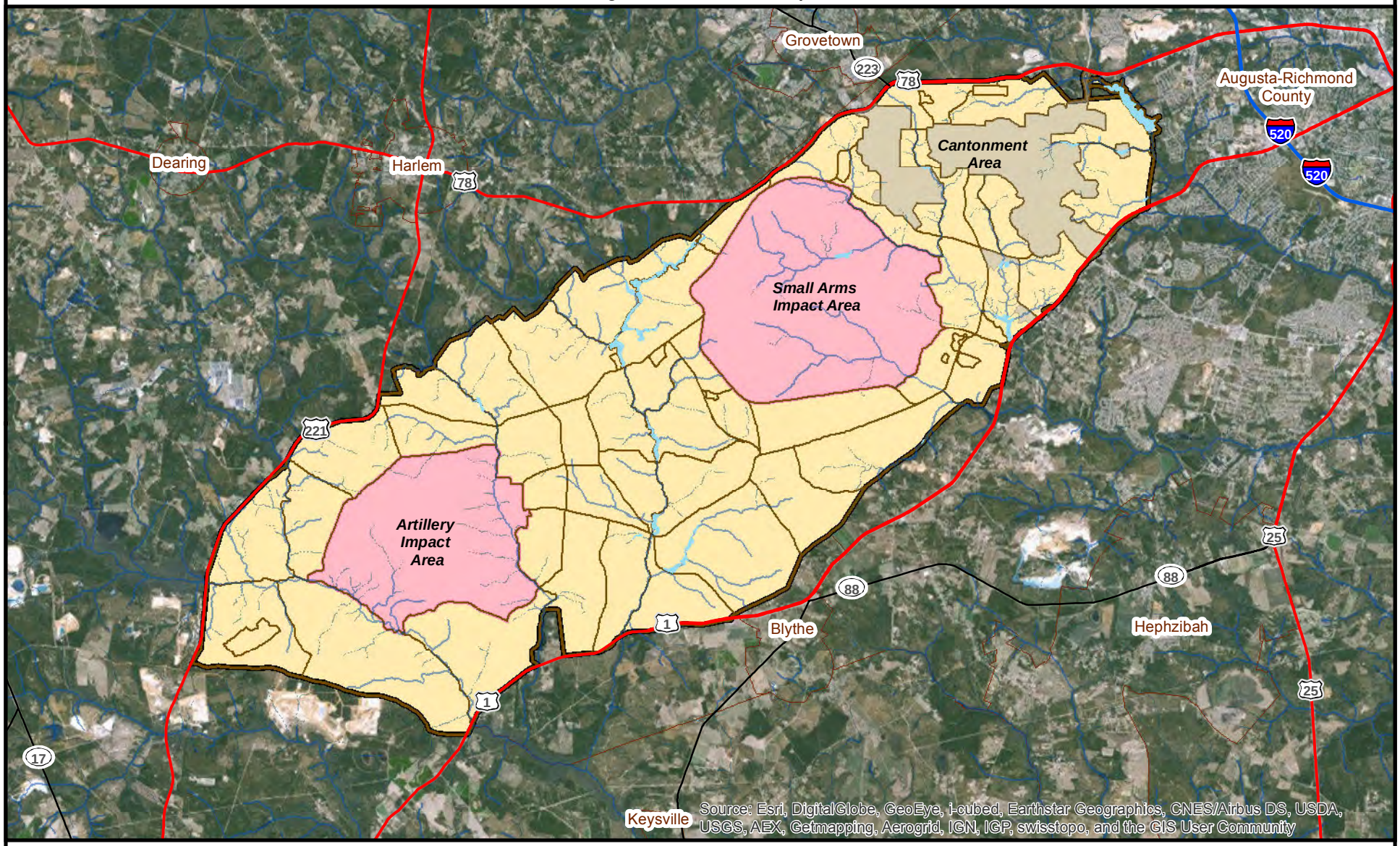
2.1.2 PROPOSED ACTION – SOLAR PV SYSTEM

The Army proposes to enter into an approximately 35-year easement with Georgia Power, in which it will allow the use of about 250 acres of land on Fort Gordon for the developer to construct, operate, and maintain an approximately 30 MW solar PV system. PV technology converts sunlight directly into electric current through the use of semiconductors. Semiconductors are usually composed of crystalline silicon wafers, either single crystal or polycrystalline, and thin film amorphous silicon. When semiconducting materials are exposed to light, they absorb some of the sun's energy in the form of photons and emit electrons in the form of direct current (DC) electricity. The basic PV cell produces only a small amount of power; therefore, PV cells are wired in a series to form panels. Several PV panels are installed in a rack to form a PV array. The power-producing components of a solar PV system consist of the solar array field (a series of networked PV arrays) (Figure 2); the power conditioning system, which contains an inverter to convert the energy produced from DC to alternating current (AC) for use on the electrical grid; and a transformer to boost voltage for feeding the power into the electrical grid.

Construction of the solar PV system will involve land disturbance, including the clearing, grubbing, and grading necessary to establish a surface suitable for the placement of the solar PV arrays, followed by the construction of security fencing, equipment shelter(s), an access road, and a site-specific stormwater drainage system. Routine maintenance, equipment monitoring, and as-needed repairs will follow, including vegetation control, solar panel washing, and periodic panel/other equipment replacement. The system operator will ensure that vegetation is maintained under and around the solar PV arrays as much as possible to reduce any runoff related to panel washing.

There was not a location in close proximity to Fort Gordon substations with enough available acres to avoid the necessity of a transmission line. Therefore, construction will also include a transmission line corridor and associated 100-foot wide, 4.9 mile-long right of way (ROW) to connect the new solar PV system to Georgia Power's substation #2 in the cantonment area.

Figure 1. Fort Gordon Map



Projection Based on:
World Geodetic System of 1984
UTM Zone 17 North
Units: Meters

1:150,000

0 1 2 4 Km

0 0.5 1 2 3 Mi

N W E S

- Installation Boundary
- Training Area Boundaries
- Cantonment Area
- Impact Area
- Lake/Pond
- Streams
- Urban Areas
- Major Road

This map was produced by the Fort Gordon Environmental Division-Natural Resources Branch.

Figure 2. Example of a Solar PV Array Field

Source: OpTerra Energy, 2012

2.2 ALTERNATIVES CONSIDERED IN THIS EA

The Proposed Action is to construct and operate an approximately 30 MW solar PV system on Fort Gordon. This section describes the alternatives considered for the Fort Gordon solar PV system.

2.2.1 ALTERNATIVE 1: SITE 5 AND TRANSMISSION LINE RIGHT OF WAY (PREFERRED ALTERNATIVE)

The Preferred Alternative is to construct an approximately 30 MW solar PV system on an approximately 250 acre parcel of land on the southeastern part of the installation, near the intersection of Highway 1 and Mirror Lake Road and east of the Gordon Lakes Golf Course (Figure 3). The proposed solar PV site is heavily wooded with abundant understory. This site offers limited environmental restrictions and is within a four mile radius of the substation. The proposed site is available for military training, although it is infrequently utilized and Fort Gordon has no future plans for increased use of this site. The developer would exclude the small training site and the cemetery adjacent to the solar PV site from development. Access to the training site and the cemetery must be maintained throughout construction and operation of the solar PV system.

The Preferred Alternative also includes the construction of a transmission line ROW. The ROW route follows Mirror Lake Road and then Range Road in a northerly direction, to 19th street, turning east and following the outside border of the cantonment area to substation #2. The ROW is predominately located in existing utility corridors along road shoulders. However, in several locations the line will cut across wooded, unimproved areas. These areas will required additional timber harvest and site preparation.

2.2.2 ALTERNATIVE 2: NO ACTION ALTERNATIVE

The CEQ regulations that implement NEPA require a clear basis for choice among options by the decision maker and the public, and a No Action Alternative must be included and analyzed (40 CFR 1502.14[d]). Under the No Action Alternative, the Army will not enter into a lease agreement with a private partner to construct, operate, and maintain a solar PV system on Fort Gordon. An opportunity to work towards the goals of reducing the Army's energy intensity and using an available renewable energy technology will, therefore, be missed.

2.3 ALTERNATIVES SCREENING PROCESS

2.3.1 ALTERNATIVE SELECTION CRITERIA

Based on the goals and objectives for this action described in the purpose and need above, the Army would assess the reasonable alternatives in this EA using the following screening criteria:

1. **Parcel Size and Topography.** Approximately 6-10 acres of solar PV array is required to generate 1 MW of energy. Accordingly, generating approximately 30 MWs of energy requires a minimum of 180 acres. The topography must be such that shading and/or shadowing on the arrays will not be an issue and the arrays must face due south to maximize sunlight absorption and power production. It is preferred that the minimum acreage amount for each action be contiguous land due to the transmission line cost (up to one million dollars per mile) to connect non-contiguous sites.

2. **Mission Compatibility/Land Use.** The location should be compatible with the military mission at Fort Gordon, and should not conflict with military or civilian actions on adjacent properties (i.e., result in range/maneuver areas closure, military or civilian road closures, and/or impact recreational resources), and must be on military-owned lands (versus joint use or Army Compatible Use Buffer lands). This may include changing a location's existing compatible Land Use category code from operational to non-operational, in accordance with Army Regulation 350-19 (DA, 2005). Resulting site development and operation of the solar PV system, secondary substation, and utility corridor, once complete, will not adversely impact military training or future planned development activities.
3. **Grid Access and Electrical Tie-in Potential (Renewable Energy).** The location should be within four miles of existing electrical transmission facilities (substations) or have technical viability and economic justification for building new electrical lines for interconnection to Fort Gordon distribution system or the grid. Close proximity to existing facilities is preferred for economic viability of the project, as transmission lines may cost up to one million dollars per mile. The infrastructure must be capable of transporting, or being upgraded to transport, electricity generated by the alternative.
4. **Environmental Factors.** The location should have minimal environmental constraints, to include presence of/impacts to wetlands, removal of existing threatened and endangered species habitat, presence of unexploded ordnance (UXO), etc. This will decrease up-front mitigation costs, avoid and minimize mitigation/permitting requirements, lessen improvement time, and minimize cumulative impacts.
5. **Safety.** The location should present minimal exposure of workers and/or site personnel to UXO and other site hazards, to include potential violations of the Army Safety Program and the Occupational Safety and Health Act. The solar panels are minimally glare-producing to ensure they are safe to site near airfields or other facilities where reflections and/or glare are a safety concern.

The Army would eliminate Alternatives from discussion if they fail to meet any of the screening criteria (except No Action Alternative). Even if the No Action Alternative has potential conflicts with the listed screening criteria, it must be carried forward for consideration as per 32 CFR Part 651 and CEQ Guidance.

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

Fort Gordon considered several locations within the installation for construction, operation, and maintenance of a solar PV system (Figure 4). The following alternatives were dismissed from further evaluation because they did not meet one or more of the screening criteria above.

2.4.1 SITE 1

Site 1 is 181 acres and is located at the intersection of North Range Road and McDuffie Road. This site does not adequately meet the parcel size requirement. Although the basic minimum acreage is available, more acres are needed to account for shading tree removal that has the potential to shade out the PV cells. A portion of Site 1 has limitations for mission compatibility because of military training on the site. Furthermore, this site has environmental restrictions. The southwest quadrant is part of the red-

cockaded woodpecker (RCW) Habitat Management Unit (HMU) and must be managed for RCW.

2.4.2 SITE 2

Site 2 is located east of the industrial cantonment area. This site is only 80 acres and falls short of the minimum parcel size of 180 acres.

2.4.3 SITE 3

Site 3 is located just south of the industrial cantonment area. This 140 acre site does not meet the minimal parcel size of 180 acres. Also, there are severe environmental limitations. This site is a former landfill that was closed before there were environmental requirements for proper closure using caps, liners, etc. As a result, leachate is seeping out of the landfill.

2.4.4 SITE 4

Site 4 is east of Site 2 and the industrial cantonment area. As with Site 2, this parcel size of 95 acres does not meet the minimum parcel size requirement of 180 acres.

2.4.5 TRANSMISSION LINE RIGHT OF WAY

Transmission line ROW alternatives would only be developed after sites were established based on the site selection criteria outlined in section 2.3.1. Several alternatives for the transmission line ROW were considered, but all were a variation of what is evaluated within the EA. The ROW that was pulled forth for analysis was the shortest distance, with the least amount of environmental constraints or impacts to the military mission. No other viable alternatives could be identified by Georgia Power or Fort Gordon.

2.4.6 USE OF OTHER RENEWABLE ENERGY TECHNOLOGIES

In collaboration with the Army and the EITF, Georgia Power presented an opportunity to construct and operate approximately 30 MWs of solar PV on Fort Benning, Fort Gordon, and Fort Stewart, for a total of approximately 90 MWs – collectively referred to as “Georgia 3x30”. Due to this unique opportunity presented by Georgia Power, this EA focuses solely on solar PV. Fort Gordon is leveraging renewable energy where it is cost effective to eliminate the installation’s dependence on fossil fuel. The Army could consider the use of other renewable energy technologies such as wind, geothermal, and biomass on Fort Gordon in the future under appropriate NEPA analysis.

Figure 3. Fort Gordon Solar PV Array Preferred Alternative - Site 5

Projection Based on:
World Geodetic System of 1984
UTM Zone 17 North
Units: Meters

1:28,000

0 200 400 Meters

0 1,000 2,000 Feet

- Installation Boundary
- Solar PV Array Site 5
- Wetlands
- Project Wetlands Delineation
- Lakes

Streams

- Permanent
- Intermittent

This map was produced by the Fort Gordon Environmental Division-Natural Resources Branch.

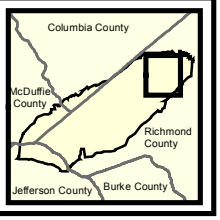


Figure 4. Fort Gordon Solar PV Site Alternatives

Projection Based on:
World Geodetic System of 1984
UTM Zone 17 North
Units: Meters
1:63,360

0 0.5 1 2 Km
0 1 Mi

Installation Boundary
Small Arms Impact Area
Wetland Area
Lakes
Streams
Permanent
Intermittent
PV Alternative Sites
Substation
Substation Buffer

This map was produced by the Fort Gordon Environmental Division-Natural Resources Branch.

3 AFFECTED ENVIRONMENT & CONSEQUENCES

3.1 ASSESSING IMPACTS

3.1.1 GENERAL INFORMATION

As discussed in Chapter 2, potential implementation alternatives being analyzed for environmental impacts are the following:

- Alternative 1: Site 5 and Transmission Line Right of Way and
- No Action Alternative.

An impact is defined as a noticeable change in a resource from the existing environmental baseline conditions caused by an action. The degree of change is determined by measuring the difference between the baseline conditions and the conditions that result following the assessed action. Any difference between the baseline conditions and the site conditions following an action suggests that the action has an impact on that resource.

3.1.2 TYPES OF IMPACTS

Context and intensity are taken into consideration in determining a potential impact's significance, as defined in 40 CFR Part 1508.27. The intensity of a potential impact refers to the impact's severity and includes consideration of beneficial and adverse impacts, the level of controversy associated with a project's impacts on human health, whether the action establishes a precedent for future actions with significant effects, the level of uncertainty about project impacts, or whether the action threatens to violate Federal, State, or local law requirements imposed for the protection of the environment. The severity of environmental impacts is characterized as none, minor, moderate, significant, or beneficial.

None – No measurable impacts are expected. Any environmental impact would be barely perceptible, confined to a single location, or would not require a long recovery period (days to months).

Minor – Short-term but measurable impacts are expected. The resource would recover in a relatively short period of time (days to months).

Moderate – Measurable and long term impacts that may not remain localized. Recovery may require several years or decades.

Significant – Impacts that result in a substantial change in the current or future condition of the Valued Environmental Component (VEC). The threshold of significance, developed for each VEC, identifies when an impact would result in a substantial or permanent adverse change. Thresholds of significance were developed for each resource (Table 1).

Beneficial – Impacts that result in a positive change in the current or future condition of the VEC.

Quantitative and qualitative analyses were used, as appropriate, in determining whether, and the extent to which, a threshold would be exceeded. Based on the results of these analyses, this EA identifies whether a particular potential impact would be adverse or beneficial, and to what extent. Impacts can further be categorized as direct, indirect, or cumulative.

Direct – Caused by the action, occurring at the same time and place

Indirect – Caused by the action and foreseeable, but occur at a later time or different place

Cumulative – Effects on the environment that result from the incremental effect of a project in combination with other past, present, or reasonably foreseeable future actions, regardless of jurisdiction or entity. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over time.

3.1.3 INTENSITY OF IMPACT

Once an impact is identified, it must also be determined if an impact approaches a level of significance. Significance, as defined by the CEQ in 40 CFR 1508.27 (Regulations for Implementing NEPA), requires consideration of both the context and intensity of the impact evaluated. Significance can vary in relation to the context of the Proposed Action and thus, where significance is not defined by regulation or policy it must be evaluated in several contexts. These contexts vary with the setting of the Proposed Action, and can include consideration of effects across both time (short vs. long-term effects) and space (local vs. regional scale). Certain thresholds of significance were set for the analysis of the Proposed Action. Table 1 shows the thresholds of significance for each resource.

Table 1. Thresholds of Significance

Resource	Significance Threshold
Land Use & Visual Resources	A significant impact would occur if the project (a) physically divided an established community; (b) conflicted with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project; or (c) conflicted with any applicable habitat conservation plan or natural community conservation plan.
Air Quality	A significant impact would occur if the project a) violated any National Ambient Air Quality Standards (NAAQS); (b) increased the number or frequency of violations; (c) contributed substantially to an existing or projected air quality violation; (d) conflicted with or obstruct implementation of any air quality plans; (e) resulted in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment; (f) exposed sensitive receptors to substantial pollutant concentrations; or (g) created objectionable odors affecting a substantial number of people. *Climate Change/Greenhouse Gases (GHGs)*: A significant impact would occur if the project would generate substantial greenhouse gas emissions (>75,000 tons of carbon dioxide (CO_2) equivalents per year)[1].

[1] U.S. Environmental Protection Agency (USEPA) GHG Tailoring Rule

Geology & Soils	A significant impact would occur if the project (a) exposed people or structures to potential substantial adverse effects, including the risk of loss, injury or death; (b) resulted in substantial soil erosion or loss of topsoil; or (c) is located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially resulted in an on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse.
Water Resources	A significant impact would (a) violate any water quality standards or waste discharge requirements; (b) substantially deplete groundwater supplies or interfere substantially with groundwater recharge; (c) substantially alter the existing drainage pattern of the site or area in a manner which would result in substantial erosion or siltation on- or off-site; (d) substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site; (e) 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; or (f) otherwise substantially degrade water quality. *Wetlands*: A significant impact would occur if the project had a substantial adverse effect on federally-protected wetlands as defined by Section 404 of the Clean Water Act. Specifically, a significant impact would occur if mitigation would be required due to the adverse effects of the project.
Biological Resources	A significant impact would occur if the project (a) had 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 or by the Georgia Department of Natural Resources (GADNR) or the U.S. Fish and Wildlife Service (USFWS); (b) had a substantial adverse effect on any sensitive or unique natural community identified in local or regional plans, policies or regulations or by GADNR or USFWS; (c) interfered substantially with the movement of native resident or migratory fish or wildlife, obstructed wildlife corridors, or harmed wildlife nursery sites; (d) conflicted with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or (e) conflicted with the provisions of an approved local, regional, or state habitat conservation plan. Specific significance thresholds for Fort Gordon include (a) reduction of the installation RCW population; (b) reduction of forage habitat at active clusters below threshold levels; and (c) direct effect to a living RCW or active cavity tree.
Cultural Resources	A significant impact would occur if the project (a) had a substantial adverse effect on the significance of a historic property as defined in the National Historic Preservation Act (NHPA); (b) directly or indirectly destroyed a unique paleontological resource or site or unique geologic feature; or (c) disturbed any human remains, including those buried outside of formal cemeteries. No quantitative threshold exists.

Hazardous Materials & Waste	A significant impact would occur if the project (a) created a hazard to the public or the environment through the routine transport, use or disposal of hazardous materials; (b) created a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment; (c) emitted hazardous emissions or handle hazardous or acutely hazardous materials, substances or waste within one-quarter mile of an existing or proposed school; (d) resulted in a safety hazard for people residing or working in the project vicinity; or (e) impaired implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.
Transportation	A significant impact would occur if the project (a) caused an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system; (b) substantially increased hazards due to a design feature; (c) noticeably hindered emergency access; or (d) overwhelmed existing parking capacity.
Utilities	*Facilities*: A significant impact would occur if the project resulted in the need for new or physically altered facilities, construction for which could cause significant environmental impacts. *Infrastructure/Utilities*: A significant impact would occur if the project resulted in a substantial increase in any utility consumption to the extent that generation capacity is exceeded, based on currently available projections or unacceptable demands are placed on infrastructure supply and distribution systems.
Socioeconomics	A significant impact would occur if the project (a) induced substantial population growth or decline in an area, either directly or indirectly; or (b) displaced substantial numbers of existing housing units or people, necessitating the construction of replacement housing elsewhere.
Temporary Construction Period Effects	Construction phase impacts on transportation, noise, air quality, and the visual environment would generally not be considered significant since construction-related changes are, by their nature, temporary. A significant impact would occur only if construction substantially affected accessibility to an area for a long period of time, caused the loss or relocation of substantial numbers of businesses or residences, or posed a severe health or safety threat.

Source: USAGFG, 2008c.

3.1.4 SOURCES OF INFORMATION AND ANALYSIS

The resource information and environmental impact analyses in the following sections were provided, assessed, and verified by subject matter experts from Fort Gordon or at other applicable local, state, or Federal agencies. References are provided in the text where necessary to identify the source of specific information or analyses. A complete list of the references cited in this document is provided in Chapter 6.

3.1.5 DESCRIPTION OF BASELINE AND DATA SOURCES

The following types of data were used to characterize the affected environment discussion within the EA:

- Geographical Information System data, including land cover, vegetation, hydrology, wetlands, sensitive species, aerial photography, and cemeteries;
- Regional and local reports, including Natural Resources Conservation Service Soil Surveys;
- Previous NEPA documentation;
- Fort Gordon management plans, including the Integrated Cultural Resources Management Plan (ICRMP), Integrated Natural Resources Management Plan (INRMP), Spill Prevention Control and Countermeasures Plan (SPCCP), and stormwater management; and
- Agency consultation.

3.2 VALUED ENVIRONMENTAL COMPONENTS

Based on the results of the project meetings and responses to the scoping letters, it was determined that the Proposed Action will have impacts warranting discussion on numerous VECs. VECs are categories of environmental and socioeconomic effects where categorization is conducted to enable a managed and systematic analysis of these resources. The following VECs and impacts are discussed in Chapter 3:

- Land Use and Visual Resources
- Airspace
- Noise
- Radio Frequency and Spectrum Use
- Air Quality
- Geology and Soils
- Water Resources
- Biological Resources
- Cultural Resources
- Hazardous Materials and Waste
- Transportation
- Utilities
- Socioeconomics

3.3 LAND USE & VISUAL RESOURCES

3.3.1 AFFECTED ENVIRONMENT

***Regional Land Use*:** Augusta, Georgia is the largest city within the vicinity of Fort Gordon. Augusta is the center for commercial manufacturing, transportation, and medical activities in the metropolitan area. The area in the vicinity of Fort Gordon is primarily rural with the exception of large urban population centers in Columbia and Richmond counties (USAGFG, 2008b).

Land use within one mile of Fort Gordon varies from semi-urban to rural. The area east of Fort Gordon is developed, making up the greater Augusta area. The major land use east of the installation along U.S. 1 and Gordon Highway is commercial and residential. Several large neighborhoods are under development on Gordon Highway, including Willhaven Estates and Hayne's Station in Richmond County. Further west of Augusta on the north and south sides of the installation, land use becomes a mixture of rural

residential, commercial, and undeveloped land. Land use south of the installation along U.S. 1 to the west of Gate 5 in western Richmond County is agricultural (USAGFG, 2008b).

In Columbia County, land use closest to Fort Gordon is mixed, with single-family residential and some mobile home development. There is also some multi-family development scattered throughout the area. Suburban areas are concentrated in the Evans-Martinez area and in the City of Grovetown (USAGFG, 2008b). Land use adjacent to Fort Gordon in Jefferson and McDuffie Counties is agricultural. More than 88 percent of Jefferson County's land is devoted to agriculture and forestry (USAGFG, 2008b).

***Fort Gordon Land Use*:** Fort Gordon encompasses approximately 55,590 acres. Approximately 50,000 acres are used for training missions: 49 training areas (TAs) occupy approximately 37,000 acres and two restricted impact areas (small arms and artillery) occupy approximately 13,000 acres. 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 Fort Gordon is classified as improved, semi-improved, and unimproved. The Inventory of Installation Land Use at Fort Gordon classifies 4.3 percent of the installation as improved, 1.7 percent as semi-improved, and 94.2 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, 2008b).

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 site/building clearings and one nuclear, biological, and chemical 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 Fort Gordon. The PV array field will be located in TA 12 and this training area is available for military training, although it is infrequently utilized. Fort Gordon has no future plans for increased training use of this site. There is a small training site adjacent to the solar PV site that is frequently used and that will be excluded from development.

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

3.3.2 ENVIRONMENTAL CONSEQUENCES

3.3.2.1 ALTERNATIVE 1: SITE 5 AND TRANSMISSION LINE RIGHT OF WAY (PREFERRED ALTERNATIVE)

DIRECT IMPACTS:

Land Use: No direct impacts to regional land use would be expected from implementing the Preferred Alternative.

Moderate adverse direct impacts to Fort Gordon land use would occur as a result of the Preferred Alternative. The land use is changing from natural wooded areas to cleared areas for the solar PV system array field.

The PV system array field would eliminate the easement acreage from available training land.

Archery hunting acreage would also be lost as a result of the PV system array field.

The direct impacts of the transmission line ROW on land use would be minor.

***Visual Resources*:** Minor adverse direct impacts on the viewshed would occur as a result of the construction and operation of the Preferred Alternative. The change in viewshed from a natural wooded area to a cleared area with a solar PV system and a transmission line would result in minor adverse impacts.

INDIRECT IMPACTS:

***Land Use*:** No indirect impacts to regional land use would be expected from implementing the Preferred Alternative.

Minor adverse indirect impacts on land use would occur as a result of the loss of 250 acres of commercial timber production for at least the next 60 years (35-year lease plus 25 years to grow trees if the lease ends).

***Visual Resources*:** No indirect impacts on the viewshed would occur as a result of the construction and operation of the Preferred Alternative.

3.3.2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, there would be no change to the existing natural and environmental resource conditions at Fort Gordon; therefore, there would be no direct or indirect adverse impacts on regional land use, Fort Gordon land use or visual resources.

3.4 AIRSPACE

3.4.1 AFFECTED ENVIRONMENT

Airspace is defined in vertical and horizontal dimensions and by time. Airspace is a finite resource and must be managed to achieve equitable allocation between commercial, general aviation, and military needs. The Federal Aviation Administration (FAA) manages all airspace within the U.S. and the U.S. territories and has established various airspace designations to protect aircraft while operating near and between airports and while operating within airspace identified for defense related purposes. Federal legislation governs airspace management. The FAA has issued implementing regulations and established procedures for use of airspace. The FAA recognizes the military's need to conduct certain flight operations and training within airspace that is separated from that used by commercial and general aviation. The FAA's existing flight rules and air traffic control procedures govern safe operations within each type of designated airspace. Most military operations are conducted within designated airspace and follow specific procedures to maximize flight safety for military, commercial, and civil aircraft.

To ensure safe and efficient airspace use, the FAA defines types of airspace, horizontal and vertical boundaries of each type and the nature of activities that each type can

accommodate. The FAA designates airspace away from congested areas for certain military training activities. One such type airspace is designated a Military Operations Area (MOA). A MOA consists of airspace with defined vertical and lateral boundaries in which aircraft can perform military training activities separated from instrument flight rules traffic. Training activities in a MOA include aircraft intercepts, turning and evasive maneuvers, airlift training, and air combat training. A MOA is designated by the FAA and serves to warn visual flight rules (VFR) traffic that military activities are taking place in the airspace. The floor of a MOA may be near ground level and the ceiling up to, but not including, 18,000 feet above mean sea level (MSL). A variety of military aircraft and aircrew training can take place in a MOA. During a single training flight, combinations of airspace training events are typically accomplished in several MOAs between takeoff and landing. Aircraft can traverse MOAs and military training routes (MTRs) unrestricted while on a VFR flight plan. To maximize safety, pilots desiring to traverse military airspace should contact the local flight service station to determine if military aircraft are scheduled to use the airspace during the anticipated transit time.

Fort Gordon does not directly support a flying mission and, therefore, no active airfield or assigned aircraft are located on base. However, the installation provides aerial access to Preston Drop Zone (DZ). The Flying Training Unit of the Air Force Reserve Command, 700th Air Squadron (AS), based at Dobbins Air Reserve Base (ARB), Georgia, conducts cargo drop training at the Preston DZ. In addition, the Joint Communications Support Element, based at MacDill Air Force Base in Tampa, Florida, and the 35th Signal Brigade, based at Fort Bragg, North Carolina, conduct occasional parachute training at the Preston DZ (USAGFG, 2009).

The Preston DZ is located approximately 110 nautical miles east-southeast of Dobbins ARB. Fort Gordon is located in an area of the U.S. that includes a dense network of military and civil airspace. Airspace surrounding Fort Gordon includes controlled and uncontrolled airspace, special use airspace, MTRs, and commercial en-route airways and jet routes.

The EA alternatives include the continued use of existing airspace above and in the vicinity of Fort Gordon by the 700th AS to meet ongoing requirements for readiness training operations. Airspace utilization by the 700th AS was fully assessed in the October 1998 EA entitled, *700th Airlift Squadron Low Altitude Tactical Navigation (LATN) Area Environmental Assessment*. In addition, prior to the use of the Preston DZ by the 700th AS, the environmental impacts were evaluated in the September 1999 EA entitled: *Environmental Assessment of the Conversion of the 700th Aircraft Squadron at Dobbins Air Reserve Base, Georgia* (Dobbins ARB, 1999).

At Nellis Air Force Base, the results of a glint/glare study indicated that under the worst case scenario, there would be a slight potential for an afterimage or flash glare resulting from reflected direct sunlight from solar PV panels. This afterimage or flash glare is similar to the potential for flash glare due to water and less than that due to weathered white concrete and snow. Since this represented the worst case scenario, it would be expected that pilots would typically mitigate glare using glare shields and sunglasses; these typically reduce radiation by approximately 80 percent and would make any reflected sunlight from solar panels insignificant (U.S. Air Force, 2011).

3.4.2 ENVIRONMENTAL CONSEQUENCES

3.4.2.1 ALTERNATIVE 1: SITE 5 AND TRANSMISSION LINE RIGHT OF WAY (PREFERRED ALTERNATIVE)

DIRECT IMPACTS: No direct impacts were identified that would impact airspace if the Preferred Alternative is implemented. The PV system array field will be constructed with low glare panels. The transmission line while being overhead, is not located in frequently used air space and will be constructed in accordance with FAA guidelines.

INDIRECT IMPACTS: No indirect impacts were identified that would impact airspace if the Preferred Alternative is implemented.

3.4.2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, there would be no change to the existing natural and environmental resource conditions at Fort Gordon; therefore, there would be no direct or indirect adverse impacts on airspace.

3.5 NOISE

3.5.1 AFFECTED ENVIRONMENT

Noise is generally described as unwanted sound, which can be based either on objective impacts (i.e., hearing loss, damage to structures, etc.) or subjective judgments (i.e. community annoyance). Sound is usually represented on a logarithmic scale with a unit called the decibel (dB). Sound on the decibel scale is referred to as sound level. The threshold of human hearing is approximately 3 dB, and the threshold of discomfort or pain is around 120 dB. Some statistical noise levels are stated in terms of decibels on the A-weighted scale (dBA). Noise levels stated in terms of dBA reflect the response of the human ear by filtering out some of the noise in the low and high frequency ranges that the ear does not detect well. The A-weighted scale is used in most ordinances and standards.

According to the Department of Defense (DoD), FAA, and U.S. Department of Housing and Urban Development criteria, residential units and other noise-sensitive land uses are “clearly unacceptable” in areas where the noise exposure exceeds the day-night level (DNL) of 75 dB, “normally unacceptable” in regions exposed to noise between the DNL of 65 to 75 dB, and “normally acceptable” in areas exposed to noise where the DNL is 65 dB or less. The Federal Interagency Committee on Noise (FICON) developed land use compatibility guidelines for noise in terms of DNL. For outdoor activities, the U.S. Environmental Protection Agency (USEPA) recommends DNL of 55 dB as the sound level below which there is no reason to suspect risk from any of the effects of noise to the general population.

***Fort Gordon Noise*:** The most common sources of noise at Fort Gordon are small arms firing and vehicles; however, the installation also conducts artillery firing, demolition, and aerial gunnery. As of August 2014, a hand grenade familiarization range and a multi-purpose machine gun range are under construction on the installation. Environmental noise contours greater than DNL of 65 dBA from activities at Fort Gordon do not extend beyond Fort Gordon’s boundary (USAGFG, 2000).

3.5.2 ENVIRONMENTAL CONSEQUENCES

3.5.2.1 ALTERNATIVE 1: SITE 5 AND TRANSMISSION LINE RIGHT OF WAY (PREFERRED ALTERNATIVE)

DIRECT IMPACTS: Implementation of the Preferred Alternative would generate noise from timber harvesting in the forested area, vegetation clearing, and construction. Noise levels from construction equipment are louder than the typical ambient noise levels in a suburban neighborhood. Consequently, short-term minor adverse effects on the noise environment near the construction sites could result from the use of heavy equipment. Heavy construction equipment would operate only during daylight hours and would be maintained to the manufacturer's specifications to minimize noise impacts. Operation of the solar panels would result in no impacts on the noise environment on Fort Gordon since the solar PV panels would operate in silent mode. While some level of noise is expected from the transmission line, here are no sensitive noise receptors near the PV system array field or the transmission line ROW.

INDIRECT IMPACTS: It is not anticipated that the Preferred Alternative would have indirect impacts on noise levels.

3.5.2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, there would be no change to the existing natural and environmental resource conditions at Fort Gordon; therefore, there would be no direct or indirect adverse impacts on the ambient noise environment.

3.6 RADIO FREQUENCY AND SPECTRUM USE

3.6.1 AFFECTED ENVIRONMENT

Communication systems interference includes negative impacts on radar, satellite, navigation aids, and infrared instruments. Radar or satellite interference occurs when objects are placed too close to a radar antenna or satellite communication device and reflect or block the transmissions of signals between the signal generation point and receiver. Impacts to radar or satellite can occur as a result of structures, such as an overhead transmission line.

Impacts on infrared communications can occur because solar panels could retain heat beyond dusk and the heat they release can be picked up by infrared communications in aircraft, causing an unexpected signal.

3.6.2 ENVIRONMENTAL CONSEQUENCES

3.6.2.1 ALTERNATIVE 1: SITE 5 AND TRANSMISSION LINE RIGHT OF WAY (PREFERRED ALTERNATIVE)

DIRECT IMPACTS: The 7th Signal Command at Fort Gordon studied and analyzed radio frequency and spectrum. They proposed that the transmission line be located below communications line of site to prevent impacts. Therefore, when the submitted route was identified, the 7th Signal Command found that the proposed transmission line route for the solar PV system would have no impacts on the current and future mission.

The currently available equipment used in solar PV panels meets or exceeds requirements of the Federal Communication Commission (Enphase Energy, 2008) and MIL-STD-461F (DoD, 2007) for electromagnetic emissions, and does not

constitute an aircraft operational hazard. Additionally, due to their low profiles, most solar PV panels typically represent little risk of interfering with radar transmissions (FAA, 2010).

INDIRECT IMPACTS: Indirect impacts to radio frequency and spectrum use would not be anticipated from implementing the Preferred Alternative.

3.6.2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, there would be no change to the existing natural and environmental resource conditions at Fort Gordon; therefore, there would be no direct or indirect adverse impacts on radio frequency and spectrum use.

3.7 AIR QUALITY

3.7.1 AFFECTED ENVIRONMENT

Air quality is the ambient air concentration of specific criteria pollutants determined by the USEPA to be of concern to the health and welfare of the public. These criteria pollutants include ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), particulate matter less than 10 microns in diameter (PM_{10}), and lead. The Federal government has established NAAQS for several criteria pollutants (USEPA, 2012). These standards identify the maximum allowable concentrations of criteria pollutants that regulatory agencies consider safe, with an additional adequate margin of safety to protect human health and welfare.

***Emissions Methodology*:** Air quality within a region is a function of the type and amount of pollutants emitted, size, and topography of the air basin, and prevailing meteorological conditions. Criteria pollutants affecting air quality in a given region can come from either stationary or mobile sources. A smokestack typifies a stationary emission source. Mobile sources of emissions include emissions from cars and aircraft. Emissions are “primary” or “secondary” pollutants. Primary pollutants are those emitted directly into the atmosphere such as CO, SO_2, $PM_{2.5}$, and PM_{10}. Secondary pollutants are those formed through chemical reactions in the atmosphere such as O_3 and NO_2. Volatile organic compounds (also referred to as hydrocarbons or reactive organic gases) are precursors to the production of O_3. SO_2 and NO_2 are reported as oxides of sulfur and oxides of nitrogen, respectively. SO_2 and NO_2 constitute the majority of their respective oxides.

Regulatory agencies designate areas that violate ambient air quality standards as nonattainment areas. Nonattainment designations for O_3, CO, $PM_{2.5}$, and PM_{10} include subcategories indicating the severity of the air quality problem (e.g., the classifications range from moderate to serious for CO and PM_{10}, and from marginal to severe for O_3). Areas that comply with Federal air quality standards are attainment areas. Areas that are redesignated from nonattainment to attainment status become maintenance areas. Areas that lack monitoring data to demonstrate attainment or nonattainment status are unclassified and considered to be in attainment for regulatory purposes.

***Greenhouse Gas Emissions*:** GHGs are chemical compounds in the Earth’s atmosphere that allow incoming short-wave solar radiation but absorb long-wave infrared radiation re-emitted from the Earth’s surface, trapping heat. Most studies indicate that the Earth’s climate has warmed over the past century due to increased emissions of GHGs, and that human activities affecting emissions to the atmosphere are likely an important contributing factor.

Gases exhibiting greenhouse properties come from both natural and human sources. Water vapor, CO_2, methane (CH_4), and nitrous oxide (N_2O) are examples of GHGs that have both natural and manmade sources, while other GHGs such as chlorofluorocarbons are exclusively manmade. In the U.S., most GHG emissions are attributed to energy use. Such emissions result from combustion of fossil fuels used for electricity generation, transportation, industry, heating, and other needs.

The principal GHGs that enter the atmosphere due to human activities are:

- ***CO_2*:** CO_2 enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, and also as a result of other chemical reactions (e.g., manufacture of cement). CO_2 is also removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle.
- ***CH_4*:** Methane is emitted during the production, transport, and combustion of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices and by the decay of organic waste in municipal solid waste landfills.
- ***N_2O*:** Nitrous oxide is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste.
- ***Fluorinated Gases*:** Hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are synthetic, powerful GHGs that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for ozone (O_3) depleting substances. These gases are typically emitted in smaller quantities, but because they are potent GHGs, they are sometimes referred to as High Global Warming Potential gases.

***Fort Gordon Air Quality*:** The region of influence (ROI) for the Proposed Action at Fort Gordon, Georgia, is the Augusta (Georgia) Aiken (South Carolina) Interstate Air Quality Control Region (AQCR), which includes Fort Gordon (40 CFR Part 81.114). This area is in attainment for the NAAQS standards for all criteria pollutants. The general conformity requirements and thresholds only apply to criteria pollutants in the ROI which are in nonattainment or maintenance of the NAAQS. Therefore, *de minimi*s levels for the project area are not applicable. New Source Review thresholds are 250 tons per year of any pollutant. For planning purposes, these thresholds are used in the absence of applicable *de minimi*s thresholds.

3.7.2 ENVIRONMENTAL CONSEQUENCES

3.7.2.1 ALTERNATIVE 1: SITE 5 AND TRANSMISSION LINE RIGHT OF WAY (PREFERRED ALTERNATIVE)

DIRECT IMPACTS: Short-term minor adverse impacts from air emissions during construction and installation of the solar PV system and transmission line would be anticipated. The primary source of air pollutants during construction would be attributed to the movement and operation of construction equipment. There would also be a potential for the generation of fugitive dust, which would be mitigated with water and the covering of open-bodied trucks. Construction activities would be temporary and would occur in a localized area; therefore, short-term minor adverse impacts are anticipated.

INDIRECT IMPACTS: Long-term moderate beneficial effects from indirect reductions in the use of fossil-fuel-based electricity would be anticipated.

3.7.2.2 NO ACTION ALTERNATIVE

The No Action Alternative would result in continued deterioration of air quality from the failure to implement a cleaner technology. Levels of GHG emissions would continue to increase at present rates under the status quo.

3.8 GEOLOGY AND SOILS

3.8.1 AFFECTED ENVIRONMENT

Fort Gordon is located near Augusta, GA, in the Southeastern Coastal Plain physiographic province near the Fall Line transition with the underlying bedrock of the Piedmont physiographic province. 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 Fort Gordon ranges from 221 feet to 561 feet MSL, and the majority of the land area (35,852 acres) is between 378 feet and 489 feet MSL.

Twenty-six soil classes were 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. 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.

Twelve of the soil types found on Fort Gordon are considered Prime Farmland under the Farmland Protection Policy Act (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 Fort Gordon 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 Fort Gordon are considered Prime Farmland or Farmland of Statewide Importance, respectively. The FPPA, however, exempts protection of these soils for national defense purposes and includes those soils on Fort Gordon. The FPPA states: “Farmland Policy Protection Act, (b) Acquisition or use of farmland by a Federal agency for national defense purposes is exempted by section 1547 (b) of the Act, 7 USC 4208(b)”. Any conversion of Prime Farmland soils or Farmland of Statewide Importance for DoD purposes is exempt from the FPPA and no further action is required under the FPPA.

3.8.2 ENVIRONMENTAL CONSEQUENCES

3.8.2.1 ALTERNATIVE 1: SITE 5 AND TRANSMISSION LINE RIGHT OF WAY (PREFERRED ALTERNATIVE)

DIRECT IMPACTS: Ground disturbance would be necessary to construct the Preferred Alternative. Construction of the solar PV system array field and transmission line ROW would directly impact the types of soils listed in Table 2 and Figure 5 below. Long-term minor adverse impacts would result from the disturbance of surface and near-surface soil horizons through heavy machinery and vehicle traverses associated with the construction of the solar PV panels. Although these impacts are considered long-term, they would not result in major impacts based upon the minimal amount of soils affected versus the overall area within the study area.

Table 2. Soils on Site 5 and Transmission Line Right of Way

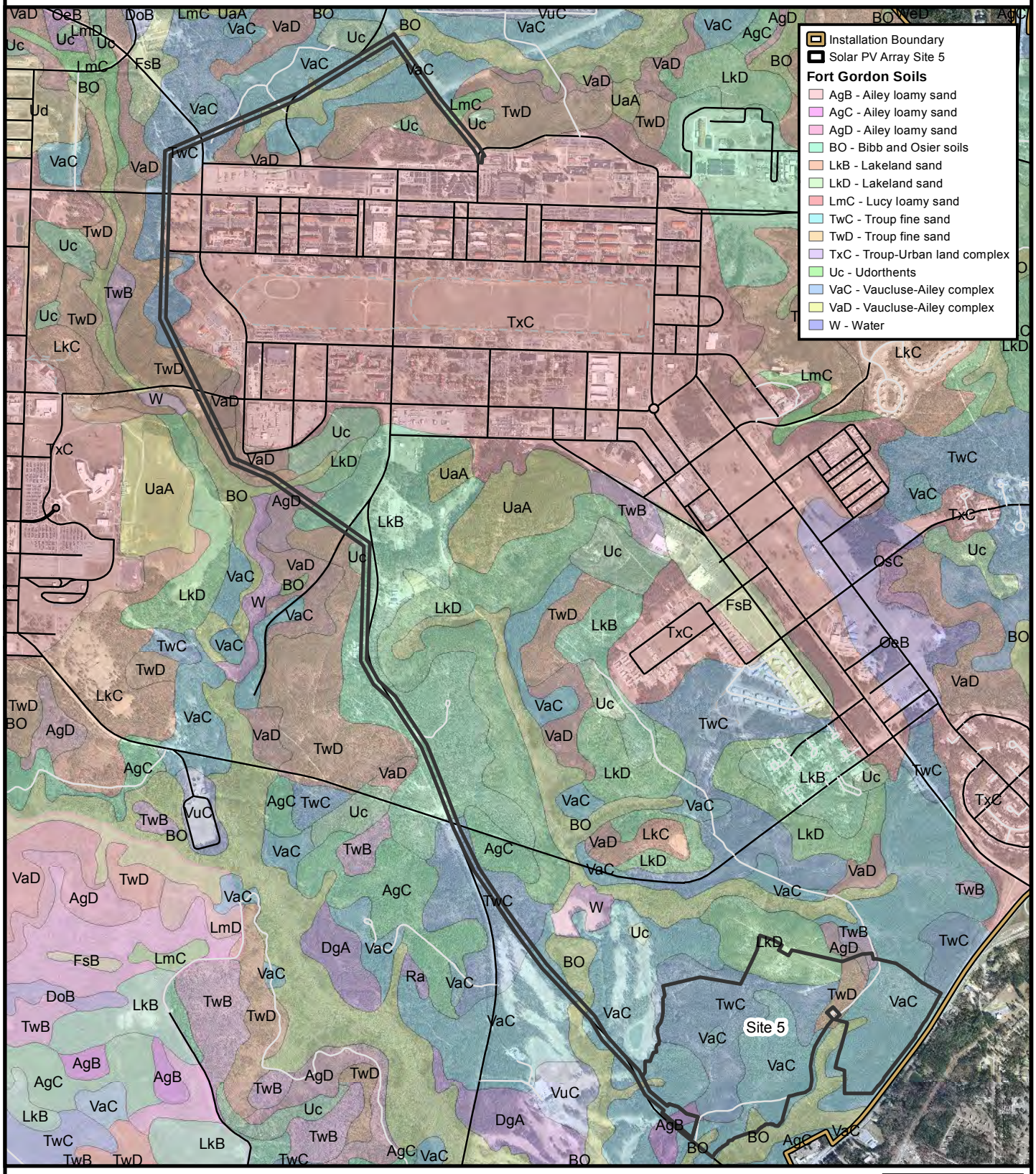
Soil Series	Soil Characteristics	Hydric?	Prime and Unique Farmland?	Farmland Statewide Importance?
Troup fine sand	Very deep, somewhat excessively drained, moderate permeability, slow runoff.	No	No	No
Lakeland sand	Very deep, excessively drained, rapid to very rapid permeability, slow runoff.	No	No	No
Vaucluse-Ailey complex	Very deep, well drained, slow to moderately slow permeability, high to very high runoff.	No	No	No
Bibb and Osler soils	Very deep, poorly drained, moderate permeability, very slow runoff.	Yes	No	No
Ailey loamy sand	Deep, well drained, rapid permeability	No	No	No
Lucy loamy sand	Very deep, well drained, rapid permeability	No	No	Yes
Troup Urban land complex	Very deep, excessively drained, rapid permeability	No	No	No
Udorthents	Areas that have been disturbed by cutting, filling, reshaping, dredging or erosion, soil properties are highly variable	No	No	No

INDIRECT IMPACTS: During construction, inadvertent releases of chemicals, oils, or solvents into the trench or surrounding soils could eventually migrate into the underlying groundwater. The developer would employ Best Management Practices (BMPs) during construction activities to minimize the potential for contaminants to be released into the soil and subsequently to the groundwater. By following the required practices and procedures in the Fort Gordon SPCCP and Installation Contingency Plan (ISCP), there is minimal potential for impacts to adjacent soils and groundwater. Consequently, no short- or long-term indirect impacts to geology and soils are expected under this alternative.

3.8.2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, there would be no change to the existing natural and environmental resource conditions at Fort Gordon; therefore, there would be no direct or indirect adverse impacts to geology and soils.

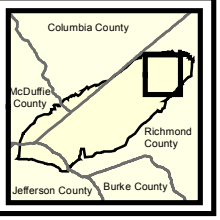
Figure 5. Fort Gordon Solar PV Site 5 Soils



Projection Based on:
World Geodetic System of 1984
UTM Zone 17 North
Units: Meters
1:28,000

0 200 400 Meters
0 2,000 Feet

This map was produced by the Fort Gordon Environmental Division-Natural Resources Branch.



3.9 WATER RESOURCES

3.9.1 AFFECTED ENVIRONMENT

Groundwater: Fort Gordon 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 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. Fort Gordon lies within the recharge area and the aquifer is relatively thin; therefore, there is limited storage capacity and only moderate supplies of potable water are available within the installation. Typical yields in this area range from 29,000 to 72,000 gallons per day (GPD). Wells within the aquifer supply potable water to the range, training, and recreation areas. Because of the high content of dissolved CO_2, 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.

***Surface Water*:** Surface streams on Fort Gordon generally flow south and east, towards the Savannah River. Five major stream systems drain portions of Fort Gordon. From north to south, they are Butler Creek, Spirit Creek, Sandy Run Creek, Boggy Gut Creek, and Brier Creek. There are 89 streams on Post associated with these five major drainages (USAGFG, 2008a).

Streams that have no tributaries flowing into them are called first-order streams. Streams that receive only first-order streams are called second-order streams. When two second-order streams meet, the combined flow becomes a third-order stream, and so on. First through third order streams are also called headwater streams and constitute any waterways in the upper reaches of the watershed. Going up in size and strength, streams that are classified as fourth through sixth order are medium streams while anything larger (up to 12th order) is considered a river. Approximately two-thirds (63 streams) of the streams on Fort Gordon are very small first-order streams, with a total length of 46 miles. Smaller numbers of second-order streams (17 streams) and third-order streams (8 streams) are present, totaling 36 miles. Brier Creek is unique in that it enters Fort Gordon as a fifth-order stream (USAGFG, 2008a). Spirit Creek's headwaters are in the northwest part of Fort Gordon. From its headwaters, Spirit Creek flows 24 miles to the southeast, entering the Savannah River two miles downstream of Augusta's Bush Field. Spirit Creek drains approximately 19,200 acres of Fort Gordon (USAGFG, 2008a). The other major stream systems drain smaller areas of the installation, from 3,840 acres (Butler Creek) to 13,440 acres (Sandy Run).

Georgia has established 5.0 milligrams per liter (mg/L) (daily average) as the state water quality standard for dissolved oxygen in waters used for fishing and contact recreation. Hoover and Kilgore (1999) found that dissolved oxygen levels in Spirit Creek, Sandy Run Creek, Boggy Gut Creek, and Brier Creek were high enough to support a diverse assemblage of aquatic organisms. Spirit Creek dissolved oxygen levels were the highest measured, ranging from 6.8 to 10.1 mg/L (Hoover and Kilgore, 1999).

The U.S. Army Public Health Command (USAPHC), formerly the U.S. Army Center for Health Promotion and Preventive Medicine (CHPPM), conducted an investigation in 2006-2007 to determine if there had been releases of munitions-related contaminants to surface water and/or groundwater that posed a threat to human health or the environment. Arsenic and copper concentrations in Spirit Creek water slightly exceeded Georgia water quality standards, as did silver concentrations in Spirit Creek sediment. However, benthic macroinvertebrate communities showed no significant impairment, suggesting actual potential of risk to aquatic receptors was low (CHPPM, 2008).

GADNR, Environmental Protection Division (GAEPD) is responsible for establishing and enforcing the state's water quality standards. Every two years, in compliance with Clean Water Act (CWA) sections 303(d) and 305(b), GAEPD publishes "Water Quality in Georgia," a comprehensive assessment of water quality in the state. In addition to presenting updated information on water quality conditions across the state, this report identifies streams and impoundments that are impaired, meaning they failed to meet one or more water quality standards or support designated uses. Only one stream on Fort Gordon, a short stretch of Headstall Creek that flows into Brier Creek in the southwestern corner of the installation, appears on GAEPD's 2010 303(d) list of impaired waters (GADNR, 2010).

In the course of preparing a Comprehensive Wildlife Conservation Strategy that was implemented in 2005, GADNR's Wildlife Resources Division identified "High Priority Waters," streams and river reaches that were deemed significant and worthy of preservation, based primarily on the uniqueness and diversity of their aquatic communities (GADNR, 2009). As part of the same planning effort, GADNR delineated watersheds that contained high priority streams or tributaries of these streams and designated them "High Priority Watersheds." GADNR works with private, corporate, and government land owners to protect and preserve these valuable streams and watersheds. The sections of Sandy Run Creek, Boggy Gut, and Brier creeks that flow through the western half of Fort Gordon have all been designated High Priority Waters (GADNR, 2009). The watersheds associated with these stream reaches are designated High Priority Watersheds. Spirit Creek, Butler Creek, and their watersheds have not been designated High Priority, however, reflecting their proximity to the developed portion of Fort Gordon and generally less-pristine character.

In addition to the 89 streams on Fort Gordon, there are 30 ponds and reservoirs scattered across the installation with a total surface area of 436 acres (USAGFG, 2008a). Most are less than 20 acres in area. The largest impoundments are Lower Leitner Pond (25.3 acres), Leitner Pond (28.5 acres), Gordon Lake (37.3 acres), and Butler Reservoir (81.9 acres) (USAGFG, 2008a). Of these 30 impoundments, 27 are managed for recreational fishing. Gordon Lake, fed by Spirit Creek, is managed primarily to provide water for the irrigation of Gordon Lakes Golf Course. Although water quality of these impoundments is not systematically monitored, the presence/absence of nuisance aquatic plants (both algae and macrophytes) is monitored, and chemical controls are applied where appropriate. Grass carp have also been stocked in several Fort Gordon reservoirs to control nuisance aquatic vegetation.

***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. Wetlands are defined as "those areas that are inundated or saturated by surface or groundwater at a frequency

and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (CFR 33, Part 328.3[b]). According to the National Wetland Inventory, there are approximately 4,395 acres of wetlands on Fort Gordon (USFWS, 2012). These wetlands 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. With the exception of Brier Creek, the floodplain of most alluvial wetlands on Fort Gordon 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, 2008b). Non-alluvial wetlands are associated in areas where groundwater emerges or precipitation is held close to the soil surface. Non-alluvial wetlands on Fort Gordon included 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 sweetbay magnolia (*Magnolia virginiana*) in the midstory and sweetgum and yellow poplar in the overstory. Isolated wetlands include small isolated ponds with grasses and herbs as dominant vegetation. If present, the overstory consists primarily of sweetgum and black gum (USAGFG, 2008b).

***Floodplains*:** EO 11988, *Floodplain Management*, requires Federal agencies to determine whether a proposed action would occur within a floodplain. The determination of whether a proposed action occurs within a floodplain typically involves consultation of appropriate Federal Emergency Management Agency (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 site 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*.

A flood zone area is an area that FEMA has defined according to varying levels of flood risk. These zones are depicted on a community's or county's FIRM or Flood Hazard Boundary Map. Each zone reflects the severity or type of flooding in the area. Examples of flood zones include the 1-percent-annual-chance flood hazard area (this is also known as a 100-year flood event) and the 0.2-percent-annual-chance flood hazard area (this is also known as a 500-year flood event).

Fort Gordon is mapped on the August-Richmond County (FEMA, 2011), Jefferson County (FEMA, 2010a), and McDuffie County (FEMA, 2010b) FIRMs. Fort Gordon is not mapped on the Columbia County FIRM (FEMA, 2007). Some areas of Fort Gordon are adjacent to surface water bodies within a flood zone area.

3.9.2 ENVIRONMENTAL CONSEQUENCES

3.9.2.1 ALTERNATIVE 1: SITE 5 AND TRANSMISSION LINE RIGHT OF WAY (PREFERRED ALTERNATIVE)

DIRECT IMPACTS: Implementation of the Preferred Alternative will change 250 acres of forested land to a solar array field. This could alter site hydrology, which consequently may affect the recharge of aquifers in the area. However, the larger wells that supply water to the range, training, and recreation areas are far removed from the solar site, on the northern side of the installation training area. There are two small wells at Gordon Lakes Golf Course. The pumping capacity of these wells

is approximately 10 gallons a minute and 1000 GPD peak useage, and supply water to two small restroom facilities on the course. Therefore these wells are not anticipated to be impacted. Impacts to the aquifer can be further mitigated by utilizing low impact development to treat on site runoff. This will allow for less change to the site hydrology. Water will still be allowed to infiltrate to the aquifer recharge area as a result and will comply with the intent of the Energy Independence and Security Act (EISA) of 2007.

Transmission line ROW would have no direct impacts to groundwater. Disturbance to soil and site hydrology would be temporary. Direct impacts to surface water would not be anticipated from implementing the Preferred Alternative (See Figure 6).

There are wetlands within the boundaries of the Preferred Alternative. There are no immediate plans to fill or alter any of these wetlands as a result of the solar PV system construction. If wetlands impacts are anticipated during the course of developing the site, appropriate permits and mitigation would apply (See Figure 6).

The transmission line route will cross wetlands, which is covered under Nationwide Permit 12. This permit covers construction, maintenance, and repair of utility lines crossing wetlands.

Direct impacts to floodplains would be during construction and anticipated to be temporary. The transmission line, which crosses a small portion of floodplains, would be stabilized with appropriate vegetative cover at the close of construction.

INDIRECT IMPACTS: Solar panel washing is anticipated to occur via water truck, using only water and no cleaning chemicals. Soils on the site would be stabilized immediately after construction to minimize runoff from solar panel washing and rain; therefore, indirect impacts to groundwater would not be anticipated from implementing the Preferred Alternative.

The transmission line ROW is expected to have no indirect impacts to ground water. The transmission line would be stabilized with appropriate vegetative cover at the close of construction.

Implementation of the Preferred Alternative could potentially have minor, indirect adverse impacts to surface water. Erosion from soil disturbance during construction could potentially result in runoff into surface water bodies. However, BMPs would be used during construction to minimize erosion and sedimentation. Soils in the disturbed areas would be stabilized immediately after construction to minimize future runoff into surface water bodies. Therefore, anticipated adverse, indirect impacts to surface water would be temporary and minor from constructing and operating the PV solar array system and transmission line ROW.

Implementation of the Preferred Alternative could potentially have minor, indirect, adverse impacts to wetlands. Erosion from soil disturbance during construction could potentially result in runoff accumulation in wetlands. However, BMPs such as silt fences, straw bale dikes, diversion ditches, riprap channels, water bars, and water spreaders would be used during construction to minimize erosion and sedimentation. Soils in the disturbed areas would be stabilized immediately after construction to minimize future runoff into wetlands. Therefore, anticipated adverse, indirect impacts to wetlands resources would be temporary and minor.

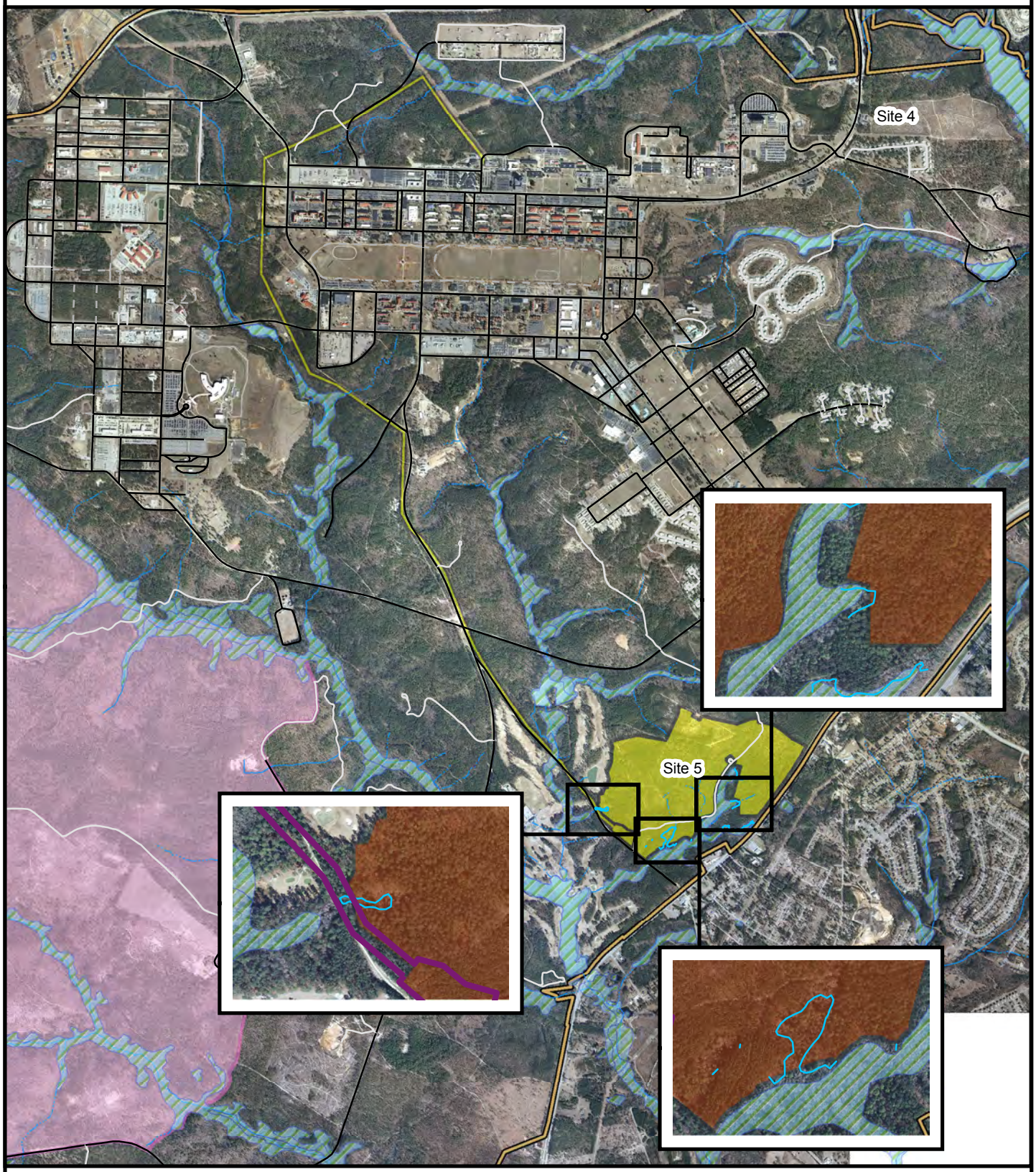
Indirect impacts to floodplains would are anticipated to be minor from implementing the Preferred Alternative. There are floodplains adjacent to Site 5, but they would be avoided (Figure 7).

The transmission line route will cross only a small amount of floodplains. There is a small area of floodplains adjacent to the the solar PV system array field. The impacts to floodplains would be minor, during construction and anticipated to be temporary.

3.9.2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, there would be no change to the existing natural and environmental resource conditions at Fort Gordon; therefore, there would be no direct or indirect adverse impacts on water resources.

Figure 6. Fort Gordon Solar PV Site 5 Surface Water Bodies and Wetlands



Projection Based on:
World Geodetic System of 1984
UTM Zone 17 North
Units: Meters
1:40,000

0 250 500 1,000 Meters
0 1,000 2,000 3,000 Feet

Installation Boundary
Small Arms Impact Area
Solar PV Array Site 5
Project Wetlands Delineation
Wetlands
Lakes
Streams
Permanent
Intermittent

This map was produced by the Fort Gordon Environmental Division-Natural Resources Branch.

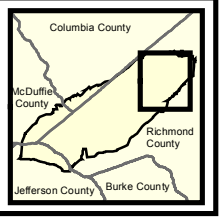
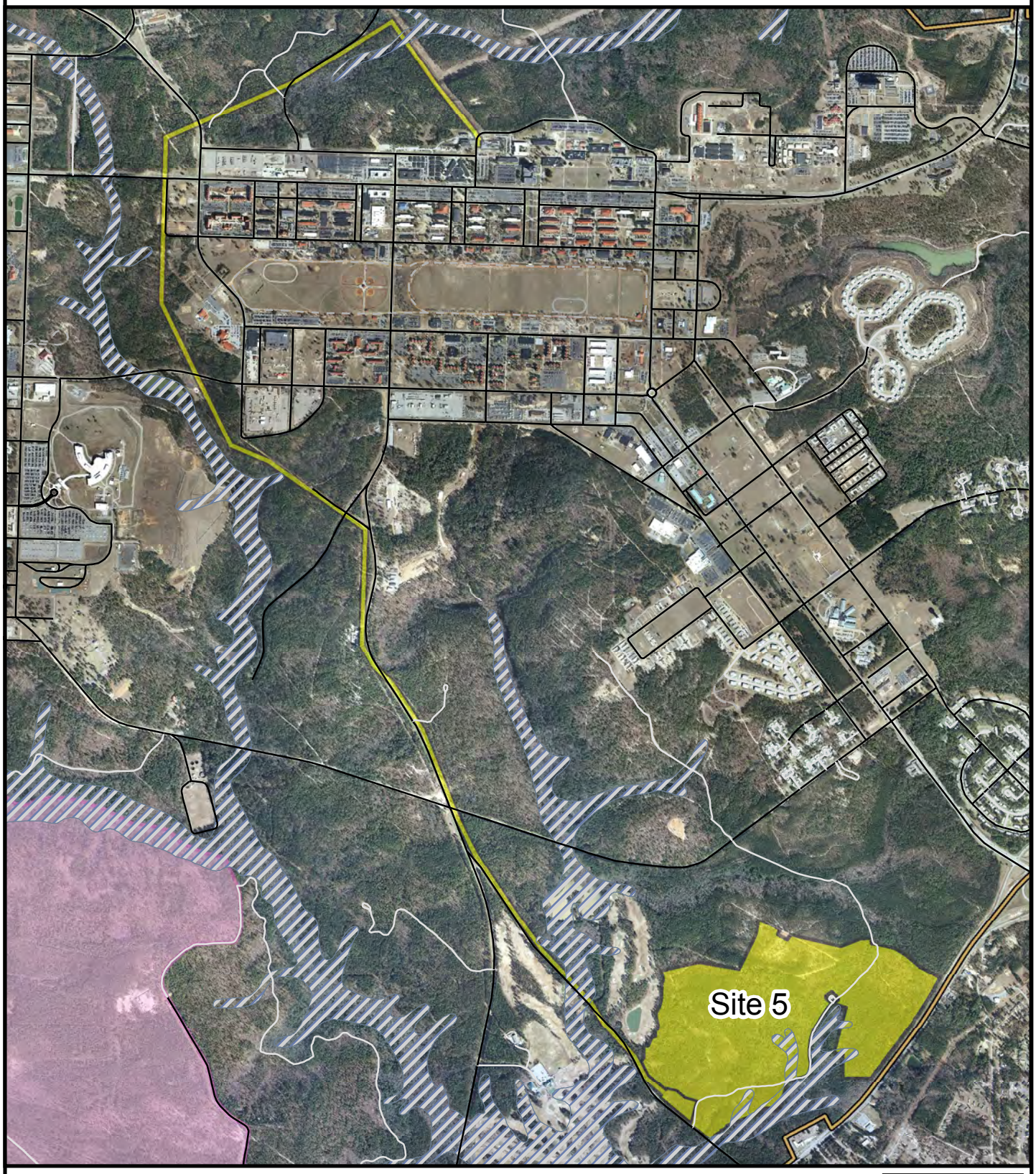


Figure 7. Fort Gordon Site 5 Floodplain Map



Projection Based on:
World Geodetic System of 1984
UTM Zone 17 North
Units: Meters
1:28,000
0 200 400 Meters
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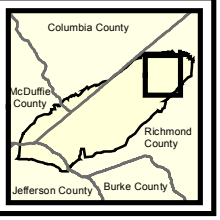
Installation Boundary
Solar PV Array Site 5
100 Year Floodplain

This map was produced by the Fort Gordon Environmental Division-Natural Resources Branch.



3.10 BIOLOGICAL RESOURCES

Biological resources include native or naturalized plants and animals and the habitats (i.e., wetlands, forests, and grasslands) in which they live. Protected biological resources include plant and animal species listed by the State of Georgia as rare, threatened, or endangered or by the 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.

Under the Endangered Species Act (ESA), an "endangered species" is defined as any species in danger of extinction throughout all or a significant portion of its range. A "threatened species" is defined as any species likely to become an endangered species in the foreseeable future. The ESA also provides for recovery plans to be developed describing the steps needed to restore a species population. Critical habitat for federally-listed species includes "geographic areas on which are found those physical or biological features essential to the conservation of the species and which may require special management considerations or protection." Critical habitat can include areas not occupied by the species at the time of the listing but that are essential to the conservation of the species. 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.

The Migratory Bird Treaty Act (MBTA), implemented in 1918, makes it illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, offer for sale, or purchase 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 Act are listed in 50 CFR 10.13.

3.10.1 AFFECTED ENVIRONMENT

***Vegetation on Fort Gordon*:** Ninety-two percent (approximately 51,143 acres) of the installation is forested, and approximately 83 percent of the forests (or 42,448 acres) are managed for wildlife (including endangered species) and timber production. The major vegetative community on the installation is pine forest, which comprises approximately 50 percent of the land area.

Fort Gordon exhibits a large variety of native vegetation characteristic of both the Upper Coastal Plain and Lower Piedmont Plateau physiographic provinces. The type of vegetation is dictated partially by elevation. The small and large scale topographic diversity between upland areas and streams forms a gradient of moisture conditions along slopes and vegetation types. Natural communities range from xeric, fire-prone uplands to moist, bottomland swamp forest, subject to periodic flooding. Most of the existing tree and shrub communities common to Fort Gordon can be grouped into nine major forest types. These are the Natural Pine, Pine Plantation, Pine-Scrub Oak, Pine-Hardwood, Scrub Oak, Bottomland Hardwood, Hardwood Pine, Streamside Forest, and Grassland communities (GSRC, 2001).

***Terrestrial Wildlife Resources*:** Fort Gordon is inhabited by a wide variety of wildlife species. Fort Gordon has identified approximately 136 species of birds on the installation. It is estimated that approximately 31 species of mammals and approximately 67 species of reptiles and amphibians inhabit Fort Gordon. These species are dispersed throughout the various habitats on the installation.

Common mammal species found on the installation include, but are not limited to: white-tailed deer, raccoon, eastern grey squirrel, Virginia opossum, red fox, gray fox (*Urocyon*

cinereoargenteus), striped skunk (*Mephitis mephitis*), eastern cottontail rabbit (*Sylvilagus floridanus*), and coyote (*Canis latrans*). Common bird species found on Fort Gordon include, but are not limited to, northern bobwhite quail (*Colinus virginianus*), turkey vulture (*Cathartes aura*), pileated woodpecker (*Dryocopus pileatus*), northern mockingbird, red-eyed vireo (*Vireo olivaceus*), tufted titmouse (*Parus biocolor*), and Carolina chickadee. Common reptile and amphibian species found on the installation include, but are not limited to: eastern box turtle, eastern mud turtle (*Kinosternon subrubrum subrubrum*), southern fence lizard (*Sceloponts undulatus undulatus*), brown water snake (*Nerodia taxispilota*), and eastern kingsnake (*Lampropeltis getula getula*). 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 are actively managed for sport hunting on Fort Gordon.

***Aquatic Resources*:** Approximately 56 species of fish are known to occur on Fort Gordon, including the bluebarred pygmy sunfish (*Elassoma okatie*). This is the only recorded siting in the State of Georgia (USAGFG, 2001). Common fish species on the installation include, but are not limited to, yellow bullhead (*Ameiurus natalis*), flat bullhead (*Ameiurus platycephalus*), bowfin (*Amia calva*), carp (*Cyprinus carpio*), and gizzard shad (*Dorosoma cepedianum*).

Gordon Lake, a 37-acre impoundment that is fed by Spirit Creek, is managed primarily to provide water for the irrigation of Gordon Lakes Golf Course. It is managed secondarily for recreational fishing. In addition to largemouth bass, bluegill, redear sunfish (*Lepomis microlophus*), and channel catfish (*Ictalurus punctatus*), which are the species most often sought by anglers, Gordon Lake contains gizzard shad, golden shiners (*Notemigonus crysoleucas*), unidentified "suckers," chain pickerel (*Esox niger*), redfin pickerel (*Esox americanus*), pirate perch (*Aphredoderus sayanus*), mud sunfish (*Acantharchus pomotis*), white crappie (*Pomoxis annularis*), warmouth (*Lepomis gulcosus*), pumpkinseed, redbreast sunfish, yellow perch (*Perca flavescens*), and several (unidentified) darters.

***Special Concern Species*:** The term "special concern species" refers to federally-endangered or threatened species and species of concern, state listed species, and state tracked species. Table 3 lists species known to occur on Fort Gordon that are either threatened, endangered, or of special concern by the USFWS or the State of Georgia. These species, their status, and brief description of habitat requirements are also included in Table 3 (USAGFG, 2008a).

Effective July 28, 2007, the USFWS removed the bald eagle (*Haliaeetus leucocephalus*) from the list of threatened and endangered species due to meeting or exceeding established recovery goals throughout the species range. The species is still afforded Federal protection under the Bald and Golden Eagle Protection Act and the MBTA. Bald eagles were observed within the boundaries of Fort Gordon (USAGFG, 2008a), and the taking of eagles, nests, or eggs is prohibited. There are no known bald eagle nesting sites on Fort Gordon.

Of the three federally-protected species observed on the installation, Fort Gordon is only required to manage for the resident RCW. The wood stork has only been seen foraging and roosting at Fort Gordon and is not considered a resident species (USAGFG, 2008a). Fort Gordon acoustically recorded the gray bat at multiple locations, but has not yet determined that the bat is a resident species. Fort Gordon also actively manages for the Federal candidate species, the gopher tortoise, in an effort to "prevent further

degradation of the species or its habitat which could result in listing under the ESA" (USAGFG, 2008a). Due to their protection and conservation status, further information on these three managed species is contained within this section.

Red-Cockaded Woodpecker

The endangered RCW is endemic to old growth pine forests of the southeastern U.S. Within its range, RCW is most commonly associated with longleaf pine, although it can be found in other pine habitats, including loblolly, shortleaf, and slash pines. Under optimum conditions, these forests contain mature pine with an open canopy, low densities of small pines, little or no hardwood or pine midstory, limited hardwood overstory, and abundant native bunchgrass and forb groundcovers.

RCWs are unique among woodpeckers in that they excavate cavities for roosting and nesting in living pine trees. The minimum age of pines selected for cavity trees is approximately 60 to 70 years and minimum diameter at breast height (dbh) is typically 15 to 18 inches. Trees must contain a minimum of six inches of heartwood to allow for cavity construction.

RCWs exist as "families" and are referred to as "groups" or "clusters". Groups normally consist of a breeding pair, helpers (usually male offspring of one or both of the breeding pair from previous years), and the current year's offspring. Helpers excavate new cavities, defend territories, and feed the young.

RCWs feed mostly on forest insects, but will also eat small fruits and seeds. They forage primarily on the surface of living pine trees within pine dominated forest stands. Pine dominated stands are generally not considered potential foraging habitat until they reach 30 years of age, but younger trees suffice if the midstory is controlled (USAGFG, 2008a).

RCW management requirements are listed in the USFWS biological opinion (BO) issued to Fort Gordon, the USFWS RCW recovery plan, and are also found in Appendix H of the Fort Gordon INRMP (USAGFG, 2008a). The requirements include:

- Conduct surveys for new cavity trees and clusters.
- Conduct project surveys prior to timber harvesting operations, construction, or other significant land-disturbing activities, excluding prescribed fire.
- Assess quality and quantity of installation-wide foraging habitat at a minimum of once every 10 years and midstory at a minimum frequency of once every five years in RCW HMUs.
- Silviculture:
    - Maintain sufficiently large and old pines to serve as cavity trees. Control hardwood and pine midstory. Encourage restoration and maintenance of native grasses and forbs by using prescribed burning. Minimize soil disturbance.
    - Implement appropriate timber management to promote adequate light at ground level. Reduce excessive overstory hardwoods. Retain dead and dying trees and all other snags, unless they present a safety hazard.
- Conduct prescribed burning at least every three years in longleaf, loblolly, slash pine, and shortleaf pine systems. Fort Gordon would protect cavity trees from fire damage during burning. Burning should normally be conducted in the growing season because the full benefits of fire are not achieved from non-growing season burns.

- To the degree practicable, clusters and surrounding foraging area should be designated as "no firing area" to protect clusters from projectile damage.

Gopher Tortoise

The Federal candidate gopher tortoise is one of four tortoise species native to North America, but is the only member of the genus *Gopherus* indigenous to the southeastern U.S. It occurs primarily in xeric sandy upland habitats, ranging from southwestern South Carolina through Georgia and Florida to southeastern Louisiana, with approximately 80 percent of remaining populations occurring in Georgia and Florida.

Gopher tortoises excavate deep burrows, approximately five meters long, which provide shelter from temperature extremes and refuge from predators. These burrows are typically constructed in sandy soils, have a single entrance, are straight and unbranched, and have an enlarged chamber at the end where the tortoise can sleep or turn around. In Georgia, adult male tortoises use an average of seven burrows per activity season (April through December), while adult females use an average of four. Younger tortoises utilize fewer burrows per activity season than adults.

Gopher tortoises mate during fall and spring, but peak mating occurs during May and June. Nesting can occur from late April to mid-July, but primarily occurs from May through mid-June. A female lays a single annual clutch of 1 to 25 eggs in a spoil mound or burrow apron immediately outside the female's burrow. However, only approximately 10 percent of nests successfully hatch, and only 23 percent of eggs survive the incubation period with most eggs consumed by small mammals.

Gopher tortoises are herbivorous and feed primarily on grasses and other herbaceous plants, but primarily on wiregrass (*Astridia stricta*). Foraging usually occurs near burrows, as tortoises do not travel great distances to forage (USACE, 1997).

Army management guidelines found in Appendix H of the Fort Gordon INRMP include the following (USAGFG, 2008a):

- Silviculture: Maintain canopy closure at 60 percent or less, reduce midstory encroachment, and maintain native grasses and forbs through prescribed burning. Minimize soil disturbance. Implement appropriate timber management to promote adequate light at ground level.
- Prescribed burning to reduce shrub and hardwood encroachment and stimulate growth of forage plants such as grasses, forbs, and legumes. Burning during the early growing season (April through June) causes even more pronounced vegetative responses when compared to burning conducted during the period of plant dormancy. Conduct prescribed burning at a frequency of one to five years, but preferably at least every three years.
- Conduct surveys of tortoise burrows at intervals of two to five years.
- Conduct burrow surveys prior to timber harvesting, operations, construction, or other significant long-disturbing activities, excluding prescribed fire. These surveys would identify gopher tortoises that may need to be avoided or possibly relocated prior to certain actions. The installation would conduct these surveys within a year prior to project initiation by natural resources personnel or contractors trained and experienced in gopher tortoise biology. Burrows found prior to project activities should be marked with conspicuous caution flagging tied to adjacent shrubs or other vegetation.

***Endangered Species Management*:** Management of federally-listed species on Fort Gordon is conducted in accordance with the ESA, endangered species recovery plans,

and U.S. Army regulations and guidance. The ESA requires all Federal agencies to conserve listed species. All Army land uses, including military training and testing, timber harvesting, and recreation, are subject to ESA requirements for the protection of RCWs.

There is no documented critical habitat on Fort Gordon, however, the protection of foraging and roosting habitat for RCWs and gopher tortoises has led to the establishment of varying restrictions that apply to land use throughout the training areas. Some installation land uses and training missions are not suitable for RCW management. These include the developed cantonment area, some parts of the Small Arms Impact Area (SAIA), Artillery Impact Area (AIA), bottomland hardwood stands, swamps, marshes, and ponds. Approximately 24,300 acres of Fort Gordon's total 55,600-acre area are suitable for potential habitat and comprise the RCW HMU. However, even the SAIA, AIA, and dud areas undergo routine, scheduled prescribed burning regimes to maintain any potential RCW habitat that may exist. Per the 2003 Recovery Plan, good quality RCW habitat has all of the following characteristics (USAGFG, 2008a):

a. There are 18 or more stems per acre of pines that greater than or equal to 60 years in age and greater than or equal to 14 inches dbh. Minimum basal area for these pines is 20 square feet per acre. Recommended minimum rotation ages apply to all land managed as foraging habitat.
b. Basal area of pines 10 to 14 inches dbh is between 0 and 40 square feet per acre.
c. Basal area of pines less than 10 inches dbh is below 10 square feet per acre and below 20 stems per acre.
d. Basal area of all pines less than or equal to 10 inches dbh is at least 40 square feet per acre. That is, the minimum basal area for pines described in categories (a) and (b) above is 40 square feet per acre.
e. Groundcovers of native bunchgrass and/or other native, fire-tolerant, fire-dependent
f. Herbaceous species total 40 percent or more of ground and midstory plants and are dense enough to carry growing season fire at least once every five years.
g. No hardwood midstory exists, or if a hardwood midstory is present it is sparse and less than seven feet in height.
h. Canopy hardwoods are absent or less than 10 percent of the number of canopy trees in longleaf forests and less than 30 percent of the number of canopy trees in loblolly and shortleaf forests. Xeric and sub-xeric oak inclusions that are naturally existing and likely present prior to fire suppression may be retained but are not counted in the total area dedicated to foraging habitat.
i. All foraging habitat is within half a mile of the center of the cluster, and preferably, 50 percent or more is within a quarter of a mile of the cluster center.
j. Foraging habitat is not separated by more than 200 feet of non-foraging areas. Non-foraging areas include: 1) any predominately hardwood forest, 2) pine stands less than 20 years in age, 3) cleared land such as agricultural lands or recently clear-cut areas, 4) paved roadways, 5) utility rights of way, and 6) bodies of water.

Per the BO, Fort Gordon has the following legally-required management goals:

- HMUs must be burned at least every three years;
- Annual increase of RCW population 5-10 percent, with the installation goal of 122 active clusters;

- RCW must be translocated to augment the population size until 30 potential breeding groups are reached;
- All (100 percent) of RCW clusters must be monitored multiple times throughout the year;
- All (100 percent) of the RCW produced from nesting must be banded;
- Fort Gordon must monitor changes in traffic patterns and frequency for impacts to successful breeding.

Fort Gordon has an installation population goal of 122 potential breeding groups (PBGs). A PBG is an adult female and adult male that occupy the same cluster, with or without one or more helpers, whether or not they attempt to nest or successfully fledge young. To determine the target PBG, the current and potential habitat (24,300 acres) is divided by the amount of forage habitat required to support one cluster. Based on Fort Gordon's quality and condition of habitat, each active cluster is partitioned into 200 acres of forage habitat.

Managing for good quality RCW habitat also benefits the gopher tortoise, and land management techniques are similar for the two species. The goal for the gopher tortoise is no net loss of population numbers. Fort Gordon must monitor burrows and survey for their presence prior to any ground-disturbing activities (e.g., training and timber harvest).

***Noxious, invasive, and pest species*:** A noxious weed is any plant designated by a Federal, state, or local government as injurious to public health, agriculture, recreation, wildlife, or property. Noxious weeds are often defined as plants that are growing out of place or competitive, persistent, and pernicious. An invasive species is an alien (non-native) species whose introduction does or is likely to cause economic or environmental harm, or harm to human health (EO 13112, *Invasive Species*). The U.S. Department of Agriculture (USDA), Animal and Plant Health Inspection Service defines a pest species as any biotic agent (any living agent capable of reproducing itself) that is known to cause damage or harm to agriculture or the environment. The Georgia Exotic Pest Plant Council maintains a list of exotic invasive plants in the state.

EO 13112 requires coordination and enhancement of Federal activities to control and minimize the economic, ecological, and human health impacts caused by invasive species. The term non-native reflects only the origin of the plant and not its ecology; therefore, not all alien or non-native plants are invasive. Department of the Army (DA) Memo "Army Policy Guidance for Management and Control of Invasive Species" (26 June 2001) provides guidance on implementing the EO. Kudzu (*Puerario lobata*) and tropical soda apple (*Solanum viarum*) are the two exotic invasive plant species identified on Fort Gordon that could interfere with the installation's mission. While other invasive plant species occur in Georgia, their distribution is very limited and not a priority (USAGFG, 2008a). The Fort Gordon INRMP contains the Fort Gordon Integrated Pest Management Plan as an appendix.

Table 3. Special Concern Species Known to Occur on Fort Gordon

Common Name	Scientific Name	Status		Description of Habitat
		Federal	State	
Birds				
Bachman's sparrow	*Aimophila aestivali*	SC	R	Abandoned fields with scattered shrubs, pines, or oaks.
Southeastern American kestrel	*Falco sparverius paulus*	SC	R	Breeds in open or partly open habitats with scattered trees and in cultivated or urban areas.
Migrant loggerhead shrike	*Lanius ludovicianus migrans*	SC	Tr	Open woods, field edges.
Wood stork	*Mycteria americana*	E	E	Feeds primarily in fresh and brackish wetlands and nests in cypress or other wooded swamps.
Red-cockaded woodpecker	*Picoides borealis*	E	E	Nests in mature pine with low understory vegetation; forages in pine and pine hardwood stands.
Mammals				
Southeastern bat	*Myotis austrororiparius*	SC	Tr	Caves used for hibernating, maternity colonies, and summer roosts.
Rafinesque's big eared bat	*Corynorhinus rafinesquii*	SC	R	Buildings in forested regions.
Gray bat	*Myotis grisescens*	E	E	Caves near streams and rivers used for hibernating, maternity colonies, and summer roosting
Reptiles and Amphibians				
Gopher tortoise	*Gopherus polyphemus*	SC	T	Well-drained, sandy soils in forests and grassy areas, associated with pine overstory.
Southern hognose snake	*Heterodon simus*	SC	T	Open, sandy woods, fields, and floodplains.
American alligator	*Alligator mississippiensis*	T(S\A)	Tr	Marshes, swamps, rivers, farm ponds and lakes. Nests in shallow, heavily vegetated, secluded areas.
Florida pine snake	*Pituophis melanoleucus mugitus*	SC	Tr	Arid pinelands, sandy areas, and dry mountain ridges.
Dwarf waterdog	*Necturus punctatus*	NL	Tr	Sluggish streams with substrate of leaf litter or woody debris.
Eastern tiger salamander	*Ambystoma t. tigrinum*	NL	Tr	Isolated wetlands; pine-dominated uplands; open fields.
Fish				
Bluebarred pygmy sunfish	*Elassoma okatie*	NL	E	Heavily vegetated creeks, sloughs, and roadside ditches.
Savannah darter	*Etheostoma fricksium*	NL	Tr	Shallow creeks with moderate current and sandy or gravel bottoms.
Sawcheek darter	*Etheostoma serrifer*	NL	Tr	Sluggish streams and swamps with sand or mud bottoms.

Common Name	Scientific Name	Status		Description of Habitat
Sandbar shiner	*Notropis scepticus*	NL	R	Large streams to medium-sized rivers.
Plants				
Sandy-woods chaffhead	*Carphephorus bellidifolius*	NL	Tr	Sandy scrub.
Sandhill rosemary	*Ceratiola ericoides*	NL	T	Dry, open scrub oak sandhills and river dunes with deep white sands of the Kershaw soil series.
Atlantic white cedar	*Chamaecyparis thyoides*	NL	R	Wet sandy terraces along clear streams and in acidic bogs.
Pink ladyslipper	*Cypripedium acaule*	NL	U	Upland oak-hickory-pine forests.
Sandhill gay-feather	*Liatris secunda*	NL	Tr	Fall Line sandhills.
Carolina bogmint	*Macbridea carolina*	SC	R	Bogs, marshes, and alluvial woods.
Indian olive	*Nestronia umbellula*	SC	R	Dry open upland forest of mixed hardwood and pine.
Sweet pitcher plant	*Sarracenia rubra rubra*	NL	T	Acid soils of open bogs, sandhill seeps, Atlantic white cedar swamps, and wet savannahs.
Carolina pink	*Silene caroliniana*	NL	Tr	Granite outcrops and sandhills near the Ogeechee and Savannah rivers.
Pickering morning glory	*Stylisma pickeringii* var. *pickeringii*	SC	T	Coarse white sands on sandhills near the Fall line and on a few ancient dunes along the Flint and Ohoopee rivers.
Silky camellia	*Stewartia malacodendron*	NL	R	Steepheads, bayheads, and swamp edges.

Key: E = Endangered, T = Threatened, SC = Species of Concern, NL = not listed, U = Unusual, R = Rare, Tr = Tracked, T(S\A) = Threatened due to similarity of appearance.

3.10.2 ENVIRONMENTAL CONSEQUENCES

3.10.2.1 ALTERNATIVE 1: SITE 5 AND TRANSMISSION LINE RIGHT OF WAY (PREFERRED ALTERNATIVE)

DIRECT IMPACTS: Construction of the Preferred Alternative would involve clearing and grading approximately 250 acres for the solar PV system array field with limited vegetation clearing for the transmission line. These activities would result in minor short-term adverse impacts to vegetation on Fort Gordon.

The impacts to terrestrial wildlife would be due to the loss of vegetation and wildlife habitat from construction activities. This loss would result in the displacement of wildlife species living on the solar PV system array field site. The transmission line right away would only be a temporary impact during construction. Impacts caused by implementing the preferred alternative would be localized and not affect regional wildlife populations.

Impacts to aquatic resources would not be anticipated by implementing the Preferred Alternative. Neither the solar PV system array field nor the transmission line right way will directly impact surface water. Indirect impacts would be mitigated through best management practices.

The land clearing and grading increases the potential for the introduction and spread of noxious weeds. To minimize this, Fort Gordon has a program to control noxious weeds that includes the stabilization of disturbed areas with native seed or other approved plantings. Therefore, minor impacts would be anticipated from the solar PV system array field and the transmission line ROW.

The Preferred Alternative site is not within the Habitat Management Unit (HMU) for the RCW. The site is forested but forestry management practices, such as prescribed burning and timber thinning, have not been applied in recent years. As a result, the area is not currently suitable RCW habitat. Even though the Preferred Alternative is not in the HMU, there are potential nesting tree and foraging habitat. Based on the presence of this potential habitat, the INRMP and BO require that the area must be surveyed to ensure that no active RCW cavities were established. The RCW Survey was completed in August 2014 (Appendix C). Accordingly, no RCW impacts are expected. Segments of the transmission line will pass through forested areas and one segment will run adjacent to the HMU. No impacts to RCW are anticipate from the construction of the transmission line.

The Preferred Alternative site is not within the HMU for gopher tortoise. There are no known gopher tortoise sites within the area of the Preferred Alternative. No tortoise or their burrows would be adversely impacted from construction or operation of the solar PV system or transmission line. Fort Gordon will follow gopher tortoise management guidelines in Appendix H of the INRMP (USAGFG, 2008a). Prior to timber harvest equipment operators will be briefed on gopher tortoise burrow identification and accidental discovery procedures.

Figures 8 and 9 display documented RCW and gopher tortoise nesting sites, along with HMUs.

Seasonal restrictions for tree and brush clearing would limit impacts to migratory bird species. With careful planning and avoiding clearing suitable migratory bird habitat during the nesting season (i.e., from April 1 through July 31), adverse impacts to migratory birds would be avoided. Overhead electric lines

Figure 8. Fort Gordon Site 5 RCW HMU and Managed Trees

Projection Based on:
World Geodetic System of 1984
UTM Zone 17 North
Units: Meters

1:28,000

0 200 400 Meters

0 1,000 2,000 Feet

Installation Boundary
Solar PV Array Site 5
RCW HMU
RCW Tree

This map was produced by the Fort Gordon Environmental Division-Natural Resources Branch.

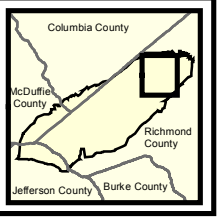


Figure 9. Fort Gordon Site 5 Gopher Tortoise Burrow Points & HMU

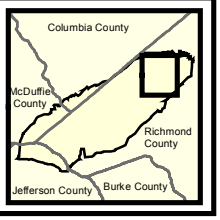
Projection Based on:
World Geodetic System of 1984
UTM Zone 17 North
Units: Meters
1:28,000

0 200 400 Meters

0 750 1,500 2,250 Feet

Installation Boundary
Solar PV Array Site 5
Gopher Tortoise HMU
Gopher Tortoise Burrow

This map was produced by the Fort Gordon Environmental Division-Natural Resources Branch.



would be constructed in accordance with avian protection guidelines, as described in Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006 (Avian Power Line Interaction Committee, 2006).

INDIRECT IMPACTS: Indirect impacts to biological resources would not be anticipated from implementing the Preferred Alternative.

3.10.2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, there would be no change to the existing natural and environmental resource conditions at Fort Gordon. There would be no direct or indirect adverse impacts on biological resources at Fort Gordon.

3.11 CULTURAL RESOURCES

Cultural resources include archaeological sites and architectural resources. Prehistoric archaeological resources are physical properties resulting from human activities predating written records, as indicated by concentrations of artifacts, features, or floral and faunal remains. Historic archaeological resources postdate the existence of written records and include features such as trails, roadbeds, foundations, and refuse concentrations. Architectural resources include standing buildings or structures from the historical period. These resources can include residential buildings, industrial structures, commercial buildings, military-related architecture, and transportation structures.

3.11.1 AFFECTED ENVIRONMENT

Fort Gordon cultural resources are managed under an ICRMP, updated in 2011, and through a Programmatic Agreement with the Georgia State Historic Preservation Office (SHPO). Fort Gordon has completed archaeological surveys on 47,619 acres, or 95 percent of the total land area of the installation. Areas not surveyed include portions of the heavily disturbed cantonment area, impact areas that contain or are likely to contain unexploded ordnance, and lake bottoms. Fort Gordon has not surveyed areas in TAs 1 and 23. These areas, left out of previous Phase I surveys of the installation, total 119 acres. As of 2009, 1,150 archaeological sites were identified on Fort Gordon. Of these, 995 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. There are 44 known historic cemeteries that date prior to the establishment of Fort Gordon. Many of these cemeteries are still in use and maintained by Fort Gordon. There are also two Prisoner of War cemeteries on Fort Gordon.

Fort Gordon has also completed an installation-wide architectural survey. There were no buildings and/or structures determined to be eligible for listing on the NRHP. However, based on 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 as few buildings of this style remain intact in Georgia. Forty-three structures were recommended for re-evaluation upon reaching 50 years of age (USAGFG, 2011).

To identify cultural resources that could be potentially impacted by the proposed undertaking, an Area of Potential Effect (APE) must be defined. The APE represents “the geographic area or areas within which an undertaking could cause changes in the character or use of historic properties, if any such exists” (36 CFR Part 800.16(d)). The APE for archaeological resources includes the area where activities could physically impact such resources, as with construction activities. The APE for architectural

resources includes the area where activities could physically impact such resources, plus the area surrounding where changes to the visual or audio character of the area could impact the setting of architectural resources.

As directed by NHPA Section 101(d)(6)(b), the Army, in carrying out its Section 106 responsibilities, shall consult with Indian tribes. Fort Gordon regularly consults with the following 9 tribes: Alabama-Quassarte, Catawba, Cherokee Nation of Oklahoma, Chickasaw Nation of Oklahoma, Kialegee, Muscogee (Creek) Nation, Poarch Band of Creek Indians, Thlopthlocco, and United Keetoowah Band of Cherokee Indians. Fort Gordon will invite these tribes to review and comment on the EA and draft FNSI.

3.11.2 ENVIRONMENTAL CONSEQUENCES

Adverse effects or impacts to historic properties occur when an undertaking alters the characteristics of a property that qualify it for listing on the NRHP and diminishes the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Adverse effects on historic properties can include:

- Physical destruction, damage, or alteration of all or part of the property;
- Removal of a property from its historic location;
- Change in the character of a property's use or of physical features within a property's setting that contribute to its historic significance;
- Introduction of visual, atmospheric, or auditory elements that diminish the integrity of a property's significant historic features;
- Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance; and
- Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of a property's historic significance (36 CFR 800.5(a)(2)).

3.11.2.1 ALTERNATIVE 1: SITE 5 AND TRANSMISSION LINE RIGHT OF WAY (PREFERRED ALTERNATIVE)

DIRECT IMPACTS: There is one cemetery, Cemetery 9, located adjacent to the boundary of the Preferred Alternative (Figure 10). Cemetery 9 is thought to be associated with the Talton Cemetery. A 2010 ground penetrating radar survey indicates a high probability that graves are at this location. There are no visible grave markers, but a 1982 survey lists 15 unmarked graves. A recent survey utilizing dogs trained in locating historic human remains indicated a number of alert points that would suggest the presence of human remains. Some of the alert points are outside the current cemetery boundary. The cemetery is designated as off-limits to development along with a 30 foot buffer around the cemetery. Fort Gordon will retain unrestricted access to the cemetery for visitation and maintenance activities.

There are three sites that were identified, through previous Phase I surveys, within the project area. Site 9RI529, a lithic scatter, and Site 9RI530, which contains both 20th century artifacts and prehistoric lithics, were both determined ineligible for the NRHP during the FY92 Phase I Timber Harvest Survey. Site 9RI179, also a lithic scatter, was determined ineligible for the NRHP during a Phase I survey conducted in 2008.

Fort Gordon has surveyed the majority of the installation for cultural resources. Although the discovery of unknown cultural resources remains possible, the

installation has procedures in place to deal with inadvertent discoveries.

The transmission line portion of the project, as presented in this document, would not have any impacts on cultural resources. The transmission line gets marginally close to NRHP eligible archaeological sites in TA 7 and TA 9. In TA 7, the site, 9RI122, is approximately 200 meters away from the planned transmission line. In TA 9, site 9RI488, is approximately 190 meters from the line. As any soil disturbance related to the construction of the transmission line is so far away from the site, no impacts to either site are anticipated.

INDIRECT IMPACTS: There are no known historic structures and there are no archaeological sites that are eligible for the NRHP within the boundaries of the Preferred Alternative. Therefore, no indirect impacts are expected.

3.11.2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, archaeological sites and architectural resources would continue to be managed in accordance with Federal laws, regulations, and Army policies and procedures. No known archaeological or architectural resources would be adversely affected with the No Action Alternative.

Figure 10. Fort Gordon Cemetery at Site 5

Projection Based on:
World Geodetic System of 1984
UTM Zone 17 North
Units: Meters
1:12,238
0 100 200 Meters
0 500 1,000 Feet

Installation Boundary
Solar PV Array Site 5
Cemetery

This map was produced by the Fort Gordon Environmental Division-Natural Resources Branch.

3.12 HAZARDOUS AND TOXIC SUBSTANCES

3.12.1 AFFECTED ENVIRONMENT

Hazardous materials are substances that cause human physical or health hazards (29 CFR 1910.1200). Materials that are physically hazardous include combustible and flammable substances, compressed gases, and oxidizers. Health hazards are associated with materials that cause acute or chronic reactions, including toxic agents, carcinogens, and irritants.

The promulgation of the Toxic Substances Control Act (TSCA) (40 CFR Parts 700 to 766) represented an effort by the Federal government to address those chemical substances and mixtures for which it was recognized that the manufacture, processing, distribution, use, or disposal may present unreasonable risk of personal injury or health of the environment, and to effectively regulate these substances and mixtures in interstate commerce. The TSCA Chemical Substances Inventory lists information on more than 62,000 chemicals and substances.

The Resource Conservation and Recovery Act (RCRA) defines hazardous waste as wastes or combination of wastes that, because of quantity, concentration, or physical, chemical, or infectious characteristics, may either cause, or significantly contribute to, an increase in mortality or an increase in serous irreversible illness, or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed. All hazardous wastes are classified as solid wastes. A solid waste is any material that is disposed, incinerated, treated, or recycled except those exempted under 40 CFR 261.4.

Fort Gordon maintains a SPCCP and an ISCP. The SPCCP identifies areas that are at risk for spills that could cause harm to human health and the environment. It also lists measures that were taken to reduce or eliminate the risk of potential contamination in the event of a spill. The SPCCP was last updated in 2010 (USAGFG, 2010b). The ISCP provides information for personnel to respond to potential spills. The Fort Gordon Environmental Branch maintains the Hazardous Waste Management Plan and an installation-wide inventory of all hazardous materials and hazardous wastes. The Hazardous Waste Management Plan (HWMP) provides guidance on the management of hazardous materials and hazardous wastes (USAGFG, 2003).

Under the Installation Restoration Program (IRP), Fort Gordon conducted an Installation Assessment in 1982 that identified 36 Solid Waste Management Units (SWMUs) within the installation. Since that time, additional sites were added bringing the total to 41 SWMUs at Fort Gordon (USAGFG, 2006). There are no IRP sites within the PV Solar Array System field site. However, there are two IRP sites that are near the transmission line ROW and a third site that is under investigation.

> ***FTGD-028***: This inactive landfill is located north of 8th Avenue at 25th Street in the north-central portion of the cantonment area between the heating plant and the former skeet range. This landfill covers approximately nine vegetated acres and slopes to the north. It is unknown when this landfill opened, but closure was in 1952. Wastes deposited in this landfill most likely consisted of sanitary refuse and construction debris. No further action was received from GAEPD on July 28, 2005.
>
> ***FTGD-046***: This site of about 26.2 acres located off of 8th Avenue was a recreational skeet shooting range which was identified by the GAEPD during a

RCRA compliance inspection and subsequently identified on May 10, 2005 as an AOC in accordance with Fort Gordon's Hazardous Waste Facility Permit No. HW-081(S)-2, Section III. On Nov. 9, 2007 the GAEPD identified this site as a SWMU requiring that an RCRA Facility Investigation (RFI) be conducted. According to interviews conducted during the SWMU assessment report research and data gathering event, the site was in operation from an unknown date and closed between 1985 and 1986. The primary activity was the use of shotguns and lead shot to shoot skeet thrown from the ground into the air. Currently, data gaps exist in the RFI and a planned performance based award (PBA) being executed through the Huntsville Corps District in FY15 is expected to address these deficiencies. Soil removal actions are planned once delineation of petroleum aliphatic hydrocarbons (PAH) and lead are complete. Based on current data, PAH contamination appears to be moving from source areas down-gradient across the slope face. Erosion at the site has also complicated delineation of lead shot as it also appears to have migrated across the face of the slope.

19th Street Former Landfill: This former landfill is located off the southwest corner of the cantonment area near the intersection of 19th Street/19th Street extension. In 2003, during routine site inspections of the outfall near McCoys Creek, a debris field with characteristics of a dump site was identified. Based on visual inspection, the area appeared to contain buried construction and demolition debris. In 2009, a contract was obtained to have the US Department of the Interior, US Geological Survey (USGS) provide site investigation for several areas of concern on Fort Gordon, including the 19th Street Former Landfill. The USGS assessed the soil gas, soil, and water in the area for potential contaminants. A summary of results is in Table 4 below (USGS, 2011).

Table 4. 19th Street Landfill Analysis Summary

Sample Type	Summary of Contaminant(s)	Concentration Range of Contaminant(s)
soil gas	no detections	n/a
soil	exceedences of background for chromium, zinc, nickel, and lead in debris field	Below USEPA Regional Screening Levels (RSLs)
surface water	volatile organic compounds and semi-volatile organic compounds	0.025 micrograms/liter to 0.110 micrograms/liter
ground water	volatile organic compounds and semi-volatile organic compounds	0.024 micrograms/liter to 4.897 micrograms/liter

3.12.2 ENVIRONMENTAL CONSEQUENCES

3.12.2.1 ALTERNATIVE 1: SITE 5 AND TRANSMISSION LINE RIGHT OF WAY (PREFERRED ALTERNATIVE)

DIRECT IMPACTS: There are no SWMU sites located in the solar PV system array field, so there will be no direct impacts as a result of its construction. However, there are potential minor impacts as a result of establishing the transmission line ROW. Figure 11 shows the SWMU sites in relation to the array field and the ROW.

To mitigate potential impacts to SWMU FTGD-46, Georgia Power would maintain a 50-foot buffer between the transmission line and the site. This buffer prevents

Figure 11. Fort Gordon Environmental Restoration Areas

Projection Based on:
World Geodetic System of 1984
UTM Zone 17 North
Units: Meters
1:28,000

0 200 400 600 Meters
0 1,000 2,000 Feet

Installation Boundary
Solar PV Array Site 5

Environmental Restoration Areas
Active
Closed
19th Street Landfill - Estimated Boundary
19th Street Landfill - Debris Field

This map was produced by the Fort Gordon Environmental Division-Natural Resources Branch.

Columbia County
McDuffie County
Richmond County
Jefferson County
Burke County

inadvertent impacts and protects worker safety. FTGD-028 is a closed SWMU with well delineated boundaries. Therefore, this site will be avoided and poses no potential impacts.

The 19th Street former landfill site will require close coordination between Fort Gordon, Directorate of Public Works (DPW) Environmental Division (ED) and Georgia Power. Through site reconnaissance, geographic information system (GIS) data, and engineering design, impacts can be mitigated. The debris field area should not have any infrastructure built into it, but the overhead line could span across it at its narrowest distance. The information about the site will be disclosed to Georgia Power and their subcontractors to develop a comprehensive health and safety plan. This will identify if there is a requirement for personal protective equipment (PPE) and if the workers on site require additional Occupational Safety and Health Association (OSHA) training. Removal of soil from the site will be restricted until Fort Gordon DPW ED determines if the soil requires analytical testing.

INDIRECT IMPACTS: Minor indirect impacts may result from implementing the Preferred Alternative. Small quantity spills and leaks of fuels and oils could potentially occur from heavy equipment machinery during construction. Any spills would be responded to in accordance with Fort Gordon management plans and Federal and state laws. Designated locations would be developed for heavy equipment and/or storage of fuels/oils during project construction. This would help minimize the potential for spills and spill contamination. Additionally, Georgia Power would be responsible for having a SPCCP. The SPCCP would be designed to help prevent the discharge of oil.

There would be minimal storage and handling of hazardous materials and waste within the project footprint during construction. Storage or handling of hazardous materials and/or hazardous wastes would comply with the requirements of the Fort Gordon HWMP (CHPPM, 2003). Hazardous materials and waste will not be present on-site during operation of the solar PV system.

NO ACTION ALTERNATIVE

Under the No Action Alternative, there would be no change to the existing natural and environmental resources conditions at Fort Gordon; therefore, hazardous waste generation amounts and types would remain consistent with current conditions. No impact to hazardous and toxic substances would be anticipated under the No Action Alternative.

3.13 TRANSPORTATION

3.13.1 AFFECTED ENVIRONMENT

Fort Gordon is accessed by a number of roadways as shown in Figure 1. The major access points, Gates 1, 2 and 5, are assessed by U.S. Highway 78 (Gordon Highway) and U.S. Highway 1 (Dean's Bridge Road), respectively. As shown in Figure 1, Fort Gordon is served by a network of paved roads accessing its business and residential areas (primary roads), unpaved secondary roads, and woodland access roads (tertiary roads). Woodland access roads provide access for activities such as tree harvesting, prescribed burning and military training. The road network is composed of 92 miles of paved roads, 67 miles of unpaved roads, and 610 miles of 1 1/2-lane earthen permanent firebreaks and woodland access roads (USAGFG, 2006).

3.13.2 ENVIRONMENTAL CONSEQUENCES

3.13.2.1 ALTERNATIVE 1: SITE 5 AND TRANSMISSION LINE RIGHT OF WAY (PREFERRED ALTERNATIVE)

DIRECT IMPACTS: An increase in traffic is not anticipated due to the nature of the construction and operation of the Preferred Alternative. The solar PV system array field and the transmission line ROW would not hinder emergency access nor affect parking capacity. The developer would maintain access to the training site and the cemetery throughout construction and operation of the solar PV system. The transmission line ROW construction may have negligible temporary impacts.

INDIRECT IMPACTS: Indirect impacts to transportation would not be anticipated from implementing the Preferred Alternative.

3.13.2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, there would be no change to the existing natural and environmental resource conditions at Fort Gordon. There would be no direct or indirect adverse impacts on transportation on Fort Gordon.

3.14 UTILITIES

This section addresses Fort Gordon's utilities (potable water supply, wastewater system, stormwater system, energy sources, and communications system) and solid waste management.

3.14.1 AFFECTED ENVIRONMENT

***Potable Water*:** Fort Gordon's potable water system was privatized to the 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 Groundwater Treatment Plant (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.

***Domestic and Industrial Wastewater at Fort Gordon*:** Fort Gordon'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 GPD and currently treats approximately 34 MGD (AUD, 2009; USEPA, 2006; and USEPA, 2009a). 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 Fort Gordon WWTP was taken offline and the base connected to the Augusta-Richmond County system. Demolition of the WWTP was completed in 2011. Fort Gordon's WWTP had a design capacity of 5 MGD, although daily flow is approximately 2 MGD (USAGFG, 2010a). Treated wastewater was discharged into Spirit Creek under National Pollutant Discharge Elimination System (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. Septic tanks are used to treat sanitary wastewater at remote locations of the installation not

served by the sanitary sewer system (USAGFG, 2006). The septic systems remain Army-owned and maintained.

***Stormwater*:** The stormwater drainage system at Fort Gordon involves a series of pipes along with paved and channeled natural drainage ditches. The stormwater system also incorporates numerous paved and natural drainage swales to drain surface runoff. Fort Gordon has a Stormwater Pollution Prevention Plan (SWPPP) (USAGFG, 2006).

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 (GAEPD, 2009).

***Electricity*:** Fort Gordon's electrical service was privatized in February 2007, and is owned and operated by Georgia Power. The system receives 115 kilovolt primary input at two owned and operated substations (main and hospital), which provide electrical power to the entire installation (USACE, 2010). Fort Gordon has 13.5 MW peak shaver generators available that provide electricity during times of peak demand. However, the peak shavers are currently not being used.

***Natural Gas*:** Natural gas is provided by Atlanta Gas and Light Company, which owns the main natural gas distribution piping on Fort Gordon and all system piping and components downstream of the regulators up to the facilities. An 8-inch main runs through Fort Gordon along a dedicated 10-foot easement for the 8.5 miles of pipe (USAGFG, 2006).

***Telecommunications*:** The Army owns and operates its 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 (USACE, 2010). All telecommunications are distributed throughout the installation by buried cable and overhead lines (USAGFG, 2006).

***Solid Waste Management*:** Fort Gordon 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 (USACE, 2010). The Fort Gordon Landfill receives approximately 2,736 cubic yards of waste per year and has 121,873 cubic yards of capacity remaining, or 45 years (Georgia Department of Community Affairs, 2012).

Other solid waste is disposed of at the Augusta-Richmond County Landfill on Deans Bridge Road under contract (USACE, 2010). The landfill operates under Permit 121-018D Municipal Solid Waste Level. 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 (Georgia Department of Community Affairs, 2012).

Fort Gordon has a Qualified Recycling Program to reduce the solid waste stream, prevent pollution, and conserve natural resources. The program also produces savings in the forms of cost avoidance, extended landfill life, reduced environmental cleanup, and reduction in required solid waste disposal (USAGFG, 2007). Fort Gordon actively participates in recycling/waste minimization efforts. Metals and paper/cardboard are collected for off-Post recycling.

3.14.2 ENVIRONMENTAL CONSEQUENCES

3.14.2.1 ALTERNATIVE 1: SITE 5 AND TRANSMISSION LINE RIGHT OF WAY (PREFERRED ALTERNATIVE)

DIRECT IMPACTS:

Operational use of solar PV technology would not generate wastewater. Therefore, use of this technology would have no adverse impacts on wastewater.

The Preferred Alternative would be required to adhere to Fort Gordon's SWPPP for post-construction BMPs. In accordance with the Energy Independence and Security Act of 2007, low impact development (LID) practices will be used in order to maintain pre and post development run off coefficients to the greatest extent possible, where technically feasible. Upon meeting these requirements, no adverse impacts would be anticipated for stormwater.

Fort Gordon could realize a long-term return on investment. Fort Gordon could reduce its fossil-fuel-based energy demand commensurate with the output levels associated with solar PV output.

There would be no impacts to natural gas or telecommunications from implementing the Preferred Alternative.

The Preferred Alternative would create small amounts of solid waste during maintenance activities. Use of solar PV would be anticipated to have no adverse impacts on solid waste management.

INDIRECT IMPACTS:

Minor adverse impacts to stormwater are anticipated due to timber harvesting, which would result in increased runoff and a reduction of natural infiltration. The Georgia BMPs for Forestry would be used for mitigation of the timber harvest. BMPs such as silt fences, diversion ditches, riprap channels, water bars, and water spreaders would be used for mitigation during the construction of the solar PV system and the transmission line. The developer would mitigate natural infiltration through utilization of LID. The transmission line ROW will run adjacent to an impaired outfall south of Lane Avenue. Additional engineering controls may be needed to prevent further damage to the outfall. Fort Gordon does have plans to repair the outfall when funds become available. Upon meeting these requirements, no adverse impacts would be anticipated for stormwater. Indirect impacts to solid waste management would not be anticipated from implementing the Preferred Alternative.

3.14.2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, no construction activities would be required and the site would not be affected. Fort Gordon utility demands and operations would remain consistent with current conditions. Minor adverse impacts to utilities would be anticipated as utility upgrades and improvements in efficiency and conservation associated with the Preferred Alternative would not be implemented.

3.15 SOCIOECONOMICS

3.15.1 AFFECTED ENVIRONMENT

***Region of Influence*:** The socioeconomic ROI for this Proposed Action is defined as the Augusta, Georgia–Aiken, South Carolina Metropolitan Statistical Area (MSA) and Burke County, Georgia. The MSA includes the City of Augusta, Georgia; Richmond, Columbia,

and McDuffie counties, Georgia; and Edgefield and Aiken counties, South Carolina. The ROI is affected economically and socially by the operations at Fort Gordon. The City of Augusta is adjacent to the installation and is the primary area affected by activities at Fort Gordon. Augusta is the center for commercial, manufacturing, transportation, and medical activities of a large, bi-state area.

***Economy*:** Fort Gordon has a significant economic impact within the six-county ROI, especially in Richmond and Columbia counties. In 2013, Fort Gordon employed over 23,000 military and civilian personnel, making it the largest individual employer in Richmond and Columbia counties. The cumulative annual economic impact of Fort Gordon exceeds $2.2 billion as the result of direct and indirect employment/salaries and business sales, purchase of materials and supplies, and construction activities (USAGFG, 2014).

Fort Gordon's budget is primarily determined by the amount funded by Congress and the DA each year. There are several programs on Fort Gordon that are self-sustaining programs. These programs include the Fort Gordon Forestry Program as well as the Hunting and Fishing Program. The Hunting and Fishing Program is sustained by the sale of licenses. The Forestry Program is sustained by the sale of forest products such as timber, pine straw, and fire wood. The program is minimally supplemented by DA.

***Environmental Justice*:** EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations*, was issued by President Clinton on February 11, 1994. This EO requires that federal agencies take into consideration disproportionately high and adverse environmental effects of governmental decisions, policies, projects, and programs on minority and low-income populations.

According to the U.S. Census Bureau, minority populations composed 40.5 percent of the total population in the ROI. That is higher compared to the statewide average of 37.6 percent in Georgia, 31.7 percent in South Carolina, and the national average of 22.3 percent of the population being classified as minority population. The poverty level in the ROI was 18.8 percent, compared to the statewide averages of 17.6 percent in Georgia and 17.4 percent in South Carolina, and the national rate of 14.9 percent (USCB, 2014).

***Protection of Children*:** EO 13045, *Protection of Children from Environmental Health and Safety Risks,* issued by President Clinton on April 21, 1997, requires Federal agencies, to the extent permitted by law and mission, to identify and assess environmental health and safety risks that might disproportionately affect children. Children are present at Fort Gordon as residents and visitors (e.g., family housing, schools, and recreational facility participants). The Army takes precautions for their safety through a number of means, including, but not limited to, the use of fencing, limitations on access to certain areas, and provision of adult supervision.

3.15.2 ENVIRONMENTAL CONSEQUENCES

3.15.2.1 ALTERNATIVE 1: SITE 5 AND TRANSMISSION LINE RIGHT OF WAY (PREFERRED ALTERNATIVE)

DIRECT IMPACTS: Implementation of the Preferred Alternative would not significantly impact the regional economy or other socioeconomic issues. Also, there are no anticipated increases in the number of Fort Gordon troops or personnel; therefore, there would be no change to the installation's impact on regional economy as a result of this project. Beneficial short-term effects to the local economy during the

construction phase of the project are anticipated if local workforce is used. Overall, there will be no potential direct impacts to socioeconomics.

Implementation of this alternative would not cause adverse impacts associated with environmental justice. There are three primary considerations to be made in assessing the potential environmental justice impacts of implementing this alternative. First, as determined in the previous VEC analysis, implementation of this alternative would not cause any significant environmental impacts. Second, the non-significant impacts would not affect minority or low-income populations within the regions of influence. And third, without significant impacts and the absence of impacts on low-income or minority populations, there can be no disproportionately high and adverse impacts on those populations.

Implementation of this alternative would not cause impacts associated with the protection of children. The developer would restrict children, as well as all other unauthorized persons, from entering the solar PV system site and the transmission line ROW. Also, as determined in the previous VEC analysis, implementation of this alternative would not cause any significant environmental impacts. Therefore, there are no environmental health and safety risks that may disproportionately affect children by implementation of this alternative.

INDIRECT IMPACTS: A minor indirect impact on the Fort Gordon Forestry Program is anticipated by implementing the Preferred Alternative. The timber harvesting of more than 250 acres of forest land would have to be conducted on an accelerated schedule in order to meet the Proposed Action schedule. Because of the accelerated schedule, it would be expected that the timber harvest contract would have a lower value compared to what it would be on a normal contract schedule. Contract value will depend on what the timber market is at the time of the contract. Overall, the impacts to socioeconomics with the implementation of the Preferred Alternative are considered minor.

3.15.2.2 NO ACTION ALTERNATIVE

Implementation of the No Action Alternative is not anticipated to produce any significant adverse or beneficial impact to the socioeconomics on Fort Gordon or the ROI. There would be no adverse impacts associated with environmental justice or the protection of children.

4 CUMULATIVE IMPACTS

4.1 REGULATORY COMPLIANCE

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 Part 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* (CEQ, 1997).

Cumulative impacts result from the incremental effect of separate past, present, and reasonably foreseeable future actions on the environment, regardless of what agency or person undertakes those actions. They can accrue from individually minor but collectively significant actions taking place over an extended period of time. Taken individually, environmental damage is incremental, occurring one action at a time. However, determining the significance of the collective actions requires an understanding of their effect on the larger environment.

4.2 CUMULATIVE IMPACT ANALYSIS

The cumulative impact analysis is prepared at a level of detail that is reasonable and appropriate to support an informed decision by the Army in selecting a Preferred Alternative. To do this, it is necessary to identify those projects that may interact with the potential impacts of the alternatives. This is done by defining the greatest extent of potential impacts from the alternatives and then identifying those projects that also have impacts within that area. This is known as the cumulative impact analysis area.

Given the scale of the alternatives and the potential impacts, the cumulative impact analysis area for this EA is limited to Fort Gordon and the wetlands and watershed areas immediately downstream of the Preferred Alternative.

Having defined the cumulative impact analysis area, the past, present, and reasonably foreseeable future actions that could interact with the Proposed Action to produce cumulative impacts also must be identified. These actions are described briefly in the following sections.

The cumulative impacts on a resource become significant when the total impacts from individual projects are greater than the identified significance criterion for that resource. This determination depends on the resource being assessed and the individual project impacts on that resource.

4.3 POTENTIAL CUMULATIVE EFFECTS OF THE PROPOSED ALTERNATIVES

The cumulative effects concerns are primarily impacts to natural resources, specifically impacts to water quality and the longleaf-wiregrass ecosystem to include timber and endangered species management. Impacts are discussed further below.

Approximately 47,000 acres on Fort Gordon are managed in accordance with the INRMP. The areas not included in management are the cantonment area and range footprints within the SAIA and the AIA; primarily areas that were previously disturbed and are being re-developed or areas that are too unsafe to actively manage. Under the INRMP, Fort Gordon will remove timber for numerous reasons to include construction projects, timber harvests, and maintenance/repair type projects. In many cases, new timber is planted as sites are cleared and prepped for planting. In some cases, pine plantations are converted from one type of timber to another (i.e. slash pine to longleaf or loblolly pine) in order to restore the longleaf pine ecosystem. In other cases, an area might be thinned to the basal area that is

appropriate for the RCW to live and forage. In both of these cases, the restoration and thinning are considered improvements to the ecosystem although timber was initially removed. Table 5 shows the past, present, and future actions of timber removal or thinning within areas that are not actively managed under the INRMP (i.e. cantonment, range footprints, etc…). Table 6 shows the past, present, and future actions of timber removal, restoration, and thinning within areas that are managed for natural resources under the INRMP.

4.3.1 ALTERNATIVE 1: SITE 5 AND TRANSMISSION LINE RIGHT OF WAY (PREFERRED ALTERNATIVE)

The construction activities associated with the implementation of Alternative 1: Site 5 and Transmission Line ROW would have the potential for a slight increase in small spills or leaks of hazardous substances from construction equipment. These spills could generate small quantities of contaminated media (*i.e.*, soil, vegetation) requiring disposal. However, these impacts would be relatively minor and would be controlled through proper application of BMPs on the construction sites.

Future development within the cantonment and in the surrounding community would contribute to air emissions. However, the solar PV system would only contribute temporarily to air emissions during construction. Once the solar PV system is operational, air emissions would be minimal.

Additionally, future development and the PV solar array could increase the potential for sediment runoff and associated deposition in downstream areas. Both on and off the installation, these impacts would be controlled by proper application of state recommended and required BMPs on the construction sites. With the construction of the PV solar array the Army also requires the use of low-impact development LID technology. This will also minimize negative cumulative impacts to downstream areas.

If not coordinated with ongoing and future mission activities, continued development along the installation boundary could result in unintentional conflicts between mission requirements at the installation and development in the surrounding communities. Continued communication and coordination with neighboring local planning agencies would work to avoid such impacts to the installation mission activities. The proposed site is available for military training, although it is infrequently utilized and Fort Gordon has no future plans for increased use of this site.

In the recent past, present, and future approximately 222 acres of timber were cut and 21 acres were thinned within areas not managed under the INRMP (cantonment, AIA, etc…). Within the areas managed under the INRMP, past, present and future forestry actions include: cutting approximately 480 acres; restoring/planting approximately 3,600 acres; and thinning approximately 6,898 acres. As a result of the solar PV system construction, approximately 250 acres of timber would be removed in TA 12 representing 0.5 percent of the amount Fort Gordon must maintain in accordance with the INRMP. As a result of the transmission line ROW construction, approximately 70 acres of timber would be removed. representing less than 0.1 percent of the amount Fort Gordon must maintain in accordance with the INRMP The acres that would be cut are all within areas managed under the INRMP.

Table 7 shows the total acres cumulatively affected by past, present, and future actions within areas that are managed under the INRMP, not managed under the INRMP, and the solar PV system.

Table 5. Past, Present, and Future Actions of Timber Removal or Thinning within Areas that are not Managed under the INRMP

Project	Temporal Type of Action	Type of Forestry Action	Forestry Management Action		
			Acres Removed	Acres Restored	Acres Thinned
Construction of NSA/CSS Georgia Cryptologic Center	Past	Construction/Harvest	157	0	21
2 New Child Development Centers	Past	Construction	<5	0	0
AUD Raw Water Irrigation System	Past	Construction	<20	0	0
AIT Barracks	Past	Construction	<5	0	0
AUD Gate 1 Sewer Line	Past	Construction	<20	0	0
3rd Avenue Stormwater Improvements and Landfill Cap Project	Present	Construction/Harvest	<5	0	0
Construction of Whitelaw Hall Expansion (NSA)	Present	Construction	0	0	0
Addition to AAFES PX Exchange	Present	Construction	0	0	0
AIT Barracks (Phase 2)	Present	Construction	0	0	0
Ground Heat Transfer System	Future	Construction	0	0	0
Privatized Army Lodging Candlewood Suites	Future	Construction	0	0	0
Army Cyber Command and Control Facility	Future	Construction	0	0	0
Road to Growth Stationing Actions	Future	Construction/Potential Harvest	unknown	unknown	unknown
Tank Removal and Replacement at Building 310	Future	Construction/Harvest	<5	0	0
Eisenhower Stormwater Outfall Repair	Future	Construction/Harvest	<5	0	0
Totals			**222**	**0**	**21**

Key for Tables 5 and 6. *Construction*: Timber removed at cost of project; *Construction/Harvest*: Fort Gordon Forestry harvested the timber for a project; *Harvest*: Fort Gordon Forestry timber harvest; *Planting*: Fort Gordon Forestry planted timber where a harvest had occurred or some other action occurred that involved the loss of timber.

Table 6. Past, Present, and Future Actions of Timber Removal, Restoration, and Thinning within Areas that are Actively Managed for Natural Resources under the INRMP

Project	Temporal Type of Action	Type of Forestry Action	Forestry Management Action		
			Acres Removed	Acres Restored	Acres Thinned
Sewage Force Main	Past	Construction/Harvest	6	0	0
Hand grenade Familiarization Range/TA19	Past	Construction/Harvest	0	30	269
FY11 Timber Harvests	Past	Harvest	75	249	834
FY12 Timber Harvests	Past	Harvest	63	85	397
FY13 Timber Harvests	Present	Harvest	70	917	1,321
Modified Record Fire Upgrade Project - Range 6	Present	Construction	> 5	0	0
Relocation of Mini-Mute Site to TA38	Present	Construction/Harvest	20	0	0
Multipurpose Machine Gun Range	Present	Construction/Harvest	187	0	0
Ice Storm Pax Damaged Timber Operations	Present	Silviculture/Harvest	0	41	157
FY14 Timber Harvests	Present	Harvest	0	321	394
FY15 Timber Harvests	Future	Harvest	0	1,957	3,526
Range Construction and Operations Projects*					
Squad Defense Course	Future	Harvest/Construction	4	0	0
TA12 Troposcatter Site Improvements	Future	Harvest	6	0	0
Firing Point Rehabilitations	Future	Harvest/Construction	44.4	0	0
Totals			**480**	**3,600**	**6,898**

*Projects identified in the *US Army Garrison Fort Gordon, GA, Range Construction and Ongoing Field Training Operations Programmatic EA*.

Table 7. Cumulative Effects of Forestry Management Actions from Past, Present, and Future Actions in Addition to Alternative 1: Site 5 and Transmission Line Right of Way

Action	Forestry Management Action		
	Acres Removed	Acres Restored	Acres Thinned
Past, Present, Future Actions (INRMP & non-INRMP managed areas)	702	3,600	6,919
Alternative 1: Site 5 and Transmission Line Right of Way	250	0	0
Totals	**952**	**3,600**	**6,919**

Projects occurring on Fort Gordon (in addition to the Preferred Alternative) would be required to follow the BMPs described in this EA. If these BMPs are properly implemented and maintained for each project, there would be only minor cumulative impacts. When necessary, appropriate state and Federal agencies would be consulted, and impacts on the respective resources would be avoided by following the agency recommendations.

4.3.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the approximately 250 acres for the solar PV system would remain available for military training, although it is not currently being utilized and Fort Gordon has no future plans to use the site for military training. The installation would maintain its current power supply from Georgia Power and the installation would not utilize a sustainable energy source.

4.4 PAST ACTIONS

Past actions are defined as actions within the cumulative impacts analysis areas under consideration that occurred before August 2014 (the environmental baseline for this EA). These include past actions at Fort Gordon and past demographic, land use, and development trends in the areas that surround the installation, as generally described below:

- Training activities conducted by Fort Gordon's assigned personnel and units;
- Construction, alteration, repair, rehabilitation and maintenance of buildings, structures, site improvements, and utility systems as required ensuring that Fort Gordon is capable of meeting its training standards and military missions. Some construction activities include:
    - Construction of new Range Control Head Quarters
    - Construction of National Security Agency (NSA)/Central Security Service (CSS) Georgia Cryptologic Center
    - Augusta Utility Constructed Sewage Force Main

  Tables 5 and 6 above show how much timber was removed for each action.
- Range maintenance at Fort Gordon as necessary to ensure the long–term viability of plant growth, reduce pest and insect infestations, reduce the potential for inadvertent power outages caused by trees and tree limbs falling onto power lines, and maintain a professional, military appearance.

- Natural and cultural resources management policies and actions at Fort Gordon include the continuation of programs to reduce and eliminate damage to the environment such as the INRMP, Endangered Species Management Plan, and ICRMP, as well as ESA Section 7 Consultation with the USFWS when applicable.

4.5 PRESENT ACTIONS

Present actions are those that are taking place in the analysis area as of August 2014. These include:

- Current on-post operations at Fort Gordon, including current management and land use activities (to include natural and cultural resources)
- Current operations and training activities on the installation ranges;
- Funded construction projects at Fort Gordon. Some of these include:
    - Relocation of the Mini-Mute Site to TA 38
    - Multi-Purpose Machine Gun Range in TA 46
    - Hand Grenade Familiarization Range (refurbishment)
    - Expansion of the installation Army and Air Force Exchange Service (AAFES) Post Exchange (PX)

  Tables 5 and 6 above show how much timber is being removed for each action.

- Current resource management programs and land use activities that are being implemented by other governmental agencies and the private sector within the cumulative impact analysis areas.

4.6 REASONABLY FORESEEABLE FUTURE ACTIONS

Reasonably foreseeable future actions are limited to those that were approved and can be identified and defined with respect to timeframe and location. The actions listed below meet these criteria and are located in the cumulative impacts analysis area.

- Past and present actions discussed above would continue. Fort Gordon would continue to be used by the DoD as an operational and training post for active and reserve personnel and units.
- Facilities construction projects, similar to those listed above, would be performed in order to provide adequate training and support facilities to meet identified DoD missions. Some of these include:
    - Construction of the Army Cyber Command and Control Facility (to include a stationing with a total increase potential of up to 1,500 personnel).
    - Road to Growth Stationing Actions (to include stationings with a total increase potential of up to 6,000 personnel).
    - Fort Gordon Range Construction and Ongoing Field Training Operations.

  Tables 5 and 6 above show how much timber removal is planned for each action.

- The installation would continue to complete efficiency studies, in accordance with the Office of Management and Budget circular A-76, to determine the most efficient organization and staffing to use in the accomplishment of many administrative, maintenance, repair, and logistic functions.

- Additional agricultural and open land use areas near the installation would be converted to urban areas, primarily residential.
- Road, bridge, and ROW maintenance and construction by county and local government units would continue.
- The continued construction on new off-post residential, commercial, and industrial development, primarily near the northern boundary of the installation.
- The continuation of environmental restoration and pollution prevention activities.
- The continuation of forest management of properties in the proximate community, and the continued grazing by domestic livestock and tillage for planting of row crops.
- The continued construction of ponds and other erosion control features by farmers, developers, and other private and public organizations.
- The continued use of herbicides, pesticides, and fertilizer.

A summary of cumulative impacts expected for the Preferred Alternative and the No Action Alternative is shown in Table 8.

Table 8. Summary of the Expected Cumulative Impacts

Resource	Past Actions	Present Actions	Future Actions	Alternative 1: Site 5 and Transmission Line Right of Way (Preferred Alternative)	No Action Alternative	Cumulative Effects
Land Use & Visual Resources	Development of Fort Gordon has extensively modified land use within cantonment area.	Military installation, commercial, residential, light industrial land uses.	Growth within cantonment area in accordance with the Installation Real Property Planning Board.	Moderate adverse direct impacts would occur as a result of the timber harvest prior to construction. Minor adverse indirect impacts on land use would occur as a result of the loss of 250 acres of commercial timber production. Once the area is converted to solar panels, Fort Gordon would lose any future timber harvest revenue for at least the next 60 years (35-year lease plus 25 years to grow trees if the lease ends). Archery hunting acreage would also be lost as a result of the timber harvest. Minor adverse indirect impacts on the viewshed would occur as a result of construction and operation. The change in viewshed from a natural wooded area to a cleared area with a solar PV system and transmission line would result in minor adverse impacts.	No impacts to land use & visual resources.	None of the alternatives would significantly induce further development on or around Fort Gordon and would only minimally change land use on Fort Gordon. No cumulative impacts are anticipated as a result of any of the alternatives.

Resource	Past Actions	Present Actions	Future Actions	Alternative 1: Site 5 and Transmission Line Right of Way (Preferred Alternative)	No Action Alternative	Cumulative Effects
Air Quality	Attainment area for all criteria pollutants.	Emissions from vehicles and buildings.	Growth at Fort Gordon will result in increased traffic and emissions.	Short-term minor adverse impacts from air emissions during construction and installation. Long-term beneficial effects from indirect reductions in the use of fossil-fuel-based electricity.	Continued deterioration of air quality from the failure to implement a cleaner technology. Levels of GHG emissions would continue to increase at present rates under the status quo.	Continued attainment and no permanent increase in any criteria pollutants. No cumulative impacts to Air Quality would be anticipated as a result of any of the alternatives.
Geology & Soils	Past regional and Fort Gordon development has modified soils.	Current regional and Fort Gordon development will modify soils.	Continued development of Fort Gordon would locally impact soils.	Long-term minor adverse impacts would result from the disturbance of surface and near-surface soil horizons through heavy machinery and vehicle traverses associated with construction.	No impacts to geology and soils.	No cumulative impacts are anticipated as a result of any of the alternatives.

Resource	Past Actions	Present Actions	Future Actions	Alternative 1: Site 5 and Transmission Line Right of Way (Preferred Alternative)	No Action Alternative	Cumulative Effects
Water Resources	Surface water in cantonment and training areas moderately impacted by development and training. Wetlands in cantonment and training areas moderately impacted by development and training.	Pollution from industrial sources and training is generally minor. Impacts to wetlands in cantonment and training areas from development and training are generally minor.	Continued development of Fort Gordon would result in sedimentation from construction activities and increase in impervious surfaces. Continued training will increase lead in surface and groundwater. Impacts to wetlands in cantonment and training areas from development and training will remain generally minor through mitigation by avoidance.	Erosion from soil disturbance during construction could potentially result in runoff into surface water bodies and wetlands. There are wetlands within the boundaries of the Preferred Alternative. There are no immediate plans to fill or alter any of these wetlands as a result of the solar PV system and transmission line construction. If wetlands impacts are anticipated during the course of developing the site, appropriate permits and mitigation would apply. The transmission line route will cross wetlands, which is covered under Nationwide Permit 12. This permit covers construction, maintenance, and repair of utility lines crossing wetlands.	No impacts on water resources.	No cumulative impacts are anticipated as a result of any of the alternatives.

Resource	Past Actions	Present Actions	Future Actions	Alternative 1: Site 5 and Transmission Line Right of Way (Preferred Alternative)	No Action Alternative	Cumulative Effects
Biological Resources	Habitat and timber removal due to past regional and Fort Gordon development. Ecosystems converted back to longleaf/ wiregrass ecosystem.	Habitat and timber removal due to present regional and Fort Gordon development. Ecosystems conversion to longleaf/ wiregrass ecosystem.	Continued development of the region and Fort Gordon would require some habitat and timber removal. Continued ecosystems conversion to longleaf/wiregrass ecosystem.	Construction would involve clearing and grading approximately 250 acres for the solar PV site with limited vegetation clearing for the transmission line. The clearing and grading would increase the potential for the introduction and spread of noxious weeds. The loss of vegetation and habitat would result in the displacement of wildlife species living on the project site. Impacts would be localized and not affect regional wildlife populations. The project site is not within the RCW HMU. Segments of the transmission line will pass through forested areas and one segment will run adjacent to the HMU. There are no known gopher tortoise sites within the area of the project site.	No impacts to biological resources.	None – loss of potential habitat for RCW for duration of 35 year lease.
Cultural Resources	Possible destruction of unknown archaeological resources.	Identification and recordation of historic and cultural resources.	Continued identification and management of historic and cultural resources as well as possible inadvertent discovery of cultural resources during training and construction.	There is one cemetery, Cemetery 9, located adjacent to the boundary of the project site. There are no known historic structures and there are no archaeological sites that are eligible for the National Register of Historic Places (NRHP) within the boundaries of the project site. Possible inadvertent discovery of cultural resources during construction.	No impacts to cultural resources.	No cumulative impacts are anticipated as a result of any of the alternatives.

Resource	Past Actions	Present Actions	Future Actions	Alternative 1: Site 5 and Transmission Line Right of Way (Preferred Alternative)	No Action Alternative	Cumulative Effects
Hazardous Materials & Waste	Introduction of hazardous substances to support installation operations.	Fort Gordon manages hazardous materials and wastes through HWMP.	Continued development within Fort Gordon would result in increased use of hazardous materials and production of hazardous wastes.	Potential for a slight temporary increase in small spills or leaks of hazardous substances as a result of construction equipment.	No impacts to hazardous materials & waste.	No cumulative impacts are anticipated as a result of any of the alternatives.
Utilities	Infrastructure developed to support installation operations.	Fort Gordon continues to improve utilities.	Future development of Fort Gordon would increase the demand on Fort Gordon's infrastructure and utilities. Future demolition projects would decrease the capacity of the Gibson Road landfill.	Fort Gordon could realize a long-term return on investment. Fort Gordon would reduce its fossil-fuel-based energy demand commensurate with the output levels associated with solar PV output. Fort Gordon would meet the Purpose and Need of the project by producing renewable energy, helping to meet Army renewable energy goals. Operational use of solar PV would create small amounts of solid waste during maintenance activities. No adverse impacts are anticipated.	No impacts to utilities.	No cumulative impacts are anticipated as a result of any of the alternatives.

Resource	Past Actions	Present Actions	Future Actions	Alternative 1: Site 5 and Transmission Line Right of Way (Preferred Alternative)	No Action Alternative	Cumulative Effects
Socioeconomics	Fort Gordon contributes to local economic community.	Continued support of local economic community.	Continued development of Fort Gordon would impact local economy and services.	Potential temporary beneficial impacts to the local economy. A minor indirect impact on the Fort Gordon Forestry Program is anticipated. The timber harvesting of up to 250 acres of forest land would have to be conducted on an accelerated schedule in order to meet the proposed action schedule. Because of the accelerated schedule, it would be expected that the timber harvest contract would have a lower value compared to what it would be on a normal contract schedule.	Minor adverse impacts would occur as a result of the forgone economic benefit to the region from temporary increased spending and increase in employment.	No cumulative impacts are anticipated as a result of any of the alternatives.

5 SUMMARY AND RECOMMENDATIONS

This section summarizes the discussion of impacts in Chapter 3 and identifies the selected alternative to be implemented to fulfill the Proposed Action. This section also summarizes any necessary impact reduction activities for the selected alternative(s).

5.1 FINDINGS AND RECOMMENDATIONS

Table 9 summarizes by resource area the impacts of the alternatives discussed in this EA. As summarized in Table 9, none of the impacts identified for the Preferred Alternative assessed are significant.

After consideration of the alternatives and associated impacts, as well as any required mitigation measures and BMPs, the Army determined that no significant impacts would occur as a result of implementing the Preferred Alternative. An EIS is therefore not required to proceed with implementation of the Preferred Alternative. Thus, the Army will prepare and publish a FNSI to document this decision. This FNSI will summarize briefly why the Preferred Alternative would not significantly affect the environment and why, therefore, an EIS is not required.

5.2 PREFERRED ALTERNATIVE

Based on a review of the results of this EA, the Army has selected Alternative 1: Site 5 and Transmission Line ROW. Figure 12 shows a summary of the resource area assessed for this site. The recommendations, requirements, and restrictions detailed throughout this EA and summarized in Section 5.3 should be incorporated into the planning, construction, and operation of the solar PV system.

5.3 IMPACT REDUCTION MEASURES FOR THE PREFERRED ALTERNATIVE

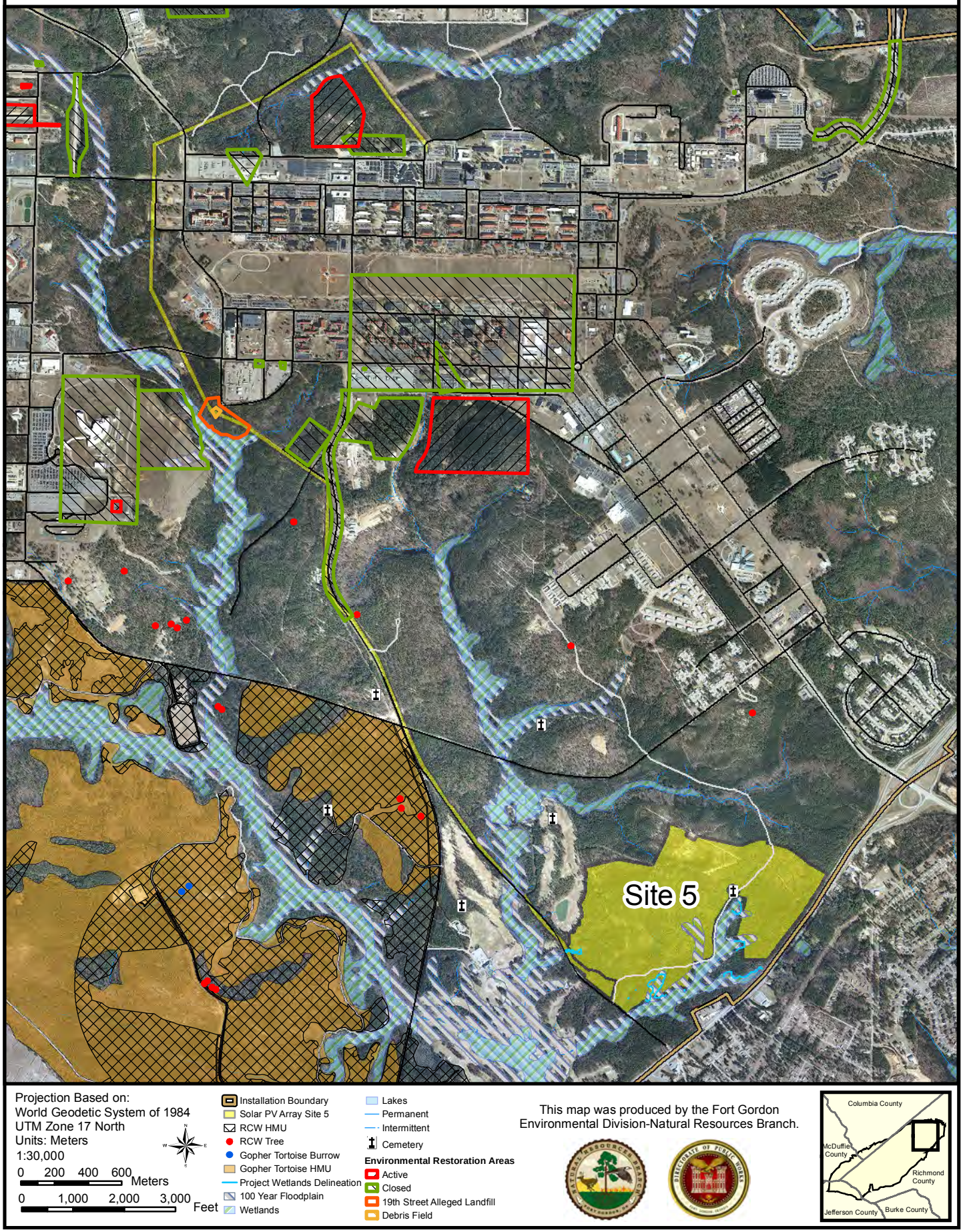
There are three types of activities that the developer could use to reduce the impact of an action on the affected environment. These are, in increasing order of regulatory importance: (1) BMPs, (2) required mitigation measures, and (3) permits, stipulations, and conditions. There are no mitigation measures required to keep any of the listed impacts below the level of being significant. There are, however, several standard BMPs that are required for any construction activities that occur on the installation. An overview of these BMPs is provided below.

5.4 BEST MANAGEMENT PRACTICES

Alternative 1: Site 5 and Transmission Line ROW would not result in significant adverse effects on the land at Fort Gordon or the surrounding area. However, reasonable and prudent measures (RPMs), BMPs, and mitigation measures would be implemented to eliminate or reduce the impacts of the non-significant effects. These measures include the following, in order of preference:

- Avoid the effect by stopping or modifying the Proposed Action.
- Minimize impacts by limiting the degree of magnitude of the action and its implementation.
- Reduce or eliminate the effect over time via maintenance operations.
- Remedy the effect by repairing, rehabilitating, or restoring the affected environment.
- Replace or provide substitute resources.

Figure 12. Fort Gordon Site 5 Environmental Constraints



Fort Gordon would use a wide range of ongoing environmental management programs, BMPs, standard operating procedures, monitoring programs, and permit compliance procedures to minimize the type and magnitude of adverse effects identified in this EA.

RPMs and BMPs included as part of Alternative 1: Site 5 and Transmission Line ROW are summarized below.

- Clearing and grubbing would be timed with construction to minimize the exposure of cleared surfaces. Such activities would not be conducted during periods of wet weather. Construction activities would be staged to allow for the stabilization of disturbed soils.
- Fugitive dust-control techniques such as watering and stockpiling would be used to minimize adverse effects. All such techniques would conform with the applicable regulations.
- Erosion and sediment control measures such as soil erosion-control mats, silt fences, straw bales, diversion ditches, riprap channels, water bars, water spreaders, and hardened stream crossings, would be used as appropriate.
- A *NPDES General Permit for Stormwater Discharges from Construction Activities*, site-specific Sediment and Erosion Control Plans, and SWPPPs would be prepared to minimize potential erosion and sedimentation during the construction.
- The developer would mitigate natural infiltration through utilization of LID.
- Provisions would be taken to prevent pollutants from reaching soil, groundwater, or surface water. These provisions include the Fort Gordon SPCCP, Fort Gordon Facility Response Plan, and standard wellhead protection measures. During project activities, contractors would be required to perform daily inspections of equipment, maintain appropriate spill-containment materials onsite, and store all fuels and other materials in appropriate containers. Equipment maintenance activities would not be conducted on the construction site.
- Any operations involving navigable water, stream crossings, or jurisdictional wetlands would be coordinated with Fort Gordon and the U.S. Army Corps of Engineers (USACE). All required USACE permits for any stream (navigable waters) or wetland impacts would be obtained prior to any work efforts with potential impacts.

Mitigation measures included as part of Alternative 1: Site 5 and Transmission Line ROW are summarized below.

- Should suspected cultural resources be discovered during demolition, site preparation, or excavation, work would stop immediately and measures would be taken to secure the area and prevent disturbance of the suspected cultural resources. The suspected cultural resources would be evaluated for NRHP-eligibility with the Georgia SHPO in accordance with Section 106 of the NHPA and the NRHP Federal Program (36 CFR 60.4).

Table 9. Summary of Potential Environmental and Socioeconomic Impacts

Resource	Potential Environmental Impacts Resulting from the Preferred Alternative	Mitigation to Negate Impacts from the Preferred Alternative	Summary of Impacts (see Section 3.1.2 for definitions of the types of impacts)	
			Alternative 1: Site 5 and Transmission Line Right of Way (Preferred Alternative)	No Action Alternative
Land Use & Visual Resources				
Land Use & Visual Resources	Direct Impacts: Moderate adverse impacts would occur as a result of the timber harvest prior to construction.		**Moderate**	None
	Indirect Impacts: Minor adverse indirect impacts on land use would occur as a result of the loss of 250 acres of commercial timber production. Once the area is converted to solar panels, Fort Gordon would lose any future timber harvest revenue for at least the next 60 years (35-year lease plus 25 years to grow trees if the lease ends). Archery hunting acreage would also be lost as a result of the timber harvest. Minor adverse indirect impacts on the viewshed would occur as a result of construction and operation. The change in viewshed from a natural wooded area to a cleared area with a solar PV system and transmission line would result in minor adverse impacts.		**Minor**	None
Airspace				
Airspace	Direct Impacts: None		None	None
	Indirect Impacts: None		None	None

Noise				
Noise	Direct Impacts: Noise is expected from timber harvesting in the forested area, vegetation clearing, and construction. Short-term minor adverse effects near the construction sites could result from the use of heavy equipment. Operation of the solar panels would result in no impacts on the noise environment since the PV panels would operate in silent mode.	Heavy construction equipment would operate only during daylight hours and would be maintained to the manufacturer's specifications to minimize noise impacts.	**Minor**	None
	Indirect Impacts: None		None	None
Radio Frequency & Spectrum Use				
Radio Frequency & Spectrum Use	Direct Impacts: The solar PV system array site would have no impact. The transmission line could have minor impacts on communication missions on Fort Gordon.	Transmission line ROW has been adjusted in accordance to the needs of Fort Gordon mission through consultation with stakeholders.	**Minor**	None
	Indirect Impacts: None		None	None
Air Quality				
Air Quality	Direct Impacts: Short-term minor adverse impacts from air emissions during construction and installation. The primary source of air pollutants during construction would be attributed to the movement and operation of construction equipment.	Fugitive dust would be mitigated with water and the covering of open-bodied trucks.	**Minor**	None
	Indirect Impacts: Long-term beneficial effects from indirect reductions in the use of fossil-fuel-based electricity.		**Beneficial**	**Minor**
Geology & Soils				
Geology & Soils	Direct Impacts: Ground disturbance would be necessary to construct the solar PV system and would directly impact soils. Long-term minor adverse impacts would result from the disturbance of surface and near-surface soil horizons through heavy machinery and vehicle traverses associated with construction. During operation, no adverse impacts to geology & soils are anticipated.	The developer would use BMPs for sedimentation and erosion such as soil erosion-control mats, silt fences, straw bale dikes, diversion ditches, riprap channels, water bars, and water spreaders.	**Minor**	None
	Indirect Impacts: During construction, inadvertent releases of chemicals, oils, or solvents into surrounding soils could eventually migrate into the underlying groundwater.	The developer would employ BMPs during construction activities to minimize the potential for contaminants to be released into the soil and the groundwater. The developer would follow procedures required in the Fort Gordon SPCCP and ISCP.	**Minor**	None

Water Resources				
Groundwater	Direct Impacts: Changing 250 acres of forested land to a solar array field could alter site hydrology. Transmission line installation of utility poles and ROW establishment would be negligible impacts to groundwater.	In accordance with the Energy Independence and Security Act, LID practices will be used in order to maintain pre and post development run off coefficients to the greatest extent possible, where technically feasible. Stormwater will be more likely to infiltrate to the recharge area as a result of the installation of LID practices.	**Minor**	None
	Indirect Impacts: During construction, inadvertent releases of chemicals, oils, or solvents into the trench or surrounding soils could eventually migrate into the underlying groundwater.	The developer would employ BMPs during construction activities to minimize the potential for contaminants to be released into the soil and the groundwater. The developer would follow procedures required in the Fort Gordon SPCCP and ISCP.	**Minor**	None
Surface Water	Direct Impacts: None		None	None
	Indirect Impacts: Erosion from soil disturbance and inadvertent releases of chemicals, oils, or solvents during construction could potentially result in runoff into surface water bodies.	The developer would use BMPs for sedimentation and erosion control such as soil erosion-control mats, silt fences, diversion ditches, riprap channels, water bars, and water spreaders. Therefore, anticipated adverse impacts would be temporary and minor.	**Minor**	None
Wetlands	Direct Impacts: There are wetlands within the boundaries of the Preferred Alternative. There are no immediate plans to fill or alter any of these wetlands as a result of the solar PV system construction.	If wetlands impacts are anticipated during the course of developing the site, appropriate permits and mitigation would apply. The transmission line route will cross wetlands, which is covered under Nationwide Permit 12. This permit covers construction, maintenance, and repair of utility lines crossing wetlands.	**Minor**	None
	Indirect Impacts: Erosion from soil disturbance during construction could potentially result in runoff and sediment accumulation in wetlands.	BMPs such as soil erosion-control mats, silt fences, straw bale dikes, diversion ditches, riprap channels, water bars, and water spreaders would be used during construction to minimize erosion, sedimentation, and the potential for contaminants to be released. Therefore, anticipated adverse impacts would be temporary and minor.	**Minor**	None
Floodplains	Direct Impacts: The impacts to floodplains would be during construction and anticipated to be temporary. The transmission line would be stabilized with appropriate vegetative cover at the close of construction.		None	None

	Indirect Impacts: There are floodplains adjacent to Site 5. The transmission line ROW will cross only a small amount of floodplains.	The transmission line ROW impacts to floodplains would be during construction and anticipated to be temporary. Both site 5 and ROW would be stabilized with appropriate vegetative cover at the close of construction.	**Minor**	None
Biological Resources				
Flora	Direct Impacts: Construction would involve clearing and grading approximately 250 acres for the solar PV site with limited vegetation clearing for the transmission line, which would increase the potential for the introduction and spread of noxious weeds.	Fort Gordon has a program to control noxious weeds that includes the stabilization of disturbed areas with native seed or other approved plantings. Therefore, minor adverse impacts would be anticipated.	**Minor**	None
	Indirect Impacts: None		None	None
Fauna	Direct Impacts: The loss of vegetation and habitat would result in the displacement of wildlife species living on the project site. Impacts would be localized and not affect regional wildlife populations.		**Minor**	None
	Indirect Impacts: During construction, inadvertent releases of chemicals, oils, or solvents surrounding soils could eventually migrate into surface water bodies, which could affect wildlife.	The developer would employ BMPs during construction activities to minimize the potential for contaminants to be released into the soil, groundwater, and surface water. The developer would follow procedures required in the Fort Gordon SPCCP and ISCP.	None	None
T&E and other sensitive species	Direct Impacts: The project site is not within the RCW HMU. The site is forested but forestry management practices, such as prescribed burning and timber thinning, have not been applied in recent years. As a result, the area is currently not suitable RCW habitat. Segments of the transmission line will pass through forested areas and one segment will run adjacent to the HMU. There are no known gopher tortoise sites within the area of the project site.	The area must be surveyed to ensure that no active RCW cavities were established. Fort Gordon would follow gopher tortoise management guidelines in Appendix H of the INRMP (USAGFG, 2008a). Seasonal restrictions for tree and brush clearing would limit impacts to migratory bird species. With careful planning and avoiding clearing suitable migratory bird habitat during the nesting season (i.e., April 1 – July 31), adverse impacts would be avoided.	**Minor**	None
	Indirect Impacts: None		None	None

Cultural Resources				
Cultural Resources	Direct Impacts: There is one cemetery, Cemetery 9, located adjacent to the boundary of the project site. There are no known historic structures and there are no archaeological sites that are eligible for the National Register of Historic Places (NRHP) within the boundaries of the project site.	The cemetery is designated as off-limits to development along with a 30 foot buffer around the cemetery. Access to the cemetery must be maintained throughout construction and operation of the solar PV system. Fort Gordon has surveyed the majority of the installation for cultural resources. Although the discovery of unknown cultural resources remains possible, the Installation has procedures in place to deal with inadvertent discoveries.	None	None
	Indirect Impacts: None		None	None
Hazardous Materials & Waste				
Hazardous Materials & Waste	Direct Impacts: There are no IRP sites within the PV Solar Array System field site. However, there are two IRP sites that are near the transmission line ROW and a third site that is under investigation.	To mitigate potential impacts to SWMU site FTGD-46, Georgia Power would maintain a 50-foot buffer between the transmission line and the site. SWMU site FTGD-28 is closed and will be avoided. 19th Street landfill will be engineered to not impact debris field. Contaminant levels were found to be low. Health and safety plan will be implemented during construction.	**Minor**	None
	Indirect Impacts: Minor spills and leaks of fuels and oils could occur from heavy equipment machinery during construction. There would be minimal storage and handling of hazardous materials and waste within the project site during construction only.	Implement preventive measures identified in the SPCCP and follow procedures identified in the Installation Spill Prevention and Response Plan. Storage or handling of hazardous materials and waste would comply with the requirements of the Fort Gordon HWMP..	**Minor**	None
Transportation				
Transportation	Direct Impacts: An increase in traffic is not anticipated due to the nature of the construction and operation of the solar PV system. The Preferred Alternative would not hinder emergency access nor affect parking capacity.		None	None
	Indirect Impacts: None		None	None
Utilities				
Potable Water	Direct Impacts: None		None	None
	Indirect Impacts: None		None	None

Wastewater	Direct Impacts: None		None	None
	Indirect Impacts: None		None	None
Stormwater	Direct Impacts: None		None	None
	Indirect Impacts: Minor adverse impacts to stormwater are anticipated due to timber harvesting, which would result in increased runoff on the highly erodible soils prior to the construction of the solar PV system and transmission line.	The Georgia BMPs for Forestry would be used for mitigation of the timber harvest. BMPs such as soil erosion-control mats, silt fences, straw bale dikes, diversion ditches, riprap channels, water bars, and water spreaders would be used during construction of the solar PV system and transmission line to minimize erosion and sedimentation. The solar PV site would be required to adhere to Fort Gordon's SWPPP for post-construction BMPs. The developer would mitigate natural infiltration through utilization of Low Impact Development (LID).	**Minor**	None
Electricity	Direct Impacts: Fort Gordon could realize a long-term return on investment. Fort Gordon would reduce its fossil-fuel-based energy demand commensurate with the output levels associated with solar PV output.		**Beneficial**	**Minor**
	Indirect Impacts: None		None	None
Solid Waste Management	Direct Impacts: Operational use of solar PV would create small amounts of solid waste during maintenance activities. No adverse impacts are anticipated.		None	None
	Indirect Impacts: None		None	None

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APPENDIX A:

APPLICABLE LAWS, REGULATIONS, POLICIES, AND PLANNING CRITERIA

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APPLICABLE LAWS, REGULATIONS, POLICIES, AND PLANNING CRITERIA

When considering the affected environment, physical, biological, economic, and social factors must be considered. In addition to the National Environmental Policy Act (NEPA), the following environmental laws and Executive Orders (EOs) are applicable to the Proposed Action and are considered in this EA. These laws and EOs are briefly summarized below.

NOISE

The Environmental Noise Management Program, in *Army Regulation 200-1 Environmental Protection and Enhancement*, is the Army's guidance for managing noise. The goal of the program is to control environmental noise to protect the health and welfare of people on and off-Post.

LAND USE

Land use guidelines established by the U.S. Department of Housing and Urban Development and based on findings of the Federal Interagency Committee on Noise (FICON) recommend acceptable levels of noise exposure for specific land uses.

AIR QUALITY

The Clean Air Act (CAA) of 1970, and Amendments of 1977 and 1990, recognizes that increases in air pollution result in danger to public health and welfare. To protect and enhance the quality of national air resources, the CAA authorizes the U.S. Environmental Protection Agency (USEPA) to set six National Ambient Air Quality Standards (NAAQS) regulating carbon monoxide, lead, nitrogen dioxide, ozone, sulfur dioxide, and particulate matter pollution emissions. The CAA seeks to reduce or eliminate the creation of pollutants at their source, and delegates this responsibility to state and local governments. States are directed to use financial and technical assistance as well as leadership from the Federal government to develop implementation plans to achieve NAAQS. The USEPA has established geographic regions for air quality planning purposes are designated as Air Quality Control Regions (AQCR). These AQCRs are officially classified by USEPA as being in attainment or nonattainment for pollutants in relation to their compliance with NAAQS. Pollutant concentration levels are measured at designated monitoring stations within the AQCR. An area with insufficient monitoring data is designated as unclassifiable and is classified as being attainment. Section 309 of the CAA authorizes USEPA to review and comment on impact statements prepared by other agencies.

An agency should consider what effect an action might have on NAAQS due to short-term increases in air pollution during construction as well as long-term increases resulting from changes in traffic patterns. For actions in attainment areas, a Federal agency might also be subject to USEPA's Prevention of Significant Deterioration regulations. These regulations apply to new major stationary sources and modifications to such sources. Although few agency facilities will actually emit pollutants, increases in pollution can result from a change in traffic patterns or volume. Section 118 of the CAA waives Federal immunity from complying with the CAA and states that all Federal agencies will comply with all Federal, state, interstate and local requirements.

WATER RESOURCES

The Clean Water Act (CWA) of 1977 is an amendment to the Federal Water Pollution Control Act of 1972, is administered by USEPA, and sets the basic structure for regulating discharges of pollutants into U.S. waters. The CWA requires USEPA to establish water quality standards for specific contaminants in surface waters and forbids the discharge of pollutants from a point source into navigable waters without a National Pollutant Discharge Elimination System (NPDES) permit. Section 404 of the CWA establishes a Federal program to regulate the

discharge of dredge and fill material into waters of the United States. Section 404 permits are issued by the U.S. Army Corps of Engineers. Waters of the United States include interstate and intrastate lakes, rivers, streams, and wetlands, which are used for commerce, recreation, industry, sources of fish, and other purposes. The objective of the CWA is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. Each agency should consider the impact on water quality from actions such as the discharge of dredge or fill material into U.S. waters from construction, or the discharge of pollutants as a result of facility operation.

The Coastal Zone Management Act (CZMA) of 1972 declares a National policy to preserve, protect, and develop, and, where possible, restore or enhance the resources of the Nation's coastal zone. The coastal zone refers to the coastal waters and the adjacent shorelines including islands, transitional and intertidal areas, salt marshes, wetlands, and beaches, including those around the Great Lakes. The CZMA encourages states to exercise their full authority over the coastal zone, through the development of land and water use programs in cooperation with Federal and local governments. States may apply for grants to help develop and implement management programs to support wise use of the land and water resources in the coastal zone. Development projects affecting land or water use or natural resources of a coastal zone, must ensure the project is, to the maximum extent practicable, consistent with the state's coastal zone management program.

The Safe Drinking Water Act (SDWA) of 1974 establishes a Federal program to monitor and increase the safety of all commercially and publicly supplied drinking water. Congress amended the SDWA in 1986, mandating dramatic changes in nationwide safeguards for drinking water and establishing new Federal enforcement responsibility on the part of USEPA. The 1986 amendments to the SDWA require USEPA to establish Maximum Contaminant Levels (MCLs), Maximum Contaminant Level Goals (MCLGs), and Best Available Technology (BAT) treatment techniques for organic, inorganic, radioactive, and microbial contaminants; and turbidity. MCLGs are maximum concentrations below which no negative human health effects are known to exist. The 1996 amendments set Federal MCLs, MCLGs, and BATs for organic, inorganic, microbiological, and radiological contaminants in public drinking water supplies.

The Wild and Scenic Rivers Act of 1968 provides for a wild and scenic river system by recognizing the remarkable values of specific rivers of the Nation. These selected rivers and their immediate environment are preserved in a free-flowing condition, without dams or other construction. The policy not only protects the water quality of the selected rivers but also provides for the enjoyment of present and future generations. Any river in a free-flowing condition is eligible for inclusion, and can be authorized as such by an Act of Congress, an act of state legislature, or by the Secretary of the Interior upon the recommendation of the Governor of the state(s) through which the river flows.

EO 11988, Floodplain Management, May 24, 1977, directs agencies to consider alternatives to avoid adverse effects and incompatible development in floodplains. An agency may locate a facility in a floodplain if the head of the agency finds there is no practicable alternative. If it is found there is no practicable alternative, the agency must minimize potential harm to the floodplain, and circulate a notice explaining why the action is to be located in the floodplain prior to taking action. Finally, new construction in a floodplain must apply accepted flood-proofing and flood protection to include elevating structures above the base flood level rather than filling in land.

BIOLOGICAL RESOURCES

The Endangered Species Act (ESA) of 1973 establishes a Federal program to conserve, protect, and restore threatened and endangered plants and animals and their habitats. The

ESA specifically charges Federal agencies with the responsibility of using their authority to conserve threatened and endangered species. All Federal agencies must ensure any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of an endangered or threatened species or result in the destruction of critical habitat for these species, unless the agency has been granted an exemption. The Secretary of the Interior, using the best available scientific data, determines which species are officially endangered or threatened, and the U.S. Fish and Wildlife Service (USFWS) maintains the list. A list of Federal endangered species can be obtained from the Endangered Species Division, USFWS (703-358-2171). States might also have their own lists of threatened and endangered species which can be obtained by calling the appropriate state fish and wildlife office. Some species, such as the bald eagle, also have laws specifically for their protection (e.g., Bald Eagle Protection Act).

The Migratory Bird Treaty Act (MBTA) of 1918, amended in 1936, 1960, 1968, 1969, 1974, 1978, 1986, and 1989, implements treaties and conventions between the United States, Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. Unless otherwise permitted by regulations, the MBTA makes it "unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill; attempt to take, capture, or kill; possess, offer for sale, sell, offer to barter, barter, offer to purchase, purchase, deliver for shipment, ship, export, import; cause to be shipped, exported, or imported; deliver for transportation, transport or cause to be transported, carry or cause to be carried, or receive for shipment, transportation, carriage, or export, any migratory bird, any part, nest, or eggs of any such bird, or any product, whether or not manufactured, which consists, or is composed in whole or part, of any such bird or any part, nest, or egg (16 USC 703)." The MBTA also makes it unlawful to ship, transport, or carry from one state, territory, or district to another, or through a foreign country, any bird, part, nest, or egg that was captured, killed, taken, shipped, transported, or carried contrary to the laws from where it was obtained; and import from Canada any bird, part, nest, or egg obtained contrary to the laws of the province from which it was obtained. The U.S. Department of the Interior has authority to arrest, with or without a warrant, a person violating the MBTA.

EO 13186, Conservation of Migratory Birds, January 10, 2001, creates a more comprehensive strategy for the conservation of migratory birds by the Federal government. The EO provides a specific framework for the Federal government's compliance with its treaty obligations to Canada, Mexico, Russia, and Japan. The EO provides broad guidelines on conservation responsibilities and requires the development of more detailed guidance in a Memorandum of Understanding (MOU). The EO will be coordinated and implemented by the USFWS. The MOU will outline how Federal agencies will promote conservation of migratory birds. The EO requires the support of various conservation planning efforts already in progress; incorporation of bird conservation considerations into agency planning, including NEPA analyses; and reporting annually on the level of take of migratory birds.

EO 11514 Protection and Enhancement of Environmental Quality, March 5, 1970, states that the President, with assistance from the Council on Environmental Quality (CEQ), will lead a national effort to provide leadership in protecting and enhancing the environment for the purpose of sustaining and enriching human life. Federal agencies are directed to meet national environmental goals through their policies, programs, and plans. Agencies should also continually monitor and evaluate their activities to protect and enhance the quality of the environment. Consistent with NEPA, agencies are directed to share information about existing or potential environmental problems with all interested parties, including the public, in order to obtain their views.

EO 11990, Protection of Wetlands, May 24, 1977, directs agencies to consider alternatives to avoid adverse effects on and incompatible development in wetlands. Federal agencies are to

avoid new construction in wetlands, unless the agency finds there is no practicable alternative to construction in the wetland, and the proposed construction incorporates all possible measures to limit harm to the wetland. Agencies should use economic and environmental data, agency mission statements, and any other pertinent information when deciding whether or not to build in wetlands. EO 11990 directs each agency to provide for early public review of plans for construction in wetlands.

CULTURAL RESOURCES

The National Historic Preservation Act (NHPA) of 1966 sets forth national policy to identify and preserve properties of state, local, and national significance. The NHPA establishes the Advisory Council on Historic Preservation (ACHP), State Review Boards and State Historic Preservation Officers (SHPOs), and the National Register of Historic Places (NRHP). ACHP advises the President, Congress, and Federal agencies on historic preservation issues. Section 106 of the Act directs Federal agencies to take into account effects of their undertakings (actions and authorizations) on properties included in or eligible for the NRHP. Section 110 sets inventory, nomination, protection, and preservation responsibilities for federally-owned cultural properties. Section 106 of the Act is implemented by regulations of the ACHP, 36 CFR Part 800. Agencies should coordinate studies and documents prepared under Section 106 with NEPA where appropriate. However, NEPA and NHPA are separate statutes and compliance with one does not constitute compliance with the other. For example, actions which qualify for a categorical exclusion under NEPA might still require Section 106 review under NHPA. It is the responsibility of the agency official to identify properties in the area of potential effects, and whether they are included or eligible for inclusion in the NRHP. Section 110 of the NHPA requires Federal agencies to identify, evaluate, and nominate historic property under agency control to the NRHP.

The American Indian Religious Freedom Act of 1978 and Amendments of 1994 recognize that freedom of religion for all people is an inherent right, and traditional American Indian religions are an indispensable and irreplaceable part of Indian life. It also recognized the lack of Federal policy on this issue and made it the policy of the United States to protect and preserve the inherent right of religious freedom for Native Americans. The 1994 Amendments provide clear legal protection for the religious use of peyote cactus as a religious sacrament. Federal agencies are responsible for evaluating their actions and policies to determine if changes should be made to protect and preserve the religious and cultural rights and practices of Native Americans. These evaluations must be made in consultation with native traditional religious leaders.

The Archaeological Resource Protection Act (ARPA) of 1979 protects archaeological resources on public and Indian lands. It provides felony-level penalties for the unauthorized excavation, removal, damage, alteration, or defacement of any archaeological resource, defined as material remains of past human life or activities which are at least 100 years old. Before archaeological resources are excavated or removed from public lands, the Federal land manager must issue a permit detailing the time, scope, location, and specific purpose of the proposed work. ARPA also fosters the exchange of information about archaeological resources between governmental agencies, the professional archaeological community, and private individuals. ARPA is implemented by regulations found in 43 CFR Part 7.

The Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 establishes rights of Indian tribes to claim ownership of certain “cultural items,” defined as Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony, held or controlled by Federal agencies. Cultural items discovered on federal or tribal lands are, in order of primacy, the property of lineal descendants, if these can be determined; property of the tribe

owning the land where the items were discovered; and then property of the tribe with the closest cultural affiliation with the items. Discoveries of cultural items on Federal or tribal land must be reported to the appropriate Indian tribe and the Federal agency with jurisdiction over the land. If the discovery is made as a result of a land use, activity in the area must stop and the items must be protected pending the outcome of consultation with the affiliated tribe.

EO 11593, Protection and Enhancement of the Cultural Environment, May 13, 1971, directs the Federal government to provide leadership in the preservation, restoration, and maintenance of the historic and cultural environment. Federal agencies are required to locate and evaluate all Federal sites under their jurisdiction or control which might qualify for listing on the NRHP. Agencies must allow the ACHP to comment on the alteration, demolition, sale, or transfer of property which is likely to meet the criteria for listing as determined by the Secretary of the Interior in consultation with the SHPO. Agencies must also initiate procedures to maintain federally-owned sites listed on the NRHP.

EO 13007, Indian Sacred Sites, May 24, 1996, provides that agencies managing Federal lands, to the extent practicable, permitted by law, and not inconsistent with agency functions, shall accommodate Indian religious practitioners' access to and ceremonial use of Indian sacred sites, shall avoid adversely affecting the physical integrity of such sites, and shall maintain the confidentiality of such sites. Federal agencies are responsible for informing tribes of proposed actions that could restrict future access to or ceremonial use of, or adversely affect the physical integrity of, sacred sites.

EO 13287, Preserve America, March 3, 2003, orders the Federal government to take a leadership role in protection, enhancement, and contemporary use of historic properties owned by the Federal government, and promote intergovernmental cooperation and partnerships for preservation and use of historic properties. The EO established new accountability for agencies with respect to inventories and stewardship.

SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, February 11, 1994, directs Federal agencies to make achieving environmental justice part of their mission. Agencies must identify and address adverse human health and environmental effects its activities have on minority and low-income populations, and develop agency wide environmental justice strategies. The strategy must list "programs, policies, planning and public participation processes, enforcement, and/or rulemakings related to human health or the environment that should be revised to promote enforcement of all health and environmental statutes in areas with minority populations and low-income populations, ensure greater public participation, improve research and data collection relating to the health and environment of minority populations and low-income populations, and identify differential patterns of consumption of natural resources among minority populations and low-income populations." A copy of the strategy and progress reports must be provided to the Federal Working Group on Environmental Justice. Responsibility for compliance with this EO lies with each Federal agency.

HAZARDOUS MATERIALS AND WASTE

The Resource Conservation and Recovery Act (RCRA) of 1976 is an amendment to the Solid Waste Disposal Act. RCRA authorizes USEPA to provide for "cradle-to-grave" management of hazardous waste and sets a framework for the management of nonhazardous municipal solid waste. Under RCRA, hazardous waste is controlled from generation to disposal through tracking and permitting systems, and restrictions and controls on the placement of waste on or into the land. Under RCRA, a waste is defined as hazardous if it is ignitable, corrosive, reactive,

toxic, or listed by USEPA as being hazardous. With *The Hazardous and Solid Waste Amendments (HSWA) of 1984,* Congress targeted stricter standards for waste disposal and encouraged pollution prevention by prohibiting the land disposal of particular wastes. The HSWA amendments strengthen control of both hazardous and nonhazardous waste and emphasize the prevention of pollution of groundwater.

The Toxic Substance Control Act (TSCA) of 1976 consists of four titles. Title I established requirements and authorities to identify and control toxic chemical hazards to human health and the environment. TSCA authorizes USEPA to gather information on chemical risks, require companies to test chemicals for toxic effects, and regulate chemicals with unreasonable risk. TSCA also singles out polychlorinated biphenyls (PCBs) for regulation, and, as a result, PCBs are being phased out. TSCA and its regulations govern the manufacture, processing, distribution, use, marking, storage, disposal, and cleanup; and release reporting requirements for numerous chemicals like PCBs. PCBs are persistent when released into the environment and accumulate in the tissues of living organisms. They have been shown to cause adverse health effects on laboratory animals and might cause adverse health effects on humans. TSCA Title II provides statutory framework for "Asbestos Hazard Emergency Response," which applies only to schools. TSCA Title III, "Indoor Radon Abatement," states that indoor air in U.S. buildings should be as free of radon as the outside ambient air. Federal agencies are required to conduct studies on the extent of radon contamination in buildings they own. TSCA Title IV, "Lead Exposure Reduction," directs Federal agencies to "conduct a comprehensive program to promote safe, effective, and affordable monitoring, detection, and abatement of lead based paint and other lead exposure hazards." Further, any Federal agency with jurisdiction over a property or facility must comply with all Federal, state, interstate, and local requirements concerning lead-based paint.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 authorizes USEPA to respond to spills and other releases of hazardous substances to the environment, and authorizes the National Oil and Hazardous Substances Pollution Contingency Plan. CERCLA also provides a Federal "Superfund" to respond to emergencies immediately. Although the "Superfund" provides funds for cleanup of sites where potentially responsible parties cannot be identified, USEPA is authorized to recover funds through damages collected from responsible parties. This funding process places the economic burden for cleanup on polluters.

The Superfund Amendments and Reauthorization Act (SARA) of 1986 mandates strong clean-up standards, and authorizes USEPA to use a variety of incentives to encourage settlements. Title III of SARA authorizes the *Emergency Planning and Community Right to Know Act (EPCRA)*, which requires facility operators with "hazardous substances" or "extremely hazardous substances" to prepare comprehensive emergency plans and to report accidental releases. *EO 12856, Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements, August 3, 1993,* requires Federal agencies to comply with the provisions of EPCRA. If a Federal agency acquires a contaminated site it can be held liable for the cleanup as the property owner/operator. A Federal agency can also incur liability if it leases a property, as the courts have found lessees liable as "owners." However, if the agency exercises due diligence by conducting a Phase I Environmental Site Assessment, it may claim the "innocent purchaser" defense under CERCLA. According to Title 42 U.S. Code (U.S.C.) 9601(35), to use this defense, the current owner/operator must show that it undertook "all appropriate inquiry into the previous ownership and uses of the property consistent with good commercial or customary practice" before buying the property.

The Pollution Prevention Act (PPA) of 1990 encourages manufacturers to avoid the generation of pollution by modifying equipment and processes, redesigning products, substituting raw

materials, and making improvements in management techniques, training, and inventory control. EO 12856 requires Federal agencies to comply with the provisions of the PPA and ensure all necessary actions are taken to prevent pollution. In addition, in Federal Register Volume 58 Number 18 (January 29, 1993), CEQ provides guidance to Federal agencies on how to "incorporate pollution prevention principles, techniques, and mechanisms into their planning and decision making processes and to evaluate and report those efforts, as appropriate, in documents pursuant to NEPA."

APPENDIX B:

AGENCY/STAKEHOLDER CORRESPONDENCE

SAMPLE SCOPING LETTER

AND

AGENCY RESPONSES

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DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY GARRISON
307 CHAMBERLAIN AVENUE
FORT GORDON, GEORGIA 30905-5730

REPLY TO
ATTENTION OF:

IMGO-PWE 8 July 2014

Environmental Division

US Fish and Wildlife Service
Ecological Services Office
Attn: Debbie Harris
105 Westpark Drive, Suite D
Athens, GA 30606

RE: Request for information and notification of the preparation of an Environmental Assessment (EA) for the proposed Photovoltaic Generating Systems at Fort Gordon, GA

Dear Ms. Harris:

The U.S. Army Energy Initiatives Task Force (EITF) and Georgia Power are proposing the development of a 30 megawatt, alternating current, photovoltaic (PV) solar array system to be located at Fort Gordon. The purpose of this project is to aid the Army's renewable energy goals.

Under the proposed action, the Army will enter into a 35-year easement with Georgia Power that will allow the use of approximately 200 acres of land on Fort Gordon to build the PV solar array.

The alternative sites for the PV solar array field originally considered were (see also enclosure 1):

Site 1: 181 acres located at the intersection of North Range Road and McDuffie Road.

Site 2: 80 acres located in the eastern portion of the cantonment area along Chamberlain Avenue, a main road on the installation.

Site 3: Approximately 140 acres located off 3rd Avenue in Training Areas 10 and 11.

Site 4: 95 acres east of Site 2 and located in the vicinity of Maglin Terrace (Senior Officers Quarters), Gate 1, and Butler Reservoir.

Site 5: 206 acres in Training Area 12, near the installation boundary.

Of the five sites proposed for the project, three sites (Sites 2, 3, and 4) were too small. Site 1 was just at the 180 acre minimal requirement, but would have impacts on the red-cockaded woodpecker and cultural resources. Therefore, Site 1 was also eliminated as an alternative. Construction will also include a transmission line corridor and associated right-of-way (ROW) to connect the new PV System to Georgia Power's substation in the cantonment area (see enclosure 2).

The EA will fully evaluate the potential environmental consequences of the construction, operation, and maintenance of the PV solar array in Site 5 and the transmission line to the substation. The EA will identify and evaluate the potential environmental impacts (including but not limited to biological assets, historical and archaeological assets, and socioeconomics) associated with the proposed action. Also to be evaluated in the EA will be the no action alternative, as required by the National Environmental Policy Act (NEPA) and 32 CFR, Part 651, *Environmental Analysis of Army Actions; Final Rule.*

The purpose of this letter is to inform you of this study effort, and request:

- any information your agency may have on file that may be pertinent to the analysis,
- resource areas that you feel should be considered in the EA process, and
- identification of additional interested parties that should be contacted.

A list of the other persons and organizations that are being contacted as part of this coordination effort is attached to this letter (enclosure 3). If you, or someone on your staff, have any questions concerning this information request, please contact me for clarification or discussion at (706) 791-6374. Please provide written comments or information regarding the action at your earliest convenience, but no later than 07/22/14.

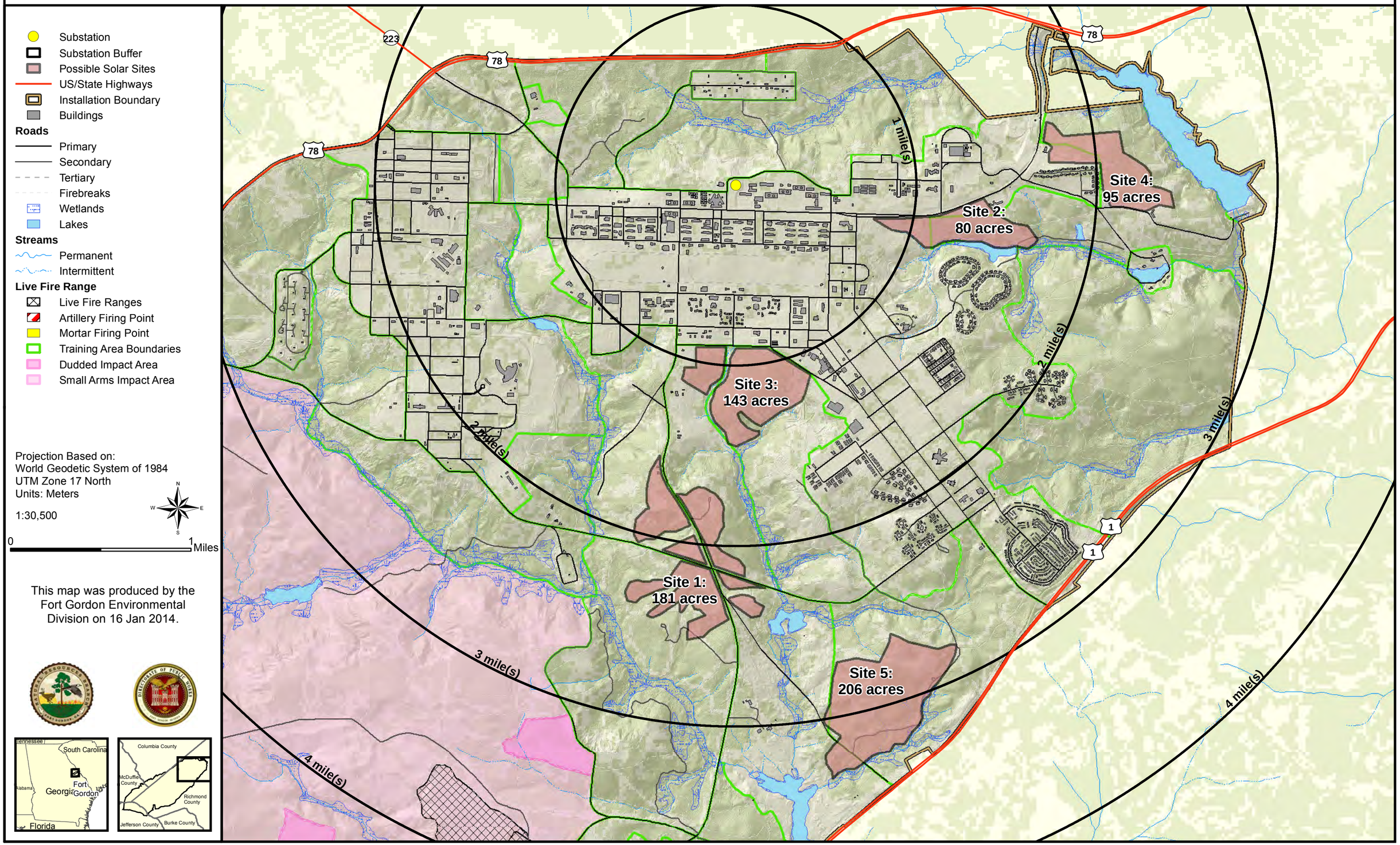
Sincerely,

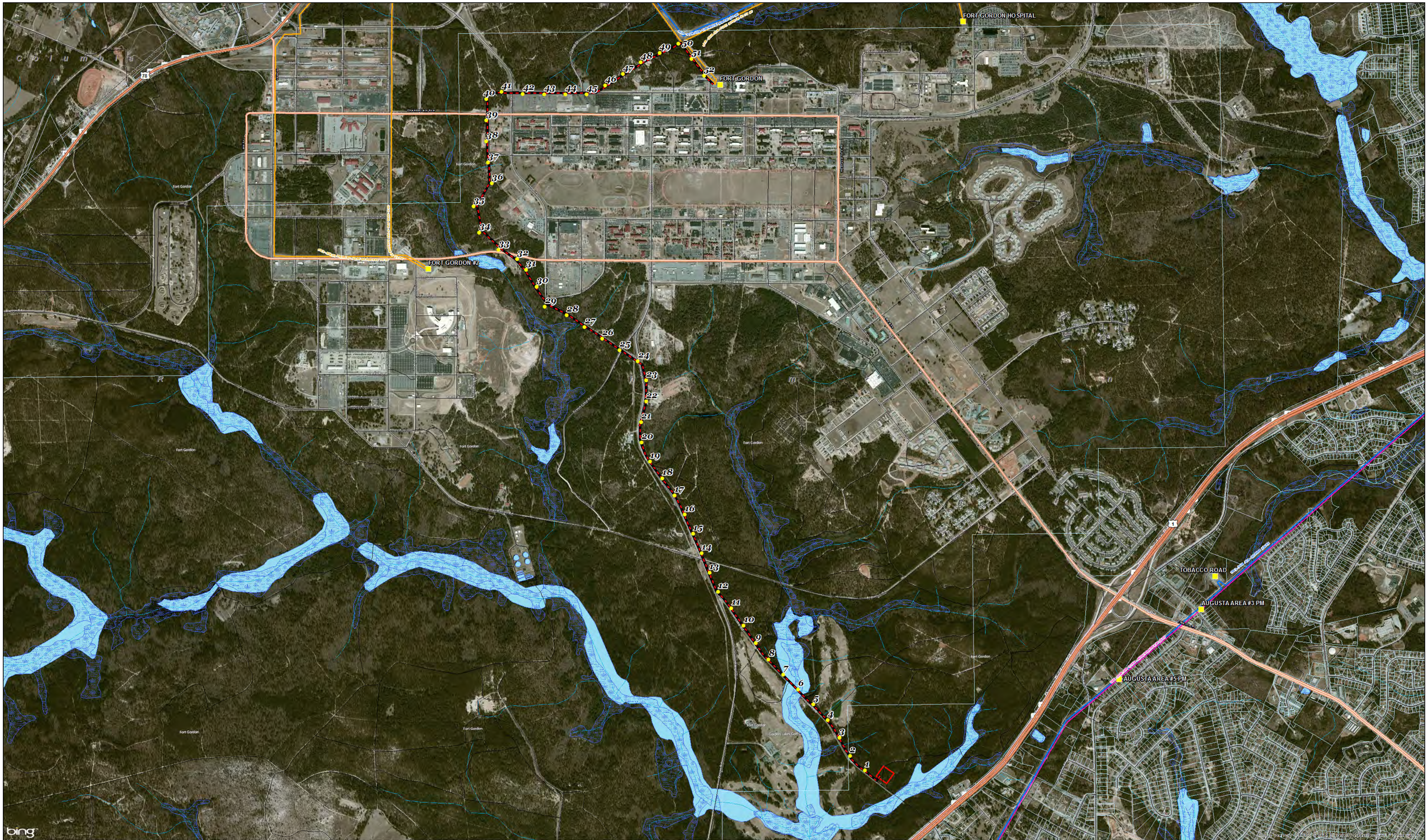
Robert L. Drumm
Chief, Natural Resources Branch
Directorate of Public Works

Enclosures:
1. Possible Sites for Solar Panel Installation Map
2. Proposed Right of Way Map
3. List of persons contacted
4. Provisional Site Map

Enclosure 1

Possible Sites for Solar Panel Installation, Fort Gordon, US Army





Fort Gordon Solar

RICHMOND COUNTY

MAP NOT BASED ON FIELD SURVEY DATA

1 inch = 1,000 feet

0 0.5 1 Miles

N

Enclosure 2

GEORGIA POWER
A SOUTHERN COMPANY

LIST OF AGENCIES CONTACTED

Federal Agencies

US Fish and Wildlife Service
Ecological Services Office
Attn: Debbie Harris
105 Westpark Drive, Suite D
Athens, GA 30606

U.S. Army Corps of Engineers
ATTN: CESAS-OP-F
Post Office Box 889
100 West Oglethorpe Ave.
Savannah, GA 31402

EPA Region 4
Science and Ecosystem Support Division
980 College Station Rd.
Athens, GA 30605

Regional Administrator
Federal Aviation Administration
Southern Region Headquarters
1707 Columbia Avenue
College Park, GA 30320

State Agencies

Dr. David Crass
Georgia Department of Natural Resources
Historic Preservation Division
254 Washington Street, SW
Ground Level
Atlanta, Georgia 30334-9007

Georgia Department of Natural Resources
Wildlife Resources Division
Headquarters Office
2070 U.S. Hwy. 278, S.E.
Social Circle, GA 30025

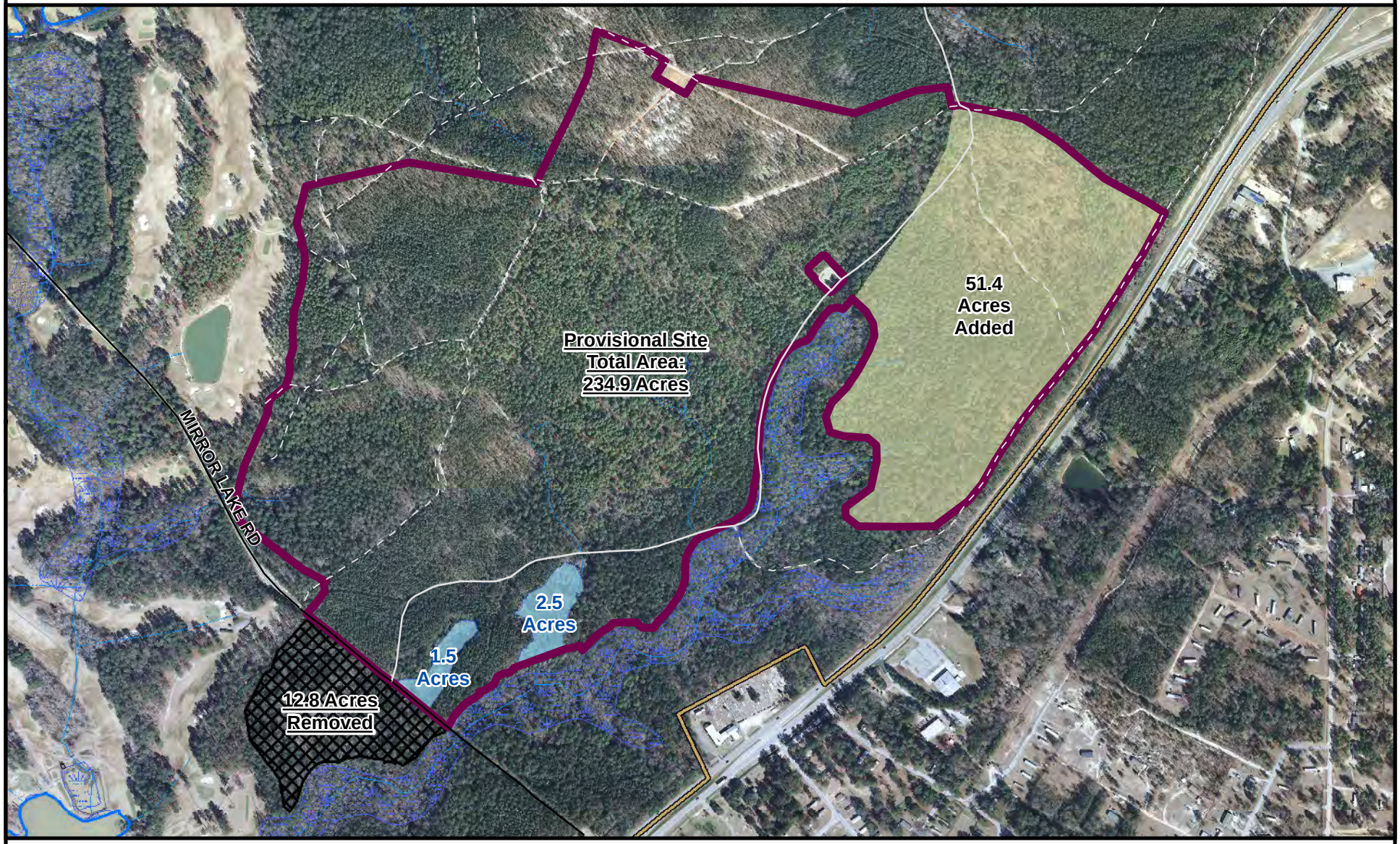
Georgia Dept. of Natural Resources
Wildlife Resources Division
Region 3, Game Management
142 Bob Kirk Rd.
Thomson, GA 30824

George Patty, Director
Augusta-Richmond Planning and Development Department
525 Telfair Street
Augusta, GA 30901

Jeff M. Darley
Environmental Protection Division
East Central District
3525 Walton Way Extension
Augusta, GA 30909

Enclosure 4

EITF Boundary Modifications for New Provisional Site, Fort Gordon, US Army



Projection Based on:
World Geodetic System of 1984
UTM Zone 17 North
Units: Meters

1:9,000

0 100 200 Meters

0 250 500 1,000 Feet

Installation Boundary
Buildings
Roads
Primary
Secondary
Tertiary
EITF Provisional Site for GA Power Analysis
EITF Site - Added
EITF Site - Removed
Wetlands
Wet Areas Not in NWI

This map was produced by the Fort Gordon Environmental Division-Natural Resources Branch.

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
HISTORIC PRESERVATION DIVISION

CHRIS CLARK
COMMISSIONER

DR. DAVID CRASS
DIVISION DIRECTOR

August 6, 2014

Robert L. Drumm
Chief, Natural Resources Branch
Directorate of Public Works
307 Chamberlain Avenue
Fort Gordon, Georgia 30905-5730

RE: Fort Gordon: Proposed Photovoltaic Solar Array System
Richmond County, Georgia
HP-140715-001

Dear Mr. Drumm,

The Historic Preservation Division (HPD) has received initial information concerning the above referenced project requesting comments pursuant to the National Environmental Policy Act of 1969 (NEPA). Our comments are offered to assist the Department of the Army and Fort Gordon in complying with the provisions of Section 106 of the National Historic Preservation Act of 1966, as amended.

Thank you for notifying us of this federal undertaking. We look forward to receiving Section 106 compliance documentation as appropriate. If Fort Gordon is planning on utilizing NEPA to satisfy Section 106, please let us know.

Please refer to project number **HP 140715-001** in future correspondence concerning this undertaking. If we may be of further assistance, please contact me at (404) 651-6546 or Jennifer.dixon@dnr.state.ga.us.

Sincerely,

Jennifer Dixon
Environmental Review Historian

254 WASHINGTON STREET, SW | GROUND LEVEL | ATLANTA, GEORGIA 30334
404.656.2840 | FAX 404.657.1368 | WWW.GASHPO.ORG

DEPARTMENT OF THE ARMY
SAVANNAH DISTRICT, CORPS OF ENGINEERS
100 W. OGLETHORPE AVENUE
SAVANNAH, GEORGIA 31401-3640

REPLY TO
ATTENTION OF:

AUGUST 08 2014

Regulatory Division
SAS-2014-00561

Mr. Robert Drumm
Chief, Natural Resources Branch
Directorate of Public Works
U.S. Army Garrison, Fort Gordon
IMGO-PWE, Building 14500
307 Chamberlain Avenue
Fort Gordon, Georgia 30905-5209

Dear Mr. Drumm:

I refer to your letter dated July 8, 2014, requesting comments from the U.S. Army Corps of Engineers regarding the "Request for information and notification of the preparation of an Environmental Assessment for the proposed Photovoltaic Generating Systems at Fort Gordon Georgia". This project has been assigned number SAS-2014-00561. Please refer to this number in any future correspondence concerning this project with this office.

Based on our review of the information received, the construction of the proposed solar energy facility and associated transmission lines, access roads, and other related infrastructure may involve work in waters of the United States that are considered to be within the jurisdiction of Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act. The placement of dredged or fill material into any waterways and/or their adjacent wetlands, including material re-deposited during mechanized land clearing or excavation of those wetlands, would likely require prior Department of the Army authorization.

To avoid any potential violations at the site, we recommend submitting a jurisdictional determination of the project site to this office, prior to performing any work at the site. To learn more about our program, you may want to access our website located at http://www.sas.usace.army.mil/Missions/Regulatory.aspx.

Thank you in advance for completing our on-line Customer Survey Form located at http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey. We value your comments and appreciate your taking the time to complete a survey each time you have interaction with our office.

If you have any questions, please call Mr. Donald Hendrix, Regulatory Specialist, Coastal Branch, at 912-652-6210.

Sincerely,

David E. Crosby
Deputy Chief

United States Department of the Interior

Fish and Wildlife Service
105 West Park Drive, Suite D
Athens, Georgia 30606
Phone: (706) 613-9493
Fax: (706) 613-6059

West Georgia Sub-Office
Post Office Box 52560
Fort Benning, Georgia 31995-2560
Phone: (706) 544-6428
Fax: (706) 544-6419

Coastal Sub-Office
4980 Wildlife Drive
Townsend, Georgia 31331
Phone: (912) 832-8739
Fax: (912) 832-8744

July 22, 2014

Mr. Robert L. Drumm
Chief, Natural Resources Branch
Environmental Division
Fort Gordon, Georgia 30905-5209

Re: FWS Log Number; NG-14-272-Rich
Request for information for EA on proposed Photovoltaic Generating System

Dear Mr. Drumm:

Thank you for your July 8, 2014, letter and map requesting our review of the proposed development of a 30 megawatt, alternating current, photovoltaic (PV) solar array system at Fort Gordon. We received your letter in our office on July 14, 2014. We submit the following comments as technical assistance in accordance with section 7(a) (2) of the Endangered Species Act of 1973, as amended, (16 U.S.C. 1531 *et seq.*).

Under the proposed Action, the Army will enter into a 35-year easement with Georgia Power that will allow the use of approximately 200 acres of land on Fort Gordon to build the PV solar array. Of the five sites proposed for the project, sites 2, 3, and 4 were too small. Site 1 would have impacts on the endangered red-cockaded woodpecker (RCW) and cultural resources and was therefore eliminated. The Environmental Assessment (EA) will fully evaluate the potential environmental consequences of the construction, operation, and maintenance of the PV solar array in Site 5 and the necessary transmission line to the station.

Fort Gordon provides habitat for hundreds of species of fish, wildlife, and plants including the federally-endangered Red-cockaded Woodpecker (RCW), and species of special concern such as migratory birds, gopher tortoise, and possibly the northern long-eared bat (proposed as endangered in 2013). In addition, the installation supports streams, riparian and wetland habitats, sandhills, and longleaf pine ecosystems valuable to a diverse array of wildlife.

Fort Gordon has been proactive in their conservation and recovery of endangered and threatened species in accordance with section 7(a) (1) of the ESA. We support these actions and the effort

to aid the Army's renewable energy goals. We recommend that the solar project be designed to complement Fort Gordon's important environmental efforts. Specifically, we recommend the following conservation measures be considered during the early planning and included in the EA:

- Any new development should avoid decreasing or degrading RCW, gopher tortoise, northern long-eared bat, and other rare species' habitat.

- The EA should fully evaluate the impacts of developing the pv solar array system at preferred site 5 on the RCW including its nesting, foraging, and future recruitment areas and the connectivity between all these habitats. Analysis of impacts to the RCW should be done in accordance with the Fort Gordon Integrated Natural Resources Management Plan and in compliance with the Fish and Wildlife Service RCW Recovery Plan. Any new development should avoid removal of habitat in the Habitat Management Units (HMU) for RCW or cause a decrease in the Installation Regional Recovery goal of 122 active RCW clusters.

Thank you again for including the Service in your early planning. Please contact Deborah Harris in our Athens office (706-613-9493 ext. 224) if you have any questions.

Sincerely,

Donald W. Imm, Ph.D
Field Supervisor

cc: Alan Braswell, Natural Resources Branch, Fort Gordon
Steve Camp, Natural Resources Branch

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APPENDIX C:

RED-COCKADED WOODPECKER (RCW) SURVEY

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FINAL
Red-Cockaded Woodpecker Nesting Cavity Survey
Proposed Solar Voltaic Site and Transmission Line
Fort Gordon, Georgia

US Army Corps of Engineers
Savannah District
Savannah, Georgia

August 2014

RED-COCKADED WOODPECKER NESTING CAVITY SURVEY
PROPOSED SOLAR VOLTAIC SITE AND TRANSMISSION LINE
FORT GORDON, GEORGIA

Introduction

The U.S. Army Corps of Engineers conducted a Red-Cockaded Woodpecker (RCW) nesting cavity survey for a proposed solar site and transmission line at the Fort Gordon Army Installation located in Richmond County, southwest of Augusta, Georgia (Figure1a-1b, Attachment A). The survey encompassed a site that includes approximately 250 acres for a Solar Voltaic (SV) site along with a 100-foot wide transmission line corridor 4.9 miles in length. Enclosed are the Global Positioning System (GPS) transect maps for the SV site (Figure 2a-2c, Attachment A) which includes an additional 50 acres surveyed for timber harvest north of the site and an aerial site map depicting the proposed transmission line which served as the survey transect (Figures 3a-3b, Attachment A).

Red Cockaded Woodpecker *(Picoides borealis)* Life History

The RCW is a nonmigratory woodpecker that nests in living pine trees. Large old growth trees, typically 60 years or older are required for nesting cavities. Cavity excavation begins with a “start” which is a small hole that is excavated in the sapwood to a diameter of approximately two inches. RCW cavity construction may take several years to complete with shorter timeframes in trees that have a decaying fungus called red heart disease. Active cavities are easily identified because they have numerous, small resin wells which exude sap on the bole of the tree. RCWs prefer stands with an open midstory. Although longleaf pines (*Pinus palustris*) are preferred, other species of pine provide suitable habitat.

Site Description

The survey area consists of rolling hills with a variety of vegetation types. Fort Gordon is located within the Sandhills physiographic province and as a result the survey area included a variety of soil types from Lakeland sands on ridges, Troup, Vaucluse, and

Ailey soils scattered throughout and Bibb and Osier soils in the bottomland areas (USDA Web Soil Survey, Richmond County, Georgia 2013).

The dominant type of overstory vegetation are longleaf and loblolly (*Pinus taeda*) pines with turkey oak (*Quercus laevis*) and blackjack oak (*Quercus marilandica*) in the deeper sands on ridges. The most common midstory species was sparkleberry (*Vaccinium arboreum*) along with a variety of oak saplings and small pines. The most common herbaceous species in the understory included muscadine (*Vitis rotundifolia*) and greenbrier (*Smilax* sp.) along with a few species common on the sandy ridges such as false foxglove (*Aureolaria pectinata*), sandhill morning-glory (*Stylisma* sp.), and stinging nettle (*Cnidoscolus stimulosus*).

Survey Requirements

The survey was completed based on the survey protocol in Appendix 4 of the United States Fish and Wildlife RCW Recovery Plan 2003 (Attachment B). The Fort Gordon Natural Resources Branch provided site maps and a map depicting stands with pines of sufficient age to be potential cavity trees.

Both the SV site and transmission line corridor were assessed for RCW nesting starts or cavities. A number of areas did not contain suitable habitat either due to the age of the trees or a significant amount of hardwood midstory. However, because a single transect often encompassed both suitable and non-suitable habitats, the entire area was surveyed.

For the SV site, all transects were oriented north-south and run using a handheld compass. A GPS unit (Trimble GeoExplorer 2008 series) was used to identify the beginning and ending point of each transect. The survey consisted of visually inspecting all medium and large-sized pines for nesting cavities or starts. According to the survey protocol, transects should be spaced based on visibility with a maximum of 100 yards in open stands or 50 yards or less in areas of dense vegetation. Because of the season and presence of foliage, the more intensive survey was conducted with most of the transects spaced at approximately 50-60 yards. Figure 2a-2c (Attachment A) depicts transects within the SV site.

For the proposed transmission line corridor (Figure 3a-3b, Attachment A), the

centerline, based on coordinates of the proposed pole locations, served as the transect and was run using a handheld compass. Again, there were no areas excluded from survey based on habitat. Like the SV site, the transmission line site was a pedestrian survey. However, there were two exceptions where a vehicle was used to conduct the survey along the transmission line site: 1) West of the existing substation where the centerline intersects and follows 8th Avenue Road; and 2) along Range Road where the centerline is along the edge of the maintained road right of way. If suitable habitat was observed during the vehicle survey, the trees were visually inspected.

Findings and Conclusion

The U.S. Army Corps of Engineers, Savannah District performed the RCW nesting cavity survey in accordance with the methods required by the U.S. Fish and Wildlife Service and observed no starts or cavities (active or inactive) within the project area.

ATTACHMENT A

FIGURES

Proposed Solar Site
Proposed Transmission Line

Scale 1”: 2,500’

FIGURE 1a – SITE LOCATION MAP

FORT GORDON, GEORGIA

U.S. Army Corps of Engineers
Savannah District

Proposed Solar Site
Proposed Transmission Line

Scale 1”: 667’

FIGURE 1b – SV SITE LOCATION MAP

FORT GORDON, GEORGIA

U.S. Army Corps of Engineers
Savannah District

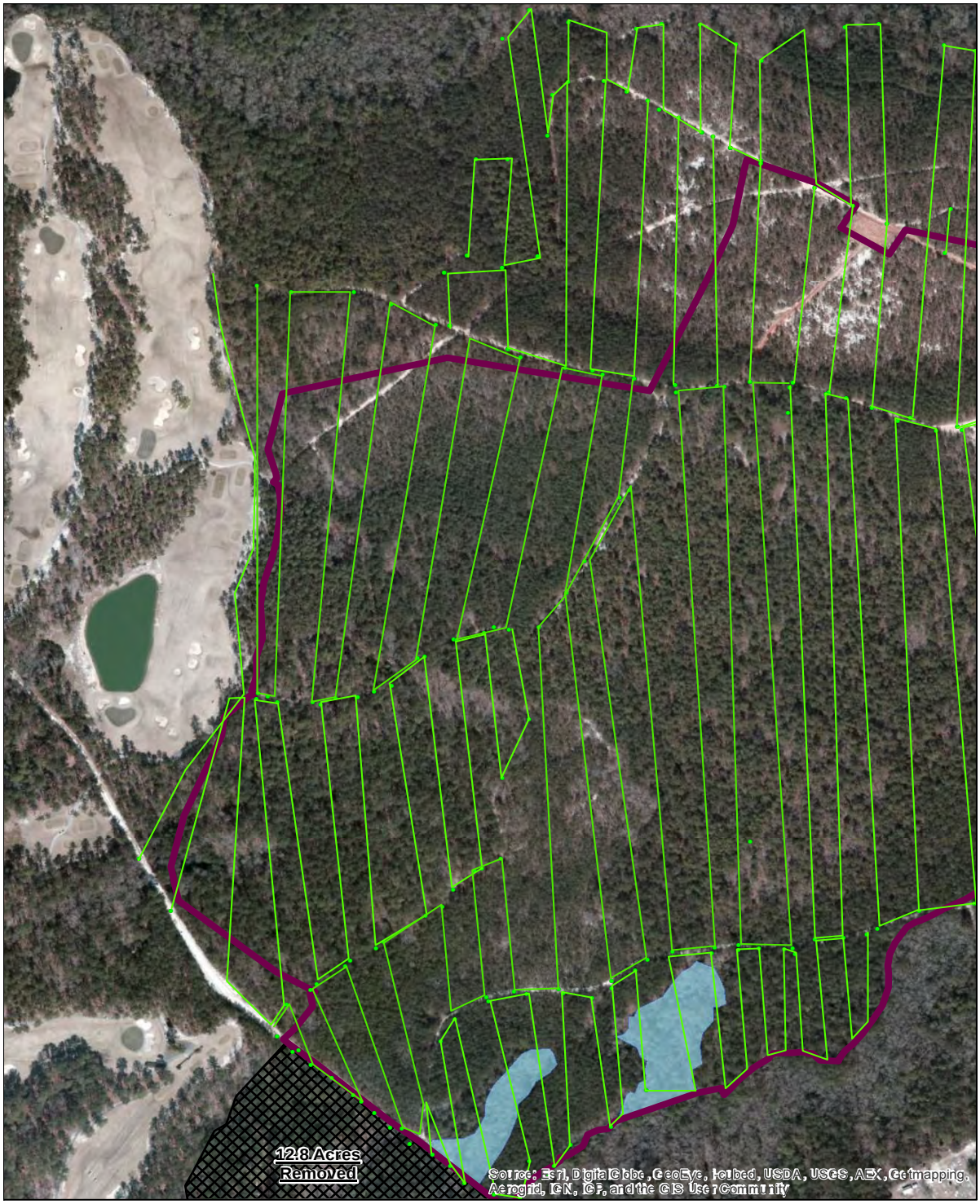
Scale 1:10,000-------1' = 833'

N

FIGURE 2a – PROPOSED SOLAR SITE
RCW SURVEY TRANSECT MAP

FORT GORDON, GEORGIA

U.S. Army Corps of Engineers
Savannah District

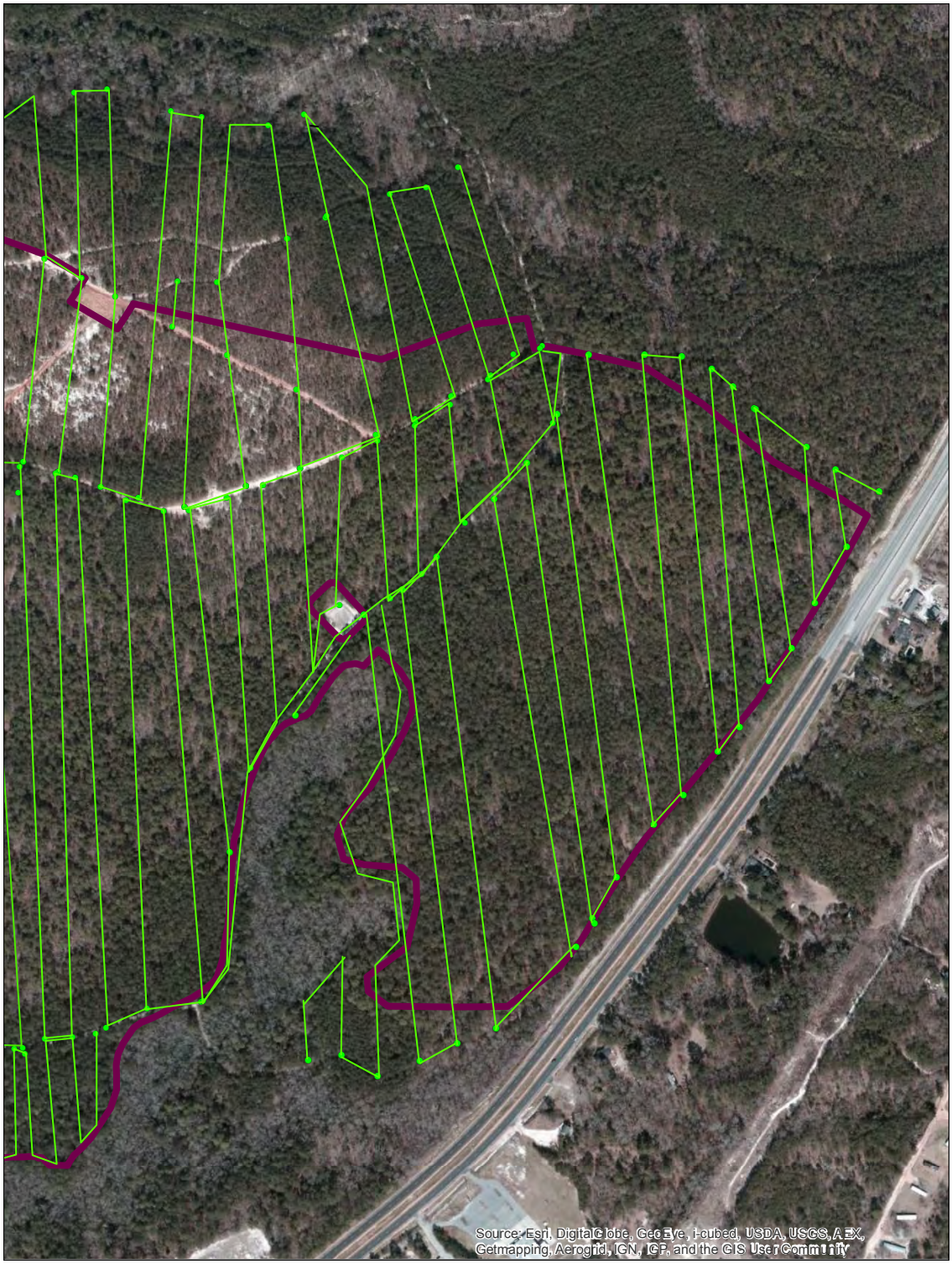


SCALE 1 : 5000-----1” = 417’

FIGURE 2b – PROPOSED SOLAR SITE
RCW SURVEY TRANSECTS - West

FORT GORDON, GEORGIA

U.S. Army Corps of Engineers
Savannah District



Scale: 1 : 5,000 ---1” = 417’

N

FIGURE 2c – PROPOSED SOLAR SITE
RCW SURVEY TRANSECT MAP - East

FORT GORDON, GEORGIA

U.S. Army Corps of Engineers
Savannah District

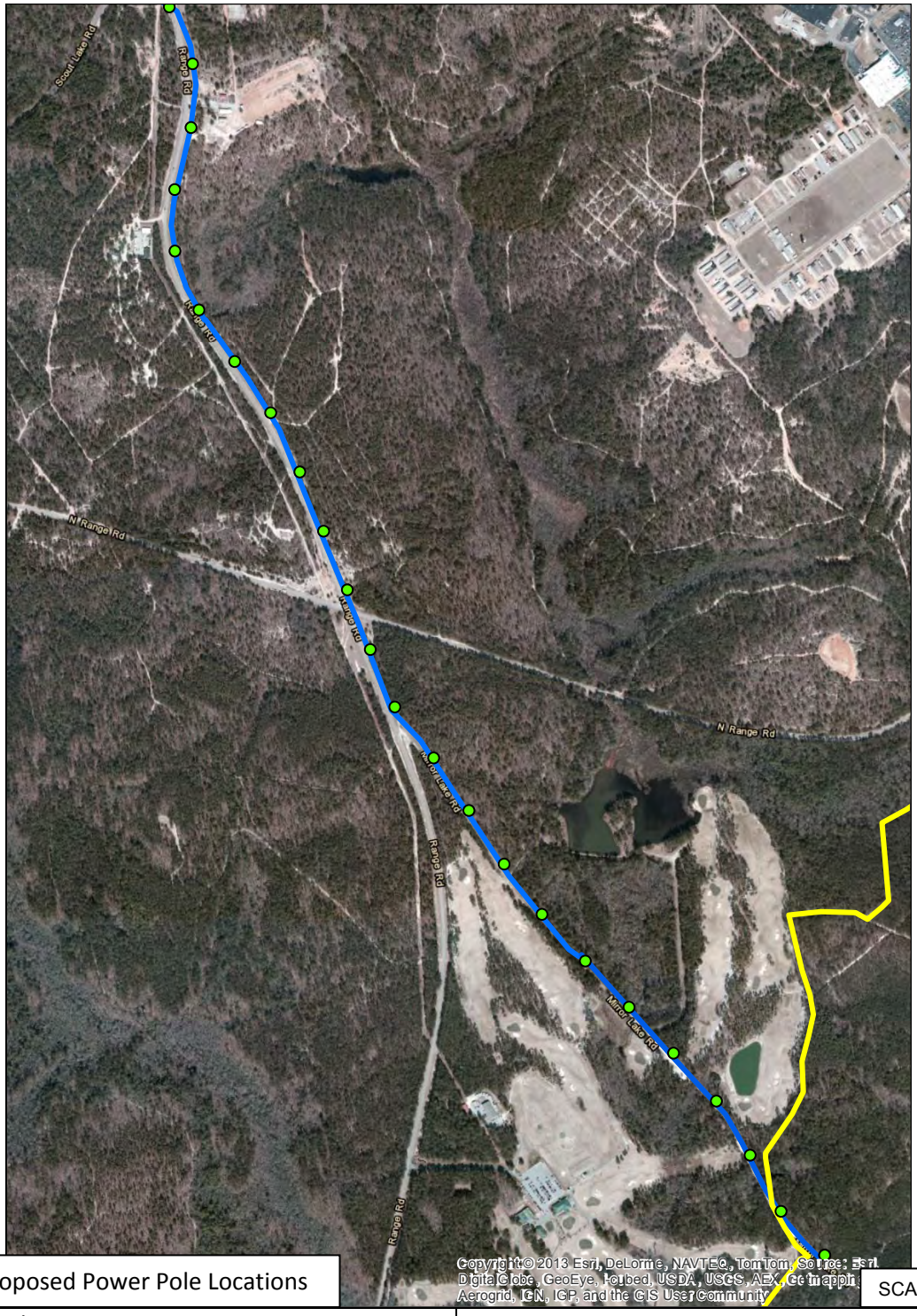
Proposed Power Pole Locations

SCALE 1" = 1,000'

FIGURE 3a – PROPOSED TRANSMISSION LINE RCW SURVEY TRANSECT MAP

FORT GORDON, GEORGIA

U.S. Army Corps of Engineers
Savannah District



Proposed Power Pole Locations

SCALE 1" = 1,000'

FIGURE 3 b – PROPOSED TRANSMISSION LINE RCW SURVEY TRANSECT MAP

FORT GORDON, GEORGIA

U.S. Army Corps of Engineers
Savannah District

ATTACHMENT B

U.S. Fish and Wildlife Service RCW Survey Protocol

APPENDIX 4. SURVEY PROTOCOL

Guidelines for Surveys to Assess Potential Project Impacts to Red-cockaded Woodpecker Nesting and/or Foraging Habitat

Surveys are used to determine whether the nesting and/or foraging habitat of a red-cockaded woodpecker group will be adversely impacted by a proposed project, such as a timber sale or development activity, on a particular tract of land. This is an important part of the conservation and management of this endangered species, and therefore the Fish and Wildlife Service has developed standard survey and analysis procedures for such determinations. These determinations must be undertaken prior to the initiation of any project within the southeastern United States that calls for removal of pine trees 30 years or older; typically such trees will be at least 25.4 cm (10 in) dbh or larger. The procedure is also used following new land acquisition by state and federal agencies in the southeast or any other circumstance in which the presence or absence of red-cockaded woodpeckers is to be assessed.

The first step in the survey procedure is to determine if suitable nesting or foraging habitat exists within the area to be impacted by the project. If no suitable nesting or foraging habitat is present within the project impact area, further assessment is unnecessary and a "no effect" determination is appropriate. If no suitable nesting habitat is present within the project impact area, but suitable foraging habitat is present and will be impacted, potential use of this foraging habitat by groups outside the project boundaries must be determined. This is accomplished by identifying any potential nesting habitat within 0.8 km (0.5 mi) of the suitable foraging habitat that would be impacted by the project. Any potential nesting habitat is then surveyed for cavity trees. This procedure is described in greater detail below. If no active clusters are found, then a "no effect" determination is appropriate. If one or more active clusters are found, a foraging habitat analysis is conducted (see 8I) to determine whether sufficient amounts of foraging habitat will remain for each group post-project.

For nesting and foraging habitat surveys within project impact areas and within 0.8 km (0.5 mi) of the project site, potential habitat is assessed at the level of the stand. A stand is a term often used to refer to a wooded area receiving past or current silvicultural treatment as a single management unit. Here we expand the term to include any subset of a tract of wooded land, divided by biological community type, management history, or any other reasonable approach. A small tract of land may be considered a single stand.

Identification of Suitable Foraging Habitat

For the purpose of surveying, suitable foraging habitat consists of a pine or pine/hardwood stand of forest, woodland, or savannah in which 50 percent or more of the dominant trees are pines and the dominant pine trees are generally 30 years in age or

older. These characteristics do not necessarily describe good quality foraging habitat (see 2E, 8I); rather, this is a conservative description of potentially suitable habitat.

Identification of pine and pine/hardwood stands can be made using cover maps that identify pine and pine/hardwood stands, aerial photographs interpreted by standard techniques, or a field survey conducted by an experienced forester or biologist. Age of stands can be determined by aging representative dominant pines in the stands using an increment-borer and counting annual growth rings. Stand data describing size classes may be substituted for age if the average size of 30 year-old pines is known, i.e., at least 25.4 cm (10 in) dbh or larger, for the local area and habitat type.

If no suitable foraging habitat is present within the project area (that is, no pines 30 years or older will be impacted), then further evaluation is unnecessary and red-cockaded woodpeckers are considered absent. If the project area contains any suitable foraging habitat that will be impacted by the project, that habitat, if it contains any 60 year old trees or older, and all other suitable nesting habitat within 0.8 km (0.5 mi) of the project site, regardless of ownership, must be surveyed for the presence of red-cockaded woodpeckers.

Identification of Suitable Nesting Habitat

For the purpose of surveying, suitable nesting habitat consists of pine, pine/hardwood, and hardwood/pine stands that contain pines 60 years in age or older and that are within 0.8 km (0.5 mi) of the suitable foraging habitat to be impacted at the project site (see above). Additionally, pines 60 years in age or older may be scattered or clumped within younger stands; these older trees within younger stands must also be examined for the presence of red-cockaded woodpecker cavities. These characteristics do not necessarily describe good quality nesting habitat (see 2D, 8E, 8F); rather, this is a conservative description of potential nesting habitat.

Determination of suitable nesting habitat may be based on existing stand data, aerial photo interpretation, and/or field reconnaissance. All stands meeting the above description, regardless of ownership, are surveyed for cavity trees.

Surveying for Red-cockaded Woodpecker Cavity Trees

Once suitable nesting habitat is identified (above), it must be surveyed for cavity trees of red-cockaded woodpeckers by personnel experienced in management and/or monitoring of the species. Potential nesting habitat is surveyed by running line transects through stands and visually inspecting all medium-sized and large pines for evidence of cavity excavation by red-cockaded woodpeckers. Transects must be spaced so that all trees are inspected. Necessary spacing will vary with habitat structure and season from a maximum of 91 m (100 yards) between transects in very open pine stands to 46 m (50 yards) or less in areas with dense midstory. Transects are run north-south, because many

cavity entrances are oriented in a westerly direction, and can be set using a hand compass.

When cavity trees are found, their location is recorded in the field using a Global Positioning System (GPS) unit, aerial photograph, and/or field map. Activity status, cavity stage (start, advanced start, or complete cavity), and any entrance enlargement are assessed and recorded at this time. Again, it is extremely important to have all surveys and cavity tree assessments performed by experienced personnel.

If cavity trees are found, more intense surveying within 457 m (1500 ft) of each cavity tree is conducted to locate all cavity trees in the area. Cavity trees are later assigned into clusters based on observations of red-cockaded woodpeckers as described in 3A. Any cavity trees or other evidence of red-cockaded woodpecker activity is reported to the Fish and Wildlife Service, at either a local office or the Clemson Field Office, Clemson, South Carolina.