

DRAFT

U.S. Army Office of Energy Initiatives
(OEI) Solar Project-Fort Meade
Environmental Assessment (EA)

Fort George G. Meade, Maryland

December 2023



DEPARTMENT OF THE ARMY

Fort George G. Meade

Fort Meade, Maryland 20755-5115

FINDING OF NO SIGNIFICANT IMPACT

ENVIRONMENTAL ASSESSMENT

Proposed Solar Array Project at Fort George G. Meade

INTRODUCTION

This Environmental Assessment (EA) has been prepared to analyze the potential environmental, cultural, and socioeconomic effects associated with construction and operation of a new solar photovoltaic (PV) panel field on a closed landfill in the southeastern corner of Fort George G. Meade, Maryland (hereinafter referred to as FMMD). This EA and Finding of No Significant Impact (FNSI) were prepared pursuant to the National Environmental Policy Act (NEPA) of 1969 (42 United States Code Section 4321 *et seq.*); the Council on Environmental Quality (CEQ) regulations that implement NEPA (Title 40 Code of Federal Regulations [CFR], Parts 1500 to 1508); and the U.S. Army's NEPA regulations at 32 CFR Part 651.

PURPOSE AND NEED FOR THE PROPOSED ACTION

The purpose of the Proposed Action is to provide carbon free energy to FMMD under either a power purchase or community solar agreement, which includes a lease of lands not suitable for other uses to a third-party developer.

The need for the Proposed Action is to support U.S. Army policies on increasing the resiliency of utility infrastructure and moving towards increased carbon free energy production. This project aligns with Executive Order (EO) 14057, *Catalyzing Clean Energy Industries and Jobs through Federal Sustainability*, by utilizing Federal land, generating carbon free energy, and establishing a public-private partnership that catalyzes the growth of clean energy industries and jobs. It also supports the Fort Meade Installation Energy and Water Plan (IEWP) (Fiscal Year 2019) recommendation to evaluate landfill sites for energy/resilience opportunities.

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The Proposed Action includes the construction and operation of a new approximately 10 megawatt (MW) solar PV panel field on a closed landfill, hereinafter Closed Sanitary Landfill (CSL), in the southeastern corner of FMMD. The Proposed Action also includes the lease of the land for the construction of the array and construction of a battery energy storage system (ESS) or other ancillary power control system. Existing developed areas would be used as pathways to connect the array and its controlling systems to existing facilities. **Figure FNSI-1** below shows a 15-MW solar array project completed at nearby Fort Detrick, Maryland.



Figure FNSI-1. A 15-MW solar array at Fort Detrick, Maryland (www.army.mil)

As part of the Proposed Action, the Army would lease up to 181.6 acres of land for the solar project (Plots A and B, **Figure FNSI-2**). This represents a larger area than the proposed solar field itself, intended to provide space for access roads and connection infrastructure to the array. This area also includes an area of the CSL (northernmost portion) that is currently undergoing remediation but has the potential to support additional panel fields in the future. A third-party developer would build, own, and operate the solar PV asset on the Fort Meade CSL. The exact size and technology would be determined during the lease solicitation process. During normal operations, the power produced by the project would feed into the regional power grid, improving the resiliency of the grid by adding distributed generation sources and diversifying the power supply chain.

A third-party developer would be granted the lease based on one of two economic incentive mechanisms: a power purchase agreement, or the Maryland Community Solar Pilot Program. The mechanism used would prescribe whether the energy generated from the solar field is directed primarily off-site to a private utility, with provisions for an emergency power supply to be available to FMMD or purchased and consumed primarily by FMMD. As stated in the previous paragraph, this arrangement would be determined during the lease solicitation process and is not known at this time. The Proposed Action description is intended to encompass both scenarios to ensure all potential impacts are analyzed in the EA, to provide project designers with adequate information for considering environmental effects of more than one option, and to allow for flexibility during the design process.



Figure FNSI-2. Proposed Action Location

No Action Alternative

The CEQ requires the analysis of the No Action Alternative even if the agency is under legislative command to act. Analysis of the No Action Alternative provides a benchmark for enabling decision-makers to compare the magnitude of environmental effects of the other action alternatives. Under the No Action Alternative, the Proposed Action would not be implemented. The No Action Alternative does not support the Army's resilience strategy or provide an opportunity to move towards increased carbon free energy production.

The EA analyzes two courses of action: the Proposed Action and the No Action Alternative.

SUMMARY OF ENVIRONMENTAL IMPACTS

As detailed in this EA, construction activities associated with the Proposed Action would generate adverse impacts to natural resources, but no significant adverse impacts would occur. This is because these impacts would be temporary, lasting approximately one year during the construction phase. The intensity of the adverse impacts would be limited to the area immediately surrounding the Proposed Action area. Additionally, the number of receptors would be limited to a relatively small number of troops, staff, and personnel within FMMD, as well as a residential community in the town of Odenton near the southeastern boundary of the installation. These adverse impacts would end once the construction phases are completed.

During operation, long-term, significant, beneficial impacts would be realized by the replacement of fossil-fuel generated energy by energy produced by renewable solar energy. On a cumulative basis, the solar array would complement other solar projects being undertaken in Maryland, resulting in more stability to the regional power grid and reduced greenhouse gas emissions. **Table FNSI-1** below summarizes the potential consequences the Proposed Action and No Action Alternative would have on resources evaluated in the EA.

Table FNSI-1. Summary of Environmental Consequences

Resource	Construction	Operation	No Action
Land Use	Short-term, negligible, direct, adverse impact on land use. Short-term, negligible adverse viewshed impacts.	Long-term, minor, and direct adverse effects on installation land use. Long-term, minor adverse effects on viewshed.	No impact.
Geology, Topography, and Soils	No impacts to geology. Negligible, short-term, and direct adverse effects to topography. Short-term, minor, adverse effect on soils.	No impacts to geology. No impacts to topography. Long-term, minor, indirect, adverse impact to soils from natural erosive forces.	No impact.
Water Resources	Short-term, negligible, direct, adverse impacts to surface water from sedimentation of stormwater run-off. No impact on floodplains (provided all practicable steps to avoid floodplain encroachment and impacts are undertaken). Short-term, direct, minor adverse impact on wetlands. Short-term, indirect, negligible, adverse impact on groundwater from incidental spills. Short-term, direct, negligible adverse impact on stormwater. No impact on coastal zone resources.	Long-term, minor, adverse effects adverse impacts to surface water. No impact on floodplains. Negligible indirect, adverse impacts to wetlands. No impacts to groundwater. No impact on coastal zone resources.	No impact.
Biological Resources	Minor long-term, direct, impacts to vegetation. Minor, indirect, temporary, adverse impacts would occur to wildlife. Minor, adverse, short-term effects would occur to rare, threatened, or endangered species.	Negligible, long-term adverse effects on vegetation. Negligible, permanent, direct, adverse impacts on terrestrial wildlife. No impact on rare, threatened, or endangered species or aquatic species and habitat.	No impact.

Resource	Construction	Operation	No Action
Cultural Resources	No impact.	No impact.	No impact.
Hazardous and Toxic Materials and Waste	Short- and Long-term negligible to moderate/less-than-significant adverse effects.	Long-term, negligible adverse impacts.	No impact.
Utilities	Short-term, negligible, direct, adverse impacts.	Long-term, negligible to minor, direct, adverse impact on selected utilities.	No impact.
Transportation and Traffic	Temporary, negligible, direct, adverse impact.	No impact.	No impact.
Noise	Short-term, minor, direct, adverse impact.	Long term, negligible, direct, adverse impact.	No impact.
Air Quality and Greenhouse Gases	Short-term, minor, direct, adverse impact.	Long-term beneficial impact.	Long-term, negligible to minor adverse impact.
Climate Change	Short-term, minor, and indirect impact.	Long-term beneficial impact.	Long-term, negligible adverse impact.
Human Health and Safety	Short-term, minor adverse impact.	Minor adverse impact.	Long-term, negligible, adverse impact.
Socioeconomics, Environmental Justice, and Protection of Children	Short-term, minor, direct, adverse impacts on Socioeconomics, namely Environmental Justice communities. No impact on Protection of Children.	Long-term, minor, beneficial impact on Socioeconomics.	No impact.
Airspace	No impact.	Long-term, minor adverse impact.	No impact.
Electromagnetic Spectrum	No impact.	Long-term, negligible impact.	No impact.

Table FNSI-2. Summary of Mitigation Measures

Requirements/Mitigation Measures	Applicable Criteria	Section
Erosion and Sediment Control <ul style="list-style-type: none"> Minimize grading requirements by using variable elevation heights of support posts 	Solar Programmatic Environmental Assessment (PEA)	Section 4.2.2
Stormwater Management Plan reviews and approvals with applicable BMPs, including: <ul style="list-style-type: none"> Sandbags Silt fences Earthen berms Fiber rolls Sediment traps Erosion control blankets Check dams in medium-sized channel Straw bale dikes in smaller channels 	<ul style="list-style-type: none"> State and Federal projects that disturb over 5,000 square feet of land area Section 438 of the Energy Independence and Security Act (EISA) of 2007 	Section 4.2.2
Stormwater Pollution Prevention Plan (SWPPP) with applicable BMPs, prepared by developer, includes implementation of BMPs, performing frequent visual inspections, and conducting benchmark monitoring to determine BMP effectiveness.	General Permit for Stormwater Associated with Construction Activity, pursuant to National Pollutant Discharge Elimination System (NPDES)	Section 4.2.2 Section 4.3.1.5
Environmental Site Design (ESD) requires a developer to demonstrate that all reasonable opportunities for meeting stormwater requirements using ESD have been exhausted by using natural areas and landscape features to manage runoff from impervious surfaces and that structural BMPs have been used only where absolutely necessary.	<ul style="list-style-type: none"> Code of Maryland (COMAR) Title 26.17.02.05 and COMAR 26.17.02.09 2015 Stormwater Management Guidelines for State and Federal Projects 	Section 4.3.1.5

Direct impacts to wetlands and their buffers would be avoided and minimized to the maximum extent practicable; for impacts that cannot be avoided, applicable permits would be obtained and mitigation proffered (if required by the permit).	<ul style="list-style-type: none"> • Section 404 of the Clean Water Act (CWA) • COMAR, Title 26, <i>Department of the Environment</i>, Subtitle 23, <i>Nontidal Wetlands</i> 	Section 4.3.2.1
Time of year restriction for tree removal: 1 June to 31 July	<ul style="list-style-type: none"> • Endangered Species Act • Migratory Bird Treaty Act (16 U.S.C. §703) 	Section 4.4.1.3
Site developments must preserve or establish 20 percent forest cover, regardless of whether or not the site was forested before the construction.	<ul style="list-style-type: none"> • Fort Meade Forest Conservation Act (FCA) and Tree Management Policy • Fort Meade Integrated Natural Resources Management Plan (INRMP) 	Section 4.4.1.1
<ul style="list-style-type: none"> • Invasive vegetation removal and reseeded with native seed mix. • Install panels minimum 24 inches off ground surface to allow vegetation growth. 	INRMP, Section 8.9	Section 4.4.2.1
Implement Pollinator Habitat Planting Plan	INRMP (Goals), U.S. Fish and Wildlife Service Policy Endangered Species Act	Section 4.4.1.3
<ul style="list-style-type: none"> • Site design will ensure that impacts to any nearby cemeteries are avoided. • Accidental Discovery Plan 	<ul style="list-style-type: none"> • Solar PEA • NHPA*; NAGPRA; ARPA; Executive Order 13007 to which access is afforded under AIRFA; and 36 CFR Part 79 (*see Section 7 for acronym definitions) 	Section 4.5.2.1

Maintain spill kits on-site during construction; stage equipment and construction stockpiles on existing fill areas to minimize clearing and the risk of contaminants being released off-site.	Fort Meade Spill Prevention, Control and Countermeasures Plan	Section 4.3.2.1
Any proposed alterations to the existing cap of the Closed Sanitary Landfill (CSL), Cell 3, or disturbance exposing landfill material during construction, must be approved and coordinated through the Maryland Department of the Environment (MDE) Solid Waste Program (SWP) and MDE Land and Materials Administration (LMA).	Resource Conservation and Recovery Act (RCRA)	Section 4.6.2.1
Developer would need to coordinate connection pathway and requirements for right of access to cross a Maryland State Highway Administration (SHA) easement.		Section 4.8.2.1
Truck beds would be covered while in transit to limit fugitive dust emissions; water would be sprayed on any unpaved roads or stockpiles to limit fugitive dust emissions; ultra-low sulfur diesel would be used as a fuel source where appropriate to minimize oxides of sulfur emissions; clean diesel would be used in construction equipment and vehicles through the implementation of add-on control technologies such as diesel particulate filters and diesel oxidation catalysts, repowers, and/or newer and cleaner equipment; when feasible, electric-powered equipment would be used in lieu of diesel-powered equipment; control measures for heavy construction equipment and vehicles, such as minimizing operating and idling time, would be implemented to limit criteria pollutant emissions.	Air quality permits would be obtained, as necessary, in compliance with Federal, state, and local standards.	Section 4.10.2.1

The developer will need to coordinate design of the solar array field with the Federal Aviation Administration (FAA) to address glare concerns, with the potential need to conduct a glare study.	FAA's Obstruction Evaluation/Airport Airspace Analysis (OE/AAA) process (49 U.S.C. § 44718)	Section 4.14.2.1
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PUBLIC INVOLVEMENT

The Draft EA was made available for public review online at <https://home.army.mil/meade/index.php/my-fort/all-services/environmental> and via a hard copy available at the FMMD Medal of Honor Memorial Library and the Odenton Regional Library, Odenton, Maryland. The Notice of Availability for the Draft EA was published in the *Capital Gazette*. All comments received during this public review period, which include agency responses but no public comments, have been considered and incorporated in the Final EA.

CONCLUSION AND FINDING OF NO SIGNIFICANT IMPACT

I have reviewed the EA and find that the Proposed Action to lease the land and construct the solar PV array on Fort Meade will have no significant impacts on the natural environment, cultural resources, or the human environment. Based on these findings, an Environmental Impact Statement is not required for this project and a FNSI shall be issued.

MICHAEL A. SAPP
COL, IN Commanding

Date

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1. INTRODUCTION

1.1. PROJECT BACKGROUND

This Environmental Assessment (EA) is prepared in accordance with the National Environmental Policy Act (NEPA) of 1969; its implementing regulations published by the Council on Environmental Quality (CEQ) at 40 Code of Federal Regulations (CFR) 1500-1508; and the Army NEPA regulations, *Environmental Analysis of Army Actions*, found at 32 CFR Part 651 and published in the *Federal Register* on March 29, 2002. Pursuant to NEPA, Federal agencies are required to consider the environmental consequences of their proposed actions. NEPA typically applies when the Federal agency is the proponent of the action or where Federal funds are involved in the action.

Fort George G. Meade (FMMD) is approximately 5,107 acres in size and is located in northwest Anne Arundel County, Maryland, roughly halfway between Baltimore, Maryland, and Washington, D.C. FMMD supports over 119 tenant organizations from all military services and several Federal agencies and is the largest employer in Maryland with a workforce of approximately 60,000 employees. FMMD is located near the communities of Odenton, Laurel, Columbia, and Jessup, Maryland (**Figure 1**).

The U.S. Army Office of Energy Initiatives (OEI) was established by the Secretary of the Army with the mission to serve as the central management office for the development, implementation and oversight of all privately financed, largescale renewable and alternative energy projects; be the proponent for projects that generate equal to or greater than 10 megawatt (MW) of renewable and alternative energy and work closely with installations to support 1-10 MW of renewable and alternative energy opportunities; and use existing Department of Defense (DoD) land-use and third-party financing authorities to develop solar, wind, biomass, and geothermal projects. OEI develops projects to improve the resiliency and security of the energy posture for Army installations. Army installations are dependent on an electrical grid increasingly subject to the potential for extended outages and decreased reliability. The Army desires resilient and secure energy infrastructure to support our troops both at home and overseas, as well as to support surrounding communities in times of national and regional emergencies.

This EA provides NEPA analysis and documentation for the Proposed Action, which includes the construction and operation of a new solar photovoltaic (PV) panel field on a closed landfill in the southeastern corner of FMMD. In addition, this EA evaluates the No Action Alternative.

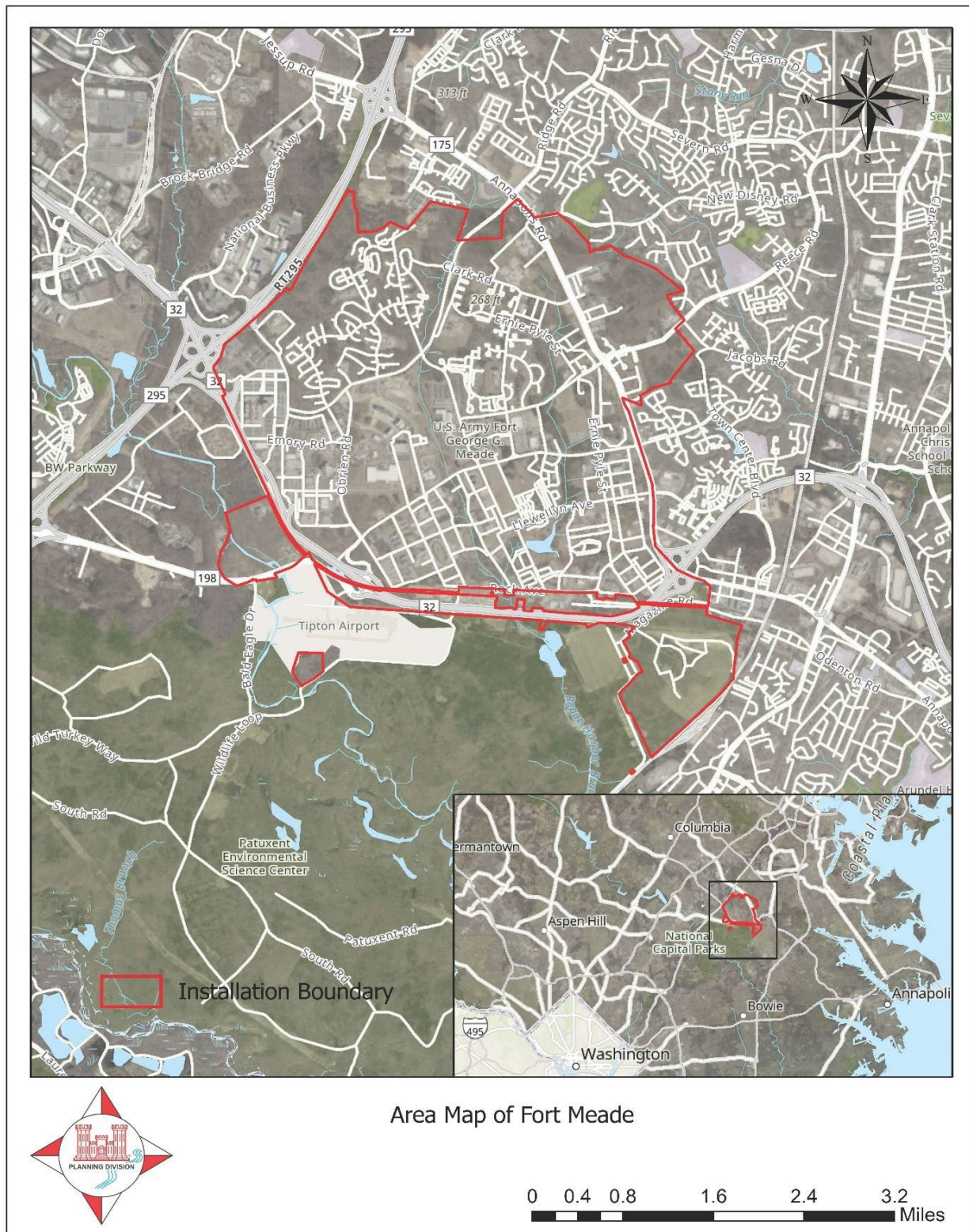


Figure 1. Fort Meade Location Map

2. PURPOSE AND NEED

The purpose of the Proposed Action is to lease land for solar generation at FMMD sites that are not suitable for other uses. While the project does not independently enhance resilience, it would support the Army's resilience strategy. During normal operations the power produced by the project would feed into the regional power grid, improving the resilience of the grid by adding distributed generation sources and diversifying the power supply chain.

The need for the Proposed Action is to support U.S. Army policies on increasing the resiliency of utility infrastructure and moving towards increased carbon free energy production. This project aligns with Executive Order (EO) 14057, *Catalyzing Clean Energy Industries and Jobs through Federal Sustainability*, by utilizing Federal land, generating carbon free energy, and establishing a public-private partnership that catalyzes the growth of clean energy industries and jobs. It also supports the Fort Meade Installation Energy and Water Plan (IEWP) (Fiscal Year 2019) recommendation to evaluate landfill sites for energy/resilience opportunities. The project would be funded through a third-party direct investment.

2.1. SCOPE OF THE ENVIRONMENTAL ASSESSMENT

Under the guidance provided in NEPA and in 32 CFR Part 651, either an Environmental Impact Statement (EIS) or an EA must be prepared for any Federal action. Actions that are determined to be exempt by law, emergencies, or categorically excluded do not require the preparation of an EA or EIS. If an action may significantly affect the environment, an EIS would be prepared. An EA provides sufficient evidence and analysis for determining whether or not to prepare an EIS. An evaluation of the environmental consequences of the Proposed Action and the No Action Alternative includes direct, indirect, and cumulative effects, as well as qualitative and quantitative (where possible) assessment of the level of significance of these effects. The EA results in either a Finding of No Significant Impact (FNSI) or a Notice of Intent (NOI) to prepare an EIS.

This EA informs decision makers and the public of the likely environmental impacts of the Proposed Action and the No Action Alternative. This EA identifies, documents, and evaluates environmental effects of the proposed activity at FMMD. Environmental effects would include those related to construction and operation of the Proposed Action. The Proposed Action and No Action Alternatives are detailed in Section 3.0.

In November 2016, the U.S. Army Environmental Command (USAEC) finalized the *Programmatic Environmental Assessment for Construction and Operation of Solar Photovoltaic Renewable Energy Projects on Army Installations* (USAEC, 2016) to provide a programmatic-level analysis of the potential environmental consequences of implementing solar projects on Army lands. The intent of such programmatic documents, in accordance with CEQ regulations, is to provide a discussion of similar environmental impacts common for solar PV projects across all installations, while allowing for site-specific analysis as necessary. The analysis in USAEC's 2016 Programmatic EA (hereinafter referred to as the "Solar PEA") is incorporated by reference into this EA; this EA builds on that analysis by concentrating on those resource issues that are specific to the Proposed Action at FMMD. In addition, the Solar PEA includes a checklist that needs to be

completed for each EA tiered from the Solar PEA. This checklist is included to help installations determine which resource areas the project-specific EA should address. The checklist has been completed for this Proposed Action at FMMD and is provided in **Appendix A** of this EA. The Solar PEA is available at

https://aec.army.mil/application/files/2915/0273/0386/SolarPV_PEA.pdf.

The existing conditions at FMMD are described in Section 4.0, *Affected Environment and Environmental Consequences*. These existing conditions, along with the No Action Alternative, serve as a baseline against which other alternatives will be measured to evaluate the effects of the construction and operation of the solar array. The evaluation of potential impacts from the Proposed Action can also be found in Section 4.0, following the descriptions of each resource area. The following resources are evaluated in this EA: land use; geology, topography, and soils; water resources; biological resources; cultural resources; hazardous and toxic materials and waste (HTMW); utilities; transportation and traffic; noise; air quality and greenhouse gases; climate change; human health and safety; socioeconomics, to include environmental justice; airspace; and electromagnetic spectrum.

2.2. PUBLIC INVOLVEMENT

Public participation opportunities with respect to this EA and decision making on the Proposed Action are guided by 32 CFR Part 651. Upon completion, the EA will be made available to the public for 30 days, along with a draft FNSI. At the end of the 30-day public review period, the Army will consider any comments submitted by individuals, agencies, or organizations on the Proposed Action, the EA, or draft FNSI, if applicable. As appropriate, the Army may then execute the FNSI and proceed with implementation of the Proposed Action. If it is determined prior to issuance of a final FNSI that implementation of the Proposed Action would result in significant impacts, the Army will publish in the *Federal Register* a NOI to prepare an EIS, commit to mitigation actions sufficient to reduce impacts below significance levels, or not take the action.

2.3. ENVIRONMENTAL LAWS AND REGULATIONS

Army decisions that affect environmental resources and conditions occur within the framework of numerous laws, regulations, and EOs. Some of these authorities prescribe standards for compliance while others require specific planning and management actions to protect environmental values potentially affected by Army actions. Compliance with environmental regulations and EOs include, but are not limited to: the Clean Air Act, Clean Water Act, Section 106 of the National Historic Preservation Act, Coastal Zone Management Act, Endangered Species Act, Fish and Wildlife Coordination Act, Archeological Resources Protection Act, Migratory Bird Treaty Act, Noise Control Act, *Environmental Justice in Minority Populations and Low-Income Populations* (EO 12898), and *Protection of Children from Environmental Health Risks and Safety Risks* (EO 13045).

3. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

3.1. PROPOSED ACTION

The Proposed Action includes the construction and operation of a new approximately 10-MW solar PV panel field on a closed landfill, hereinafter Closed Sanitary Landfill (CSL), in the southeastern corner of FMMD. The Proposed Action also includes the lease of the land for the construction of the array and construction of a battery energy storage system (ESS) or other ancillary power control system. Existing developed areas would be used as pathways to connect the array and its controlling systems to existing facilities. As part of the Proposed Action, the Army would lease up to 181.6 acres of land for the solar project (Solar Field Plots A and B, **Figure 2**). This represents a larger area than the proposed solar field itself, intended to provide space for access roads and connection infrastructure to the array. This area also includes an area of the CSL (northernmost portion) that is currently undergoing remediation but has the potential to support additional panel fields in the future. A third-party developer would build, own, and operate the solar PV asset on the Fort Meade CSL. The exact size and technology will be determined during the lease solicitation process. During normal operations, the power produced by the project would feed into the regional power grid, improving the resiliency of the grid by adding distributed generation sources and diversifying the power supply chain.

A third-party developer would be granted the lease based on one of two economic incentive mechanisms: a power purchase agreement, or the Maryland Community Solar Pilot Program. The mechanism used would prescribe whether the energy generated from the solar field is directed primarily off-site to a private utility, with provisions for an emergency power supply to be available to FMMD or purchased and consumed primarily by FMMD. As stated in the previous paragraph, this arrangement would be determined during the lease solicitation process and is not known at this time. The Proposed Action description is intended to encompass both scenarios to ensure all potential impacts are analyzed in the EA, to provide project designers with adequate information for considering environmental effects of more than one option, and to allow for flexibility during the design process.

3.2. NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Action would not be implemented. The No Action Alternative does not support the Army's resilience strategy or provide an opportunity to move towards increased carbon free energy production.



Figure 2. Proposed Action Location

4. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section presents the affected environment at the Proposed Action site and analyzes the environmental consequences of implementing the Proposed Action. The impacts of a proposed action can vary in duration. Two levels of impact duration could occur: short-term and long-term. Short-term impacts are temporary and generally occur during construction with the resource returning to preconstruction condition almost immediately afterward or represent impacts that could last up to two years following construction. Impacts considered long-term would occur if the resource would require more than five years to recover or result in a permanent change from an activity that affects a resource for the life of the project or beyond.

4.1. LAND USE

4.1.1. *Affected Environment*

4.1.1.1. *Regional Land Use*

FMMD encompasses approximately 5,107 acres and is located in the northwest corner of Anne Arundel County, Maryland approximately 17 miles southwest of downtown Baltimore and 24 miles northeast of Washington, DC. The state capitol, Annapolis, lies approximately 14 miles southeast. FMMD includes administrative areas, Army Family Housing areas, industrial and maintenance areas, the exchange mall complex, and the Kimbrough Ambulatory Care Clinic.

FMMD is bounded by the Baltimore-Washington Parkway (MD 295) to the northwest, Annapolis Road (MD 175) to the east, Patuxent Freeway (MD 32) to the south and west, and the Maryland Area Regional Commuter (MARC) Penn Line and Amtrak Line to the southeast. Other significant nearby transportation arteries include US Route 1 and Interstate 95, which run parallel to and just north of the Baltimore-Washington Parkway. Interstate 97, which connects Baltimore and Annapolis, is located several miles east of FMMD and can be reached by taking MD 175 or MD 32 east. FMMD is predominately surrounded to the north, west, and east by residential areas, commercial centers, a mix of light industrial uses, and undeveloped areas. Directly to the south of FMMD are the Tipton Airport and the 12,750-acre Patuxent Research Refuge, part of the U.S. Fish and Wildlife Service's (USFWS) National Wildlife Refuge System.

4.1.1.2. *Land Use within FMMD*

Privatized family housing, located mostly to the north, is open to active military and their families, retirees, and DoD civilian personnel. This makes up a significant portion of the installation with approximately 1,000 acres of land used exclusively for housing. The remaining areas of the installation toward the central and south primarily consist of barracks, administrative, industrial, mission headquarters, range and training, parks and recreation, schools, retail, and Soldier support functions. Recreation areas include Burba Lake and Centennial Park, with training areas in the southeast portion of the installation (United States Army Corps of Engineers [USACE], 2020).

Existing and future use of Army installations are guided by each installation's Real Property Master Plan.

The Proposed Action area is a 181.6-acre parcel located within the southeast corner of FMMD and is characterized as a combination of open space and forest (FMMD, 2020). The primary location identified for the solar array encompasses two areas of the CSL. This area contains infrastructure to both passively and actively address contamination from its former use as a landfill, but this infrastructure constitutes a relatively small influence on the overall character of this area as vegetated open space. The Proposed Action area also includes an area of the CSL (northernmost portion) that is no longer receiving waste but is actively undergoing grading as it receives excess uncontaminated soils from another construction project on the installation. This area is included in the Proposed Action area to allow the third-party developer flexibility in project design, provided all applicable remediation requirements are addressed. The western portion of the Proposed Action area is generally characterized as "non-buildable" due to natural resource constraints, namely, streams, wetlands, and forest. It is included in the Proposed Action area to be consistent with the lease documentation that the installation will use to support the third-party development of the solar field. This area is designated as a training area in the FMMD Area Development Plan (FMMD, 2020) and mid- to long-range plans envision construction of an individual physical training area and refurbishing an existing confidence course. The western portion of the lease area is intended to provide general site access to the solar panel field and would likely also support installation of an interconnection pathway to the closest electrical substation.

Other land uses immediately surrounding the Proposed Action area include a large Baltimore Gas and Electric (BGE) electric line right of way and forested area to the north of the landfill, small-arms training ranges to the west off Magazine Road, and the Amtrack rail line and rail yard to the southeast.

Although viewsheds are not a land use, for the purposes of this EA, a discussion of viewshed will be included in this section. Viewsheds encompass the landscape visible from a specific point. Topography, structures, vegetation, or other physical barriers typically are used to define the borders of a viewshed; however, a viewshed is sometimes limited by distance, changes in land use, or changes in visual character (USAEC, 2016).

4.1.2. *Environmental Consequences*

Land use impacts are based on the level of land use sensitivity in areas affected by a proposed action and compatibility of proposed actions with existing and future planned conditions. Factors considered in evaluating land use impacts include the potential for the Proposed Action to be incompatible with surrounding land uses; result in a change of land use that would degrade mission-essential activities; or be inconsistent or in conflict with the environmental goals, objectives, or guidelines of an installation or community comprehensive plan for the affected area.

Solar PV projects could preclude other land uses within the project footprint (USAEC, 2016). Impacts to land use would be considered significant if the Army actions are substantially

incompatible with existing military land uses and land use designations; or have major conflicts with Army land use plans, policies, or regulations; or create a considerable land use conflict with off-post land use. The Region of Influence (ROI) for this resource area is land use within the boundaries of FMMD and immediately surrounding communities, to include regional viewsheds. The following sections provide a discussion of the possible environmental impacts to land use that could result from the Proposed Action and No Action alternatives.

Distribution lines may require additional acreage, although this acreage would be generally linear in nature and would, to the maximum extent practicable, follow existing rights of way and use existing utility corridors. Infrastructure required for ancillary power control systems may also require additional acreage and will be dependent on the ESS and optimal location for a microgrid or back-up generator based on related distributed energy systems.

Solar arrays have the potential to affect the viewshed of the area. The installation of PV facilities would create a visual impact, but lacking the height of smokestacks or wind turbines, the visual impact at ground level, or within a neighboring building, would be limited. An ESS, or battery, would add a single-story structure and would not disrupt the skyline view of neighboring areas. Together with the array, the ESS would be in keeping with the general feel of the project area as a utility infrastructure type of land use.

4.1.2.1. Impacts from Construction of the Proposed Action

The Proposed Action would have short-term, negligible, direct, adverse impacts on land use as associated with the temporary presence of construction equipment. The installation of the solar panel field and supporting infrastructure, such as access roads, ESS, and stormwater management features, would occur within the boundary of FMMD. Therefore, the construction phase for these features has no reasonable mechanism to impact or induce changes in regional land use outside of FMMD. Additionally, construction would not reasonably impact or prevent existing or planned activities from occurring within FMMD. Any potential impact associated with the presence of construction equipment on land use with FMMD would cease once the construction phase was completed. Thus, adverse impacts during construction would be short-term, direct, and negligible.

The Proposed Action site would be disturbed during construction and careful design would be required to ensure compatibility with any regulatory requirements. Access to the construction site would need to be coordinated with the ongoing soil stockpiling associated with another construction project on FMMD, as both would bring heavy trucks to the Proposed Action area; however, it is anticipated that the timing could work out such that the two activities occur sequentially rather than concurrently.

Construction activities, which are inherently aesthetically displeasing, would have short-term, negligible adverse visual and aesthetic effects, which would cease when construction was completed. Construction activities normally would be limited to hours when contractors are permitted on the installation (7 a.m. to 5 p.m. on weekdays). The adverse effects of construction

would be tempered by the surrounding forest which provides a natural visual screen surrounding much of the Proposed Action site.

4.1.2.2. Impacts from Operation of the Proposed Action

Long-term, minor, and direct adverse effects on installation land use would be expected from implementing the Proposed Action. While the solar array would permanently occupy land on FMMD, the prior use of the land as a nonhazardous waste landfill precludes most other forms of development. Use of the Proposed Action area for a solar array facility does not preclude planned development in the main cantonment areas of FMMD in accordance with the Future Development Plan (FDP). Operation of the Proposed Action would not alter use of the training ranges or other adjacent land uses, both on and off the installation. The implementation of possible future improvements for the western portion of the Proposed Action area, namely, the individual physical training area and confidence course, would not be precluded by the Proposed Action. The day-to-day operation of the Proposed Action would be a passive land use interrupted only by periodic maintenance and washing activities.

Long-term, minor adverse effects on viewsheds would be expected from operation of the proposed action. The landfill areas are bounded by a large expanse of mature forest that is part of the Patuxent Research Refuge to the west and southwest. To the north of the Proposed Action area, a utility right of way and another, narrower swath of forest provide screening from SR 32. To the east and southeast, the Amtrack railroad, installation perimeter fence and narrow (approximately 65 foot wide) band of forest provide some level of visual buffer between the Proposed Action area and nearby residential areas within the town of Odenton. Adverse visual effects are expected to be minor due to the surrounding forest buffer and the relatively low elevation of the landfill compared to a typical municipal facility. Therefore, it would not result in an imposing visual presence for residents or commercial building occupants, as, generally, buildings are in the 1- to 3-story height range within an approximately half-mile radius for the surrounding community.

4.1.2.3. Impacts from the No Action Alternative

There would be no change to existing land use as a result of the No Action Alternative; the capped portions of the CSL would continue to be managed as a closed landfill site with remediation activities. The northernmost portion of the CSL that is currently undergoing remediation would eventually become inactive upon completion of the remediation and allowed to revegetate. This area would likely remain an open space area within the installation boundaries, with the potential for the addition of walking paths installed as part of the long-range master plan.

4.2. GEOLOGY, TOPOGRAPHY, AND SOILS

Geological resources are defined as the topography, geology, and geological hazards of a given area and soil resources are the superficial unconsolidated and usually weathered part of the earth's crust. Topography is typically described with respect to the elevation, slope, aspect, and surface features found within a given area. The geology of an area includes bedrock materials, mineral deposits, soils, paleontological resources, and unique geological features.

4.2.1. Affected Environment

4.2.1.1. Geology

The geologic history of the eastern United States is characterized by mountain-building processes and the cyclical opening and closing of a proto-Atlantic Ocean (USGS, 2000). During the mountain building event called the Alleghenian Orogeny, shallow water marine sediments were uplifted, forming the Blue Ridge-South Mountain anticlinorium. During the Cenozoic Era (1.65 million years before present to recent), the Blue Ridge-South Mountain anticlinorium began to erode, depositing Atlantic Coastal Plain sediments. Unconsolidated sand, clay, and silt compose the Atlantic Coastal Plain physiographic province. These sediments thicken towards the southeast, forming a wedge. Precambrian crystalline rocks underlie the sediments and are exposed along the boundary between the Coastal Plain and Piedmont provinces several miles to the west of FMMD.

4.2.1.2. Topography

FMMD lies in the Atlantic Coastal Plain Physiographic Province, which is characterized by relatively flat topography that slopes towards the east (Maryland Geological Survey [MGS], 2008). FMMD has approximately 210 feet of topographic relief. The highest point is at 310-feet above mean sea level (msl) and occurs at the First Army Radio Station Tower, located in the northernmost central portion of FMMD. The lowest elevation, less than 100 feet, occurs in the southwestern corner of FMMD, along the Little Patuxent River. Most of FMMD slopes gradually to the south and southwest. The Proposed Action area is in the southeast corner of FMMD. Slopes at FMMD are generally less than 10% grade (USACE, 2007). Slopes exceeding 10% are rare and occur primarily in pockets in the north-central and central parts of FMMD and along stream corridors. These steep slopes usually occur in natural wooded areas and are ideally suited as vegetated buffer zones for more developed areas.

Topography affects where development is feasible on the post. Where slopes are 10% or greater, the post should take care to maintain safe setback distances or regrade, as necessary. While much of the level land has been developed, the greatest topographical change occurs in the southeast portion of the post. This area is more forested and used for range and training areas (FMMD, 2020).

4.2.1.3. Soils

The U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) has mapped 14 distinct soil types within the Area of Investigation (AOI). **Table 1** below lists the types found as well as their acreage in the AOI. Udorthents (refuse substratum and loamy) account for approximately 68% of the soil type within the Proposed Action area. These soils are highly disturbed and found in urban environments coming from human transported material including refuse and fill. Fallsington sandy loams and Patapsco-Evesboro Fort-Mott Complex are the other primary soil types found in the Proposed Action area and account for approximately 22% of the Proposed Action area.

Table 1. Soils within the OEI Solar Proposed Action Area

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
DvB	Downer-Hammonton complex, 2 to 5 percent slopes	2.1	1.0%
DwB	Downer-Hammonton-Urban land complex, 0 to 5 percent slopes	0.3	0.1%
FaaA	Fallsington sandy loams, 0 to 2 percent slopes, northern coastal plain	21.7	10.9%
PeB	Patapsco-Evesboro-Fort Mott complex, 0 to 5 percent slopes	22.7	11.3%
PgB	Patapsco-Fort Mott-Urban land complex, 0 to 5 percent slopes	12.1	6.0%
PgD	Patapsco-Fort Mott-Urban land complex, 5 to 15 percent slopes	1.0	0.5%
RhB	Russett-Christiana-Hambrook complex, 0 to 5 percent slopes	0.1	0.0%
UfG	Udorthents, refuse substratum, 0 to 50 percent slopes	102.0	50.9%
UoB	Udorthents, loamy, 0 to 5 percent slopes	33.7	16.8%
UoD	Udorthents, loamy, 5 to 15 percent slopes	1.6	0.8%
Uz	Urban land	0.6	0.3%
W	Water	0.9	0.4%
WdaB	Woodstown sandy loam, 2 to 5 percent slopes, Northern Coastal Plain	0.2	0.1%
ZBA	Zekiah and Issue soils, 0 to 2 percent slopes, frequently flooded	1.4	0.7%
Total for areas of interest		200.4	100%

Source: USDA NRCS, 2022

4.2.2. Environmental Consequences

A significant impact to geology and soils would occur if the Proposed Action induced wind borne or stormwater related soil erosion that exceeds the amount of soil loss at which the quality of a soil can be maintained to sustain existing vegetation.

4.2.2.1. Impacts from Construction of the Proposed Action

Geology

No effects would occur to geology under the Proposed Action. The mounting system proposed for the array field will influence the extent of ground disturbance as some mounting systems will require excavation or ground penetration (e.g., poured concrete footers, driven poles) and others would not (e.g., ballasted ground mounting). Design would also influence the extent of trenching needed between modules for power distribution of the array system to the point where the system would be connected to a power grid. However, the earth-disturbing activities involved in the installation of solar PV arrays are not significant enough to change the geology of the area (USAEC, 2016).

Topography

The Proposed Action would result in negligible, short-term, and direct adverse effects to topography. The former landfill sites within the Proposed Action area have already been subject to extensive excavation and grading. Final grading to close the sites was designed to optimize

stability of slopes and minimize the risk of erosion from failed slopes or cave-ins. Site design for the solar field array would include minimizing grading requirements within topographically diverse areas by using variable elevation heights of support posts for different blocks of arrays (USAEC, 2016). Reduction of grading requirements would thereby reduce potential adverse impacts to soils.

Ground-disturbing activities involved in construction of the Proposed Action include vegetation removal, grubbing, and grading necessary to establish a level surface for the placement of the solar PV arrays, followed by the construction of security fencing, equipment shelter(s), an access road, transmission line(s) and, if needed, an ancillary power control system.

Soils

Short-term, minor, adverse effect on soils would occur during installation of the Proposed Action. The topography and soils within the Proposed Action area would be characterized prior to construction to assess their suitability for construction and potential for erosion. Installation stormwater management plans provide requirements for minimizing soil erosion that could impact streams and other water bodies from sedimentation. The developer and its contractors would use standard best management practices (BMPs) such as soil stabilization and erosion control to manage soil loss during construction, and soils would be stabilized after construction.

Examples of erosion control BMPs include sandbags, silt fences, earthen berms, fiber rolls, sediment traps, erosion control blankets, check dams in medium-sized channels, or straw bale dikes in a smaller drain channel. Other BMPs may also be specified in an installation's Stormwater Pollution Prevention Plan (SWPPP) and fugitive dust control plan. The contractor or organization constructing the solar PV system may also have soil erosion environmental protection measures identified as requirements within the associated construction permit (e.g., the National Pollutant Discharge Elimination System [NPDES] permit). In addition, soil conservation and stormwater management regulations require that appropriate BMPs be used to minimize/eliminate site-specific erosion concerns. BMPs would also assist in minimizing soil compaction issues related to construction activities.

4.2.2.2. Impacts from Operation of the Proposed Action

Geology

No impacts would occur from the operation of the Proposed Action.

Topography

Operation of the solar PV arrays would have no impact on topography. The solar arrays and their ancillary structures would only require grading during site preparation for installation.

Soils

The operation of the solar PV arrays would not directly cause any impacts to soil. However, minor indirect, long-term impacts would occur from natural erosive forces. This would be prevented

through BMPs and regular checkup and necessary intervention if soils erosion is noticeable around the solar PV arrays. Washing of solar panels would be conducted in a manner such that no erosion would result from this routine maintenance activity.

4.2.2.3. Impacts from the No Action Alternative

Under the No Action Alternative, existing conditions would remain unchanged. The CSL would remain vegetated and unmaintained, and there would be no mechanisms or activities to impact soil quality. Thus, the No Action Alternative would have no impact on soils. The geology, topography, and soils within FMMD would remain unaltered.

4.3. WATER RESOURCES

Water resources are defined as sources of water available for use by humans, flora, or fauna, including surface water, groundwater, near-shore waters, wetlands, and floodplains (USAEC, 2016). Water resources are broken down into surface water, floodplains, wetlands, groundwater, stormwater, and the coastal zone, each of which is defined individually.

4.3.1. Affected Environment

4.3.1.1. Surface Water

Surface water systems are typically defined in terms of watersheds. A watershed is a land area bounded by topography that drains water to a common destination. A watershed boundary will more or less follow the drainage divide or the highest ridgeline around stream channels, which will meet at the bottom or lowest point of the land where water flows out of the watershed, commonly referred to as the mouth of the waterway. Surface water resources, including but not limited to, stormwater, ponds, lakes, streams, rivers, and wetlands, are important for economic, ecological, recreational, and human health reasons. Year-round presence of water in surface water features varies, falling into the categories of perennial, intermittent, and ephemeral. Perennial surface waters normally have water at all times. Intermittent surface waters flow only when they receive water from rainfall or springs, or from some surface sources such as melting snow. Ephemeral surface waters flow in direct response to precipitation; they receive little to no water from springs, melting snow, or other source and its channel is over the water table at all times (USGS, 2013).

FMMD is located within the greater Chesapeake Bay watershed. The Chesapeake Bay is North America's largest and most biologically diverse estuary, home to more than 3,600 species of plants, fish, and animals (Chesapeake Bay Program, 2022). To protect and restore this valuable ecosystem, Maryland joined a consortium of state and federal agencies to establish the Chesapeake Bay Program partnership. The Army's conservation mission supports the Chesapeake Bay Programs, and FMMD is implementing BMPs that support the guidelines established by the partnership.

FMMD lies almost entirely within the Little Patuxent River watershed (Maryland watershed code number 02131105) of the Patuxent River Basin. A small area in the northeast corner of the FMMD drains to the Severn River. The Patuxent River is approximately two miles from FMMD and drains

an area of 932 square miles before discharging to the Chesapeake Bay's western shore and is designated a "scenic river" under the Maryland Scenic and Wild Rivers Act of 1968. The Act mandates the preservation and protection of natural values associated with each designated river, and state and local governments are required to take whatever actions necessary to protect and enhance the qualities of the designated rivers. The Little Patuxent River was listed on Maryland's list of impaired waters under Section 303(d) of the Clean Water Act (CWA) in 2011. Impairments include sediments, metals (cadmium) and biological. An Anne Arundel County Department of Public Works (DPW) sampling in 2019 confirmed the majority of the Little Patuxent River remains impaired (Anne Arundel County DPW, 2019). There are currently two final approved Total Maximum Daily Loads (TMDLs) within the Little Patuxent River: 1) a sediment/total suspended solids (TSS) TMDL from urban stormwater sources approved in 2011 and 2) a TMDL approved in 2017 for polychlorinated biphenyls (PCB) for the Patuxent River, including the Little Patuxent River. Due to this, it is assumed that stormwater runoff from new development would be treated to the maximum extent practicable to achieve 90% sediment removal (Anne Arundel County DPW, 2016).

FMMD contains approximately 7.2 miles of perennial streams as well as other intermittent and ephemeral channels. The major water resources on FMMD are Burba Lake and the Midway Stream Branch along with its primary tributary, the Franklin Branch, both of which are tributaries of the Little Patuxent River. The majority of FMMD is drained by Midway Branch, which flows for the entire length of FMMD from the northern end to the southern end, then confluences with the Little Patuxent River to the south and west of the Proposed Action area.

The surface water system (wetlands and stormwater) generally flows into Midway Branch to the south. There is a complex stormwater system that drains the area surrounding the Proposed Action area and connects with the wetlands onsite in multiple places. There are four stormwater ponds. The Proposed Action area contains a small intermittent stream on the northeast section that flows into a wetland. A blowout of the access road just west of this wetland has exposed outlet pipes with water flowing east from the wetland, indicating an underground pipe connection to the intermittent stream. The findings are further presented as a technical memorandum on wetlands prepared by USACE (2023).

4.3.1.2. Floodplains

Floodplains are defined as relatively flat areas adjacent to rivers, streams, watercourses, bays, or other bodies of water subject to inundations during flood events. 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 and its further amendments.

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). The USACE conducted a floodplain study in 2008 to map areas along the streams on FMMD.

On January 30, 2015, EO 11988 was amended by EO 13690, *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input*. EO 13690 provides three approaches that federal agencies can now use to establish the flood elevation and hazard area for consideration in decision-making: climate-informed science approach; adding two to three feet of elevation to the 100-year floodplain; and using the 500-year floodplain. In response to EO 13690, FEMA issued floodplain management guidelines for implementing EOs 11988 and 13690, dated October 8, 2015.

The Proposed Action area is within FEMA flood map areas 24003C0129E and 24003C0128E effective October 16, 2012 (FEMA, 2012). These maps indicate that the majority of the Proposed Action area is within Zone X, defined as an area determined to be outside the 500-year floodplain. Decisions on the precise location of a utility pathway that would connect the solar array field to the appropriate electrical distribution infrastructure would not be made until a developer has been awarded the lease; however, because of the presence of the 500-year (Zone X) and 100-year (Zone AE) floodplains of Midway Branch in the Proposed Action vicinity, there is the potential for a utility pathway to intersect this floodplain.

4.3.1.3. Wetlands

The USACE defines wetlands as “those areas that are inundated or saturated with ground or surface water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas” (33 CFR Part 328). Jurisdictional wetlands are those wetlands subject to regulatory protection under Section 404 of the CWA and EO 11990, *Protection of Wetlands*. Wetlands serve important functions including water quality improvement, groundwater recharge and discharge, pollution mitigation, stormwater attenuation and storage, sediment detention, and erosion protection. If a formal wetland delineation has already been determined for the Army installation for the proposed project area, this can be used to determine the occurrence of jurisdictional wetlands or other regulated waters of the U.S. within the footprint of the construction area for any proposed new facilities and associated infrastructure.

FMMD has approximately 217 acres of wetlands, most of which occur along the Little Patuxent River floodplain in the southwestern portion of FMMD and along Midway Branch, Franklin Branch, and their tributaries. Most of the wetlands on FMMD are palustrine forested (PFO) (typically include sweetgum, red maple, white oak, tulip tree, loblolly pine, black tupelo) along the Little Patuxent River and in the northwestern portion of FMMD. Smaller areas of wetland within FMMD include palustrine emergent (PEM) and palustrine scrub shrub (PSS). Riparian

buffers were incorporated into the FMMD Comprehensive Expansion Management Plan projects to minimize impacts and degradation to waterbodies leading to the Chesapeake Bay. FMMD maintains a voluntary 100-foot riparian forest buffer along streams and abutting wetlands to the maximum extent practical (FMMD, 2022a). The state of Maryland requires a 25-foot buffer for non-tidal wetlands under the Maryland Nontidal Wetlands Protection Act.

Approximately 180 acres of the Proposed Action area were surveyed by biologists from the USACE, Baltimore District in July and August of 2022 to provide updated information on the extent of wetlands present (USACE, 2023). No wetlands were delineated atop the elevated landfill areas. There are stormwater drainage features that receive surface runoff from the higher ground of surrounding areas and drain from east to west, connecting with natural wetland features found in Plot B of the Proposed Action area (see **Figure 2**). There is a large (24-acre) wetland system within the forested western portion of Plot B that drains west to the Rogue Harbor Branch of the Midway Branch, located off-site. There are also four PEM wetlands that were delineated totaling 1.87 acres (USACE, 2023); however, these are isolated wetlands and therefore not expected to be regulated by the Maryland Department of the Environment (MDE).

4.3.1.4. Groundwater

Groundwater is classified as any source of water beneath the ground surface and may be used for potable water, agricultural irrigation, and industrial applications. Near-shore waters can be directly affected by human activity and are important for human recreation and subsistence.

The Patuxent, Upper Patapsco, and Lower Patapsco aquifers lie under the FMMD property (FMMD, 2004). The Lower Patapsco and Patuxent aquifers are separated by the Arundel Clay formation. The Patuxent Aquifer consists of lenticular interfingering sands, silts, and clays capable of yielding large quantities of water. This aquifer is 200 to 400 feet thick and is the deepest of the three aquifers beneath FMMD. The Upper Patapsco Aquifer is unconfined and is considered the water table aquifer.

American Water owns and operates the potable water system that serves FMMD. American Water obtains potable water from six wells under a Water Appropriation and Use permit from the MDE (Atkins, 2011). The wells draw from the Patuxent Aquifer and range in depth from 500 to 800 feet below ground surface. Individual wells range in capacity from 720 gallons per minute (GPM) to 1,000 GPM (USACE, 2007). Total capacity of the wells is 5,000 GPM or 2.75 million gallons per day (MGD). The Water Appropriation and Use Permit (Permit Number. AA1969G021[7]) allows an average withdrawal of approximately 3.3 MGD from these wells.

4.3.1.5. Stormwater

Stormwater runoff at FMMD is conveyed to three primary drainages, with the majority of stormwater runoff carried by Midway and Franklin Branches, which discharge to the Little Patuxent River and ultimately into Chesapeake Bay. Runoff from developed areas at FMMD is conveyed through an extensive network of stormwater pipes and associated drainage structures, supplemented by swales, ditches, other drains, and retention ponds (FMMD, 2005). In recent years,

FMMD has followed federal and MDE environmental site design standards for development. Additionally, FMMD has a stormwater management plan and employs a number of stormwater management initiatives, including low impact development, to manage stormwater. Some examples of these include creating rain gardens, replacing concrete storm drains with grass swales, installing tree box filters, and creating stormwater retention ponds.

The proposed site has a system of stormwater drainages already in place. There are drainages (swales) that flow east to west. Each swale follows the toe of the slope to capture the runoff from its large downward slopes. There are also several stormwater ponds that capture stormwater flow. The stormwater drainage system connects with the wetlands on site in multiple places, particularly with one wetland in Plot B (**Figure 2**); this wetland appears to be connected to the large stormwater pond to the northwest. There is a large pipe blowout that appears to be causing sheet flow from the stormwater pond. This failed pipe had been installed to allow crossing for an access road running north-south on the far western perimeter of the Proposed Action area.

Energy Independence and Security Act of 2007

Army stormwater management practices are also required to comply with Section 438 of the Energy Independence and Security Act (EISA) of 2007, which directs federal agencies sponsoring development or redevelopment of over 5,000 square feet in size to use site planning, design, construction, and maintenance strategies for the property to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of water flow. This requirement is further emphasized by Army policy which states development projects of 5,000 square feet (1,524 square meters) or greater must be planned, designed, and constructed to manage any increase in stormwater runoff (i.e., the difference between pre- and post-project runoff) within the limit of disturbance.

Code of Maryland Stormwater Regulations

Provisions of Code of Maryland Regulations (COMAR) 26.17.02.01 (*Maryland Department of the Environment, Water Management, Purpose and Scope*) require that all jurisdictions in Maryland implement a stormwater management program to control the quality and quantity of stormwater runoff resulting from new development.

This regulation asserts the:

The primary goals of the State and local stormwater management programs are to maintain after development, as nearly as possible, the predevelopment runoff characteristics, and to reduce stream channel erosion, pollution, siltation and sedimentation, and local flooding by implementing environmental site design to the maximum extent practicable and using appropriate structural best management practices only when necessary.

These regulations for stormwater management apply to the development or redevelopment of land for residential, commercial, industrial, or institutional use, but do not apply to agricultural land management practices. These provisions specify the minimum content of county and municipal ordinances, responsibilities of the Administration regarding the review of the county and municipal

stormwater management programs, and approval of State-constructed projects for stormwater management by MDE. These provisions apply to all new development and redevelopment projects that do not have final approval for erosion and sediment control and stormwater management plans by May 4, 2010.

COMAR Title 26.17.02.05 (*When Stormwater Management is Required*) exempts any developments that do not disturb over 5,000 square feet of land area or 100 cubic yards of earth. Conversely, developments disturbing over 5,000 square feet of land or 100 cubic yards of earth require stormwater management. The stormwater management plan requirements are outlined in COMAR 26.17.02.09.

Environmental Site Design (ESD) requires a developer to demonstrate that all reasonable opportunities for meeting stormwater requirements using ESD have been exhausted by using natural areas and landscape features to manage runoff from impervious surfaces and that structural BMPs have been used only where absolutely necessary. The 2015 Stormwater Management Guidelines for State and Federal Projects would be implemented to the maximum extent technically feasible for the Proposed Action.

Municipal Separate Storm Sewer System Phase II

The FMMD, Environmental Division, Stormwater Program is required to meet the Municipal Separate Storm Sewer System (MS4) Phase II permit requirements for the treatment of approximately 200 acres of impervious surface. FMMD would also comply with the MS4 Phase II State and Federal permit which obligates minimum control measures for construction and post-construction runoff control.

The FMMD Stormwater Program's goal is to meet MS4 permit requirements by using stream restoration for TMDL wasteload reductions that result in impervious surface acreage equivalent credits. Projects are designed to improve degraded urban stream systems by providing for functional (stream mechanics) and biological lift (abundance/diversity of organisms).

The FMMD Environmental Division is currently planning the restoration of eight priority stream reaches on the post. New BMPs and BMP retrofits are all part of the restoration plan. The Stormwater and Natural Resource Programs have shared interest for meeting regulatory requirements and providing ecosystem benefits. The approach has been to assess the restoration potential for select streams and apply means and methods to the maximum ecological extent practical to meet programmatic goals. The Stream Functions Pyramid Framework and the USEPA Chesapeake Bay – Stream Restoration Expert Panel Protocols are used to accomplish this goal.

General Construction Permit

As part of the process to obtain the construction general permit for stormwater discharges during construction, the solar facility operator or construction contractor would prepare a SWPPP. SWPPPs include implementation of BMPs, performing frequent visual inspections, and conducting benchmark monitoring to determine BMP effectiveness. Monitoring results are

analyzed in relationship to the identified water quality objectives and if the benchmarks are not being reached, the BMPs would be modified.

4.3.1.6. Coastal Zone Management Plan

The Coastal Zone Management Act (CZMA) of 1972 (16 USC §1451, et seq., as amended) provides assistance to states, in cooperation with federal and local agencies, for developing land and water use programs in the coastal zone. CZMA policy is implemented through state Coastal Zone Management (CZM) programs. Federal lands are excluded from the jurisdiction of these state programs. However, activities on federal lands are subject to CZMA federal consistency requirements if the federal activity would affect any land or water or natural resource of the coastal zone, including reasonably foreseeable effects. Specifically, in accordance with Section 307 of the CZMA and 15 CFR 930 subpart C, federal agency activities affecting a land or water use or natural resource of a State's coastal zone must be consistent to the maximum extent practicable with the enforceable policies of the State's coastal management program.

According to 15 CFR 930.41, the reviewing state has 60 days from receipt of the Consistency Determination to “concur” or “object.” States are not required to concur with a Negative Determination. However, if a response from the state is not received by the 60th day of submittal (unless a one-time extension was requested), the federal agency may presume state agency concurrence. Additionally, 15 CFR 930.43 provides that should a state object to a Consistency Determination, the state and federal agencies should attempt to resolve their differences. However, if no resolution can be met, the federal agency may proceed if federal law prohibits the agency from being fully consistent or if that federal agency has concluded that its Proposed Action is fully consistent with the enforceable policies of the management program, though the state agency objects. If a federal agency decides to proceed with a federal agency activity that is objected to by a state agency, or to follow an alternative suggested by the state agency, the federal agency shall notify the state agency of its decision to proceed before the project commences.

All of FMMD is located within Maryland's Coastal Zone and is therefore subject to regulations pursuant to Maryland's CZM program. This includes the Chesapeake Bay, into which water from streams and their tributaries on FMMD flow. MDE regulates activities that are proposed within the CZM Program through federal consistency requirements. Under these requirements, applicants for federal and state licenses or permits must certify their proposed activity will be conducted in a manner consistent with the State's CZM Program. A Coastal Zone Consistency determination has been prepared for this project and is included in **Appendix B**. If a state permit is not required for a project, MDE has the authority to “concur” or “object” to the federal consistency determination.

4.3.2. Environmental Consequences

Impacts to water resources would be considered significant if impacts (1) substantially deplete groundwater supplies or interfere with groundwater recharge, (2) result in a violation of federal and/or state water quality standards, (3) cause an unpermitted direct impact on a water of the United States or (4) alter existing drainage patterns.

4.3.2.1. Impacts from Construction of the Proposed Action

Surface Water

Construction of the Proposed Action could result in short-term, negligible, direct, adverse impacts to surface water. Impacts could occur if sediment-laden stormwater runoff from the construction site migrated to the Little Patuxent River. During the design of the project, appropriate Soil Erosion and Sediment Control Plans would be developed and necessary permits obtained by FMMD or the construction contractor. Where possible, the designs would be developed to avoid or minimize impacts to surface water resources. These designs would comply with TMDL requirements for the Little Patuxent River, limiting stormwater runoff to the maximum extent possible.

Provided that a construction general permit for stormwater has been approved and implemented, construction of the Proposed Action would not cause an impairment of surface waters. With the implementation of permit-related construction BMPs, limited construction-related stormwater runoff is expected to intersect with the Little Patuxent at any time during construction or operation of the Proposed Action.

Floodplains

Impacts to floodplains would be considered significant if impacts (1) threaten or damage unique hydrologic characteristics (2) endanger public health by creating or worsening health hazard conditions, or (3) violate established laws or regulations adopted to protect floodplains.

EO 11988 directs that any new construction must avoid floodplains as much as possible, and if construction in the floodplain cannot be avoided, a Finding of No Practicable Alternative (FONPA) must be made by the Army and flood protection measures would be required by the third-party developer to reduce the risk of flood-associated damages.

Adverse impacts to the floodplain caused by and during instream construction of restoration measures are not anticipated. EO 11988 directs that any new construction must avoid floodplains as much as possible, and if construction in the floodplain cannot be avoided, flood protection measures must be undertaken to reduce the risk of flood-associated damages.

The interconnection pathway from the solar array to electrical distribution infrastructure could intersect the 500-year (Zone X) and 100-year (Zone AE) floodplains of Midway Branch, areas subject to inundation by the 0.2-percent-annual and 1-percent-annual chance flood events. Installation of this utility line pathway could temporarily impact up to approximately 5,740 square feet (0.13 acres) of floodplain. The interconnection would be expected to be installed either through underground directional boring, or from open trenching with backfill to the original elevation. Either option, or a third option of using overhead lines in this area only, would not change the elevation of the floodplain. See **Appendix C** which contains a draft FONPA.

Once a third-party developer has been identified and the project design is initiated, the details of the interconnection pathway would be reviewed considering EOs 11988 and 13690, which requires Federal agencies to avoid actions located in or adversely affecting floodplains unless there is no

practicable alternative. The Proposed Action would have no long-term or short-term adverse effects on floodplains, provided all practicable steps to avoid the floodplain encroachment and impacts are undertaken. During design, the alignment of the interconnection pathway would be expected to be modified to the extent practicable to avoid encroachment into the floodplain.

Wetlands

Significant adverse impacts to wetlands would occur if the Proposed Action (1) fills or alters a portion of a wetland that would cause irreversible negative impacts to a species or habitat of high concern, (2) irreversibly degrades the quality of a unique or pristine wetland and (3) reduces population size or distribution of species of high concern.

The Proposed Action would have a short-term, direct, minor adverse impact on wetlands due to potential small disturbances to the wetland in Plot B. The solar array field itself, which would comprise the majority of the project footprint, would be placed on top of the capped portion of the CSL and no wetlands have been documented within this high ground. The potential for other project components to intersect mapped wetland areas is found primarily within yet-to-be-determined access roads. No site layout plans are available at this stage of the project because such plans would be the responsibility of the third-party developer that obtains the areas to be leased from FMMD as part of the Proposed Action; however, throughout the project design process, all efforts would be made to avoid impacts to wetlands by citing project elements outside of the delineated wetland footprint, namely, the aforementioned identified wetland in Plot B and its 100-foot buffer. To the extent practicable, existing gravel access roads would be used for construction and operational activities associated with the panel array. If the access pathway with the washed-out area referenced above is identified as the best access path, repairs would be necessary to reestablish a passable route past the stormwater pond. Following the required wetland permitting regulations, impacts to wetlands would be minor.

Groundwater

Impacts to groundwater would be considered significant if a project (1) reduces water availability or supply to existing users, (2) overdrafts groundwater basins, or (3) endangers public health by creating or worsening health hazard conditions.

The Proposed Action construction activities could have a short-term, indirect, negligible, adverse impact on groundwater quality. Construction would have no mechanism to directly impact or come into contact with groundwater resources. Construction plans and crews on site would consider the existing groundwater remediation system in place at the capped portion of the CSL (see Section 4.6) and take appropriate steps to avoid damage to system components or interruptions to service. However, during construction, accidental releases of petroleum-based fluids from construction equipment could occur and, if not immediately remediated, could adversely impact groundwater quality. To avoid such potential releases and impacts, construction equipment would be properly maintained in good working order and equipped with emergency spill kits, with workers trained in proper deployment and use of these kits. This would ensure that construction contractors are prepared to respond to an emergency release of petroleum-based fluids, contain the release, and

prevent adverse impacts to groundwater from occurring. Additionally, construction equipment would be refueled in a designated area equipped with impervious surfaces to avoid potential releases to pervious surfaces and the underlying groundwater.

Stormwater

Impervious surface would not be increased for the Proposed Action. Solar PV arrays sit atop the ground, with rainfall falling off the panels onto the earth below. Stormwater management practices and control measures will be implemented to mitigate potential adverse impacts resulting from the increased stormwater runoff during project specific construction and operation activities of the Proposed Action.

An extensive stormwater management system for the landfill area is already in place within the Proposed Action area. This system would be incorporated into the solar array design.

As previously described, prior to construction all necessary stormwater-management permits would be obtained, and permit-required BMPs would be implemented and maintained throughout the construction period to minimize sedimentation of stormwater runoff generated at the construction site. These measures would ensure that construction-related impacts to stormwater quality remain at a short-term, direct, negligible adverse level.

Coastal Zone Management Plan

Factors considered in evaluating coastal zone management impacts include the potential for the Proposed Action to be inconsistent with the federal and state enforceable policies. The Proposed Action would be considered to have a significant effect on the coastal zone if the Proposed Action was inconsistent with enforceable policies under the Maryland Coastal Zone Management Plan (CZMP) and permits and mitigation, if required for construction within the coastal zone, were not obtained.

As part of compliance with the federal CZMA, Maryland's CZMP, and Maryland's Chesapeake Bay Critical Area Protection Act, consideration of the location of coastal zones and critical areas would be incorporated into the design of the Proposed Action to avoid these areas or minimize adverse impacts wherever possible. However, the Proposed Action has little ability to effect coastal zones. There are no tidal wetlands within the Proposed Action site that could be affected. Coordination with the Coastal Policy Coordination and the Maryland Department of Natural Resources (MDNR) would occur and be considered in the final outcome of the Proposed Action in regard to federal consistency determinations. No impacts to the coastal zone would occur under the Proposed Action.

4.3.2.2. Impacts from Operation of the Proposed Action

Surface Water

Operation of the solar PV arrays at FMMD would have long-term, minor, adverse effects on surface water. Once solar PV arrays are in place, there will be minimal traffic or maintenance to them. The most common maintenance to solar PV arrays is cleaning. Solar PV arrays are less

efficient if they have debris on them and therefore, are required to be sprayed down multiple times a year, potentially more depending on climatic conditions. This does require a moderate amount of water usage. Panel washing would be scheduled to ensure that water does not build up and cause excessive runoff. The exact quantity of water that would be used cannot be calculated at this time. The Proposed Action may have minor impacts on surface waters, but it is possible that the Proposed Action as a whole could create a water savings having positive impacts to the local surface waters.

With the proper permitting and requirement for BMPs, surface water would not see any increase in sedimentation or water quality decreases. Monitoring of the solar PV arrays systems, array site, and associated transmission corridors would also involve checking for soil erosion due to system maintenance or natural processes, and soil erosion or sediment reaching streams would be investigated and remedied as appropriate.

Floodplains

The operation of the solar PV arrays would have no adverse effects, direct or indirect, on floodplains. The Proposed Action area would be sited outside of the floodplain to the maximum extent practicable. If construction in the floodplain cannot be avoided, flood protection measures must be undertaken to reduce the risk of flood-associated damages. Operation of any portion of the Proposed Action, either outside the floodplain or within, would not be expected to adversely impact the floodplain.

Wetlands

The operation of the solar PV arrays would have a negligible indirect, adverse impacts on wetlands. The wetlands/stormwater features surrounding the capped portions of the CSL are not expected to be regulated by MDE; however, they are connected to the aforementioned identified wetland in Plot B, which is regulated. This wetland could experience impacts from sedimentation or increased runoff from the operation of the solar PV arrays. Sedimentation would be kept to a minimum through permitting and compliance with regulations mentioned previously. Increases in runoff would be minor and managed using BMPs.

Groundwater

There would be no impacts to groundwater from the operation of the Proposed Action. Solar PV arrays will sit atop the landfill, far removed from any connection to groundwater. The Proposed Action would comply with the Resource Conservation and Recovery Act (RCRA) (40 CFR 261-270), the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (40 CFR Parts 300-399), and the Safe Drinking Water Act (SDWA) (42 USC § 300(f) et seq. and 40 CFR Part 144).

Coastal Zone Management Plan

The operation of the Proposed Action would have no impacts on the CZM program. The Proposed Action site is considered to be within a coastal zone; however, all previously stated regulations will be followed to ensure no impacts would occur. Impacts would occur through increase sediment loads, tidal wetland degradation, or decreases in water quality. Coordination with MDNR

would occur and be considered in the final outcome of the Proposed Action in regard to federal consistency determinations to ensure no impacts occur.

4.3.2.3. Impacts from the No Action Alternative

Surface Water

Under the No Action Alternative, no changes would be implemented to the Proposed Action site. Therefore, no impacts would result. The stormwater features currently servicing the landfills will continue to function as they have.

Floodplains

Under the No Action Alternative, no changes would be implemented to the Proposed Action site. Therefore, no impacts would result as the site would remain in its current condition.

Wetlands

Under the No Action Alternative, no changes would be implemented to the Proposed Action site. Therefore, no impacts would result as the site would remain in its current condition. Wetlands do change occasionally with the movement of earth on the landfill. This is unpredictable as to how they would change and is neither a beneficial nor adverse effect as these wetlands are not regulated through MDE and are highly disturbed.

Groundwater

Under the No Action Alternative, no changes would be implemented to the Proposed Action site. Therefore, no impacts would result as the site would remain in its current condition.

Stormwater

Under the No Action Alternative, no changes would be implemented to the Proposed Action site. Therefore, no impacts would result as the site would remain in its current condition. There is currently a stormwater system onsite serving the landfill.

4.4. BIOLOGICAL RESOURCES

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

4.4.1. Affected Environment

4.4.1.1. Vegetation

Vegetative cover at FMMD consists of forestland, open land/meadow, and developed areas with

maintained turf and ornamental street trees; all of which constitute FMMD's green infrastructure. Green infrastructure is broken down into hubs and corridors in Maryland, which are mapped using satellite imagery, road and stream locations, biological data, and other information. Hubs are typically defined as unfragmented forest areas hundreds or thousands of acres in size and are vital to maintaining the state's ecological health. They provide habitat for native plants and animals, protect water quality and soils, regulate climate, and perform other critical functions. Corridors are linear remnants of natural land such as stream valleys and mountain ridges that allow animals, seeds, and pollen to move from one area to another. These are crucial in the prevention of habitat fragmentation. They also protect the health of streams and wetlands by maintaining adjacent vegetation. Preserving linkages (corridors) between the remaining blocks of habitat (hubs) will ensure the long-term survival and continued diversity of Maryland's plants, wildlife, and environment. FMMD maintains both green infrastructure hubs and corridors.

Less than one-third of the FMMD property, approximately 1,500 acres, is forested. Many native forests were cleared prior to the formation of FMMD for agriculture. Larger remaining forested tracts are located towards the perimeter of FMMD. Many of these larger tracts are connected by riparian forest corridors. Larger tracts are around 70 years old, but some stands predate the installation. Development at FMMD has resulted in forest fragments and recently reforested areas.

As described in FMMD's Integrated Natural Resources Management Plan (INRMP), extensive development has resulted in the retention of few areas of native vegetation at FMMD, most of which are associated with stream corridors (FMMD, 2004). The largest wooded area at FMMD is in the southwest corner and is associated with the Little Patuxent River. The dominant vegetation in this area's canopy is red maple (*Acer rubrum*), sweet gum (*Liquidambar styraciflua*), and black gum (*Nyssa sylvatica*). The dominant understory vegetation consists of northern arrowwood (*Viburnum recognitum*), invasive Japanese honeysuckle (*Lonicera japonica*), common greenbriar (*Smilax rotundifolia*), and eastern poison ivy (*Toxicodendron radicans*).

EEE Consulting, Inc. prepared a *Planning Level Vegetation Surveys* report in 2014 (EEE, 2014). The report included three components: a Flora Planning Level Survey Update and Floristic Inventory; a Rare, Threatened, and Endangered Species Planning Level Survey Update; and a Vegetation Communities Planning Level Survey and Forest Mapping. The surveys identified 450 taxa, including 28 invasive species, one state-endangered plant (Torrey's Rush, *Juncus torreyi*), and 134 taxa not previously identified in prior surveys conducted in 1994, 2001, or 2009 surveys. There were 711 total taxa identified within FMMD from 1994 to 2013. No federally-listed plants were identified (EEE, 2014).

The Proposed Action site has a mix of open meadow with some forested areas. USACE Baltimore District wetland delineation surveys found that the landfill site itself is predominantly covered with herbaceous vegetation, primarily (80 percent or more) Chinese bush clover (*Lespedeza cuneata*). Chinese bush clover is an invasive, nonnative species. The landfill does contain a small percentage of other vegetation such as a common milkweed (*Asclepias syriaca*), big blue stem (*Andropogon gerardi*), and invasive Asiatic tearthumb (*Persicaria perfoliata*). PEM wetlands within the open, landfill areas contained a variety of species, primarily invasive common reed (*Phragmites australis*), invasive broadleaf cattail (*Typha latifolia*), and invasive small carpetgrass (*Arthraxon*

hispidus). The wooded areas are characterized as southern red oak (*Quercus falcata*) forest. The wetland areas contain common reed, invasive Japanese stiltgrass (*Microstegium vimineum*), small-spiked false nettle (*Boehmeria cylindrica*), common jewelweed (*Impatiens capensis*), cinnamon fern (*Osmundastrum cinnamomeum*), and skunk cabbage (*Symplocarpus foetidus*) in the understory.

Forest Conservation Act

It is the intent of FMMD to maintain a campus-like environment and conserve forested areas to the maximum extent practical in accordance with the Maryland Forest Conservation Act (FCA) while continuing to sustain and support current and future missions. This includes managing the FMMD forest conservation program in accordance with the 2013 Memorandum of Understanding (MOU) between the State of Maryland and the DoD concerning federal consistency requirements of the CZMA.

Development and construction projects are required to follow the current FMMD FCA and Tree Management Policy. In keeping with the MD FCA standards, FMMD requires that the equivalent of 20 percent of a project area be forested. All projects 40,000 square feet or larger must comply with the FMMD FCA policy. Other projects are evaluated on a case-by-case basis. Site developments must preserve or establish 20 percent forest cover, regardless of whether or not the site was forested before the construction. Generally, linear utility and road projects are only required to preserve or establish 20 percent of the forest cover removed for the actual project. Should existing forest mitigation areas require disturbance, the project proponent shall replace the existing mitigation area at a two to one (2:1) ratio above the required 20 percent. Street trees are to be replaced at a minimum of a 1:1 ratio, with preference given to the preservation of specimen trees. Specimen tree replacement ratios would be calculated on a case-by-case basis. Forestry practices that cannot feasibly be performed within the project area shall be performed on other designated land areas within FMMD.

FMMD participates in the Army's conservation reimbursable and fee collection program for forestry. This program exists to provide ecosystem-level management that supports and enhances the land's ability to support each installation's respective military missionscape, while simultaneously obtaining ecologically responsible results that satisfy all federally-mandated requirements for natural resources. Program revenues are generated through the sale of forest products. The fair market value of all forest products removed due to the Proposed Action shall be deposited into the Army's Reimbursable Forestry Account to be utilized for natural resource activities and ecosystem management at Army installations.

4.4.1.2. Wildlife

In 2013, Environmental Systems Analysis, Inc. (ESA Inc.) conducted a study for fauna and wildlife populations, including breeding amphibians and a Burba Lake fisheries study. Most of the observed animal species are common to Anne Arundel County and the Central Maryland area. During the fauna study, a total of 13 bird and 11 mammal species were identified (ESA Inc., 2014) (**Table 2**). During the amphibian breeding study, 11 reptile and amphibian species were identified (ESA Inc., 2014) (**Table 3**). The species observed during the 2013 survey were very similar to

those found during the 2009 flora and fauna survey performed by USACE (USACE, 2009).

Table 2. Mammals and Birds Present at FMMD in 2013

Scientific Name	Common Name
<i>Odocoileus virginianus</i>	White-tailed deer
<i>Procyon lotor</i>	Raccoon
<i>Sciurus carolinensis</i>	Eastern gray squirrel
<i>Urocyon cinereoargenteus</i>	Gray fox
<i>Homo sapien</i>	Human
<i>Didelphimorphia</i>	Opossum
<i>Lepus curpaeums</i>	Eastern cottontail
<i>Zenaida macroura</i>	Mourning dove
<i>Vulpes</i>	Red fox
<i>Anas platyrhynchos</i>	Mallard
<i>Butorides virescens</i>	Green heron
<i>Cardinalis</i>	Northern cardinal
<i>Agelaius phoeniceus</i>	Redwing blackbird
<i>Felis catus</i>	Domestic cat
<i>Cyanocitta cristata</i>	Eastern blue jay
<i>Quiscalus quiscula</i>	Common grackle
<i>Passeridae</i> sp.	Sparrow
<i>Fringillidae</i> sp.	Finch
<i>Branta canadensis</i>	Canada goose
<i>Corvus brachyrhynchos</i>	American crow
<i>Marmota monax</i>	Groundhog
Species unknown	Mouse
<i>Dumetella carolinensis</i>	Gray Catbird
<i>Turdus migratorius</i>	American robin

Source: (ESA Inc., 2014)

Table 3. Reptiles and Amphibians Present at FMMD in 2013

Scientific Name	Common Name
<i>Pseudacris crucifer</i> (frog)	Spring peeper
<i>Lithobates clamitans</i> (frog)	Green frog
<i>Lithobates sylvatica</i> (frog)	Wood frog
<i>Acris crepitans</i> (frog)	Eastern cricket frog
<i>Lithobates sphenoccephalus</i> (frog)	Southern leopard frog
<i>Anaxyrus americanus</i> (toad)	American toad
<i>Ambystoma opacum</i> (salamander)	Marbled salamander
<i>Ambystoma maculatum</i> (salamander)	Spotted salamander
<i>Terrapene carolina</i> (turtle)	Eastern box turtle
<i>Chelydra serpentina</i> (turtle)	Common snapping turtle
<i>Plestiodon fasiatus</i> (lizard)	Common five-lined skink

Source: (ESA Inc., 2014)

4.4.1.3. Rare, Threatened and Endangered Species

Federally Listed Species

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.

USACE Baltimore District submitted an online request in September 2022, through the USFWS Information for Planning and Consultation (IPaC) online web service to determine the potential of impacting protected resources and species. This IPaC resource list can be found in **Appendix D**. An updated species list dated October 15, 2023, is also included. As reported through the USFWS Resource List, there are no critical habitats within the study area. Patuxent Research Refuge is a USFWS National Wildlife Refuge (NWR) identified as occurring within the project area. The Study Area does border the Department of Interior, USFWS Patuxent Wildlife Refuge, but the project will not impact any of their land.

The IPaC resource list identified several resources and species that do have the probability of existing within the study area including National Wetlands Inventory (NWI) wetlands, migratory birds, the endangered Northern Long-Eared Bat (NLEB) (*Myotis septentrionalis*), and the candidate species Monarch Butterfly (*Danaus plexippus*). In compliance with the ESA, Section 7(a) 4(d), a determination key was submitted through USFWS IPaC. Although NLEB may exist within the study area, this project will not have tree clearing greater than 15 acres.

The presence of NLEB and Indiana bat have been acoustically detected on FMMD based on surveys conducted in 2017-2018 (Deeley and Emrick, 2018). No hibernaculum or summer roost trees have been identified on FMMD or in Anne Arundel County, MD, and there is a relatively low chance of maternity colony presence. Tree clearing for this project may be coordinated with USFWS through the FMMD DPW Environmental Division and may be subject to restrictions during the NLEB pup season (1 June to 31 July). As of April 2, 2015, the NLEB was listed as a federally threatened species under the ESA, due largely to the impacts of white-nose syndrome. NLEBs have now been uplisted to endangered, effective January 30, 2023. Further coordination with the local, Chesapeake Bay Office USFWS will occur to ensure the bat is not affected and to implement any new regulations that will be applicable. FMMD lies within the eastern range of the NLEB and contains suitable habitat, mixed hardwood forests over three inches diameter at breast height, for summer roost trees. On January 5, 2016, the USFWS signed a Programmatic Biological Opinion (BO) on the Final 4(d) Rule that addresses effects to the NLEB by federal actions and provides for a streamlined Section 7 consultation. USFWS has not yet designated critical habitat for NLEB.

State Listed Species

State-listed species are not protected under the ESA; however, whenever feasible, FMMD cooperates with State authorities in an effort to identify and conserve State-listed species (FMMD, 2022a). The state listed faunal species that have been detected on FMMD include the glassy darter

(*Etheostoma vitreum*), American brook lamprey (*Lethenteron appendix*), coastal plain swamp sparrow (*Melospiza georgiana nigrescens*), and Northern waterthrush (*Parkesia noveboracensis*). Three state listed floral species have been detected on FMMD. These include blunt-lobe grapefern (*Sceptridium oneidense*), Torrey's rush (*Juncus torreyi*), and partridge pea (*Chamaecrista fasciculata* var. *macrosperma*). One state-wide extirpated species was spotted, Joe-pye-weed (*Eutrochium maculatum*). During the 2013 Rare, Threatened and Endangered (RTE) plant species survey, two of the previously identified state-listed RTE species were found: American chestnut (*Castanea dentata*) and dwarf azalea (*Rhododendron atlanticum*) (EEE, 2014). One Maryland Watch List plant, *Anaphalis margaritacea*, was found within the Firing Range Powerline and the Range Road Corridor; one Maryland State Rare/Watch List plant, *Bidens coronata*, was found within the Firing Range Powerline.

Potential Pollinator Habitat

On September 30, 2022, FMMD attended a meeting at the request of USFWS about the possibility of creating pollinator habitat at the Proposed Action site. During the meeting, USFWS staff provided background information on other pollinator habitat projects that have been successfully established in conjunction with solar panel installations. USFWS expressed interest in arranging a visit with FMMD in the near future to assess the feasibility of creating this pollinator habitat at the Proposed Action site.

4.4.2. Environmental Consequences

Substantial impacts to vegetation would occur if the Proposed Action (1) would result in a permanent net loss of habitat at a landscape scale or (2) could result in a long-term loss or impairment of a substantial portion of local habitat on which native species depend.

4.4.2.1. Impacts from the Construction of the Proposed Action

Vegetation

The Proposed Action would result in minor long-term, direct, impacts to vegetation. Invasive vegetation would be removed through herbicide application to prepare the site for panel installation on approximately 18 acres of land. In addition, an access road would likely be built and/or expanded to access the solar PV arrays. A cleared area/road is in place that could be expanded to reach the solar PV arrays on the capped portion of the CSL. The vegetation on top of the landfill is largely invasive Chinese bush clover. The small amount of existing native vegetation, including milkweed, could be impacted by grading for panel field preparation and construction of ancillary structures. However, the area would be required to be reseeded with a native seed mix, and the developer would be encouraged to install the panels to a minimum height of 24 inches off the ground surface to allow beneficial herbaceous ground cover to establish.

Wildlife

Minor, indirect, temporary, adverse impacts would occur to wildlife with the construction of the solar PV arrays. Wildlife would temporarily be disturbed by the installation of the solar PV arrays. Machinery noise could potentially disturb the wildlife and alter their typical behaviors. When

construction ends, this disturbance would also cease, and animal behavior would return to normal. The animals on FMMD live in a highly urbanized environment and likely are desensitized to construction or other urban noises to some extent.

Rare, Threatened, and Endangered Species

Minor, adverse, short-term effects would occur to rare, threatened, or endangered species. No protected species are known to frequent the proposed site. To fit within the scope of the Service's Interim Consultation Framework, the Proposed Action must fully comply with the conditions and requirements of the 2016 4(d) rule for the NLEB. Tree clearing for this project would be less than 15 acres and must be coordinated with USFWS through the FMMD DPW Environmental Division. Any tree clearing may be subject to restrictions during the NLEB pup season (1 June to 31 July) to avoid accidental take in the event that NLEBs do exist within the site.

Migratory birds could potentially lose habitat where the solar PV arrays are placed as well. Monarch butterflies would also temporarily be losing meadow habitat that was home to milkweed, which is an essential part of the monarch life cycle. The minor adverse impacts to the monarch's habitat would be short-term and expected to become a long-term, beneficial impact once a native seed mix containing milkweed fully germinates, generally within two years.

4.4.2.2. Impacts from the Operation of the Proposed Action

Vegetation

The operation of the solar PV arrays would have long-term beneficial effects on vegetation. Once initial invasive vegetation is removed for the installation of the solar PV arrays, the affected areas would be reseeded with a native species mix that promotes pollinator habitat. The surrounding vegetation would remain the same as solar PV array operation mainly involves washing and servicing the panels, neither of which would affect vegetation.

Wildlife

Negligible, long-term, and direct adverse impacts would occur to wildlife with the operation of the solar PV arrays. The proposed site is almost entirely open field. Wildlife that would frequent the area would be limited to typical woodland creatures such as small rodents, raccoons, deer, birds, etc. The site would still be available for habitat use to small rodents. Deer would lose foraging space due to the solar PV arrays. Predatory birds would lose some open, meadow areas for hunting and small birds would lose meadow habitat. However, there is meadow area outside of the landfills that would still be available for use along with the large swath of forested area in the center of the landfill. The connectivity of this forested would not be affected.

Rare, Threatened, and Endangered Species

Operation of the solar PV arrays would have no impacts on rare, threatened, or endangered species. No protected species are known to frequent the area. While initial adverse impacts to protected species may occur from the installation of the solar PV arrays, their operation is quiet and requires

little maintenance. Therefore, any protected species would endure no other effects. No take of protected species would occur with the operation of the solar PV arrays.

4.4.2.3. *Impacts from the No Action Alternative*

Under the No Action alternative, existing conditions within the Proposed Action area would remain unchanged for the foreseeable future. This would lead to a long-term, minor, direct, adverse impact, because there would be a continued spreading of nuisance species such as the Chinese bush clover. Common wildlife species would continue to use the area.

4.5. CULTURAL RESOURCES

Several federal laws and regulations have been established to manage cultural resources. Cultural resources are “historic properties” as defined by the National Historic Preservation Act (NHPA) of 1966; “cultural items” as defined by the Native American Graves Protection and Repatriation Act of 1979 (NAGPRA); “archaeological resources” as defined by the Archaeological Resources Protection Act of 1979 (ARPA), “sacred sites” as defined by EO 13007, *Indian Sacred Sites*, to which access is afforded under the American Indian Religious Freedom Act of 1987 (AIRFA); and “collections and associated records” as defined in 36 CFR Part 79, *Curation of Federally Owned and Administered Archaeological Collections*.

Cultural resources can include precontact and historic sites, structures, districts, or any other physical evidence of human activity considered important to a culture, a subculture, or a community for scientific, traditional, religious, or any other reason. Depending on their condition and use, these resources can provide insight into the living conditions of previous existing civilizations, or retain cultural and religious significance to modern groups, referred to as “Traditional Cultural Properties.” Traditional Cultural Properties include locations of historic occupations and events, historic and contemporary sacred and ceremonial areas, prominent topographical areas that have cultural significance, traditional hunting and gathering areas, and other resources that Native Americans or other groups consider essential for the persistence of their traditional culture.

Archaeological resources are locations where precontact or historic activity measurably altered the earth or produced deposits of physical remains. Architectural resources include standing buildings, districts, bridges, dams, and other structures of historic significance.

In order for a cultural resource to be considered significant, it must meet one or more of the following criteria for inclusion in the National Register of Historic Places (NRHP): the quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and: 1) that are associated with events that have made a significant contribution to the broad patterns of our history; or 2) that are associated with the lives or persons significant in our past; or 3) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or 4) that have yielded, or may be likely to yield, information important in prehistory or history.

While cemeteries are not necessarily cultural resources as defined by the NHPA, cemeteries are included in this Cultural Resources section in accordance with the Solar PEA (USAEC, 2016).

The NHPA, as amended, as well as Federal legislation, and DoD regulations (particularly Army Regulation 200-1, *Environmental Protection and Enhancement*), requires the Army and other Federal agencies to locate, identify, evaluate, and treat cultural resources under their ownership, administration, and control in a manner that fosters the preservation of the resources. Accordingly, the most recent update to the Integrated Cultural Resources Management Plan (ICRMP) for FMMD was preliminarily finalized in March 2020 by USACE, Baltimore District (USACE, 2020).

4.5.1. Affected Environment

4.5.1.1. Area of Potential Effect (APE)

The Area of Potential Effect (APE) for this Proposed Action is the limits of disturbance (LOD) for the construction of the solar array and distribution lines, and those areas from which the new construction would be visible. To analyze potential viewshed impacts, a viewshed buffer of 0.25-miles for the main elements of the Proposed Action within the landfill area was considered. A narrower buffer of 500-feet would be analyzed for the interconnection pathways because of their linear nature and narrow LOD.

4.5.1.2. Historic Properties: Architectural Resources

FMMD has five historic properties that have been determined eligible for listing in the NRHP. These historic architectural properties are the Fort Meade Historic District, three bridges/culverts built by German Prisoners of War (POWs) during World War II (WWII), and the water treatment plant (Building 8688). There are 13 contributing buildings in the Fort Meade Historic District. One of these buildings, the Firehouse building, along Rock Avenue is just within the limits of the Fort Meade Historic District and is included within the APE. While the Firehouse building will be affected in terms of the surrounding viewshed from the building (i.e., construction equipment will be temporarily visible from the Firehouse building during construction of the Proposed Action), it will not be adversely affected.

As stated above, a portion of the southwestern area of FMMD was utilized as a Prisoner of War (POW) camp during WWII. German POWs constructed three culverts at FMMD, all of which were designed by the USACE. The culverts are located at stream crossings on Llewellyn, Redwood, and Leonard Wood Avenues where they cross over Franklin Branch Creek. These culverts are among the few tangible reminders of the POW presence at FMMD and in Maryland during WWII. None are in the Proposed Action's APE.

As previously mentioned above, while cemeteries are not necessarily cultural resources as defined by the NHPA, cemeteries are included in this Cultural Resources section in accordance with the Solar PEA (USAEC, 2016). There are two cemeteries within the APE along Rock Avenue: the Bethel Cemetery and the Fort Meade Post Cemetery. The construction and operation of the Proposed Action will not affect these cemeteries. There is a third cemetery, the Phelps Cemetery, within the 0.25-mile APE viewshed buffer in the forested zone between the landfill and the Patuxent Research Refuge.

4.5.1.3. Historic Properties: Archaeological Sites

The entirety of FMMD has undergone Phase I-level archaeological investigations for the presence of archaeological resources. There are 41 known archaeological sites on FMMD, but none are listed in the NRHP. All the sites have been evaluated for NRHP eligibility and only one site, 18AN1240, was found to be eligible. Thirty-three other sites have been evaluated for NRHP eligibility and were found ineligible. The remaining seven sites are historic cemeteries, which were evaluated in the 2007 ICRMP update and found to be ineligible for the NRHP, although they will be maintained due to the presence of buried human remains and recommended for avoidance. None of these sites are within the APE.

4.5.2. Environmental Consequences

On August 16, 2022, FMMD initiated NHPA Section 106 consultation via a letter to the MHT, an agency of the Maryland Department of Planning that serves as the Maryland State Historic Preservation Office (SHPO). Concurring with FMMD, MHT responded on September 13, 2022 with a determination that this Proposed Action would have no adverse effect on historic properties. FMMD sent another letter dated October 21, 2022 to MHT to reinstate consultation. The purpose of the reinstatement was to provide updated information on the potential connection pathways under consideration in this EA. On November 2, 2022, MHT provided the following response to the reinstatement letter: "The Maryland Historical Trust has determined that there are no historic properties affected by this undertaking." Copies of this correspondence are included in **Appendix D**.

4.5.2.1. Impacts from Construction and Operation of Proposed Action

There would be no cultural resources adversely affected by the construction of the Proposed Action. The CSL has been heavily disturbed over the years. As stated in the Solar PEA, "[p]reviously disturbed land increases the chances that cultural resources might already have been impacted, thereby losing integrity" (USAEC, 2016, p. 71).

With regard to an interconnection pathway, this would be located predominantly within existing utility rights of ways and along established roads in order to avoid any impacts to nearby cemeteries. As explained in Section 4.9.2.2 of the Solar PEA, site design will ensure that impacts to any nearby cemeteries are avoided. In addition, the cemeteries will be designated as off-limits to project construction and maintenance workers with appropriate buffers around the cemeteries established prior to construction if necessary and pre-construction access to the cemetery for visitation and maintenance will be maintained during the construction period (USAEC, 2016).

Additionally, to minimize the potential impact to previously unknown cultural resources during subsurface work, FMMD would implement an "Accidental Discovery" plan to comply with the NHPA; NAGPRA; ARPA; Executive Order 13007 to which access is afforded under AIRFA; and 36 CFR Part 79. Under this plan, if precontact or historic artifacts that could be associated with Native American, early European, or American settlement are encountered at any time during construction or operation of the expansion areas, FMMD would cease all activities involving subsurface disturbance in the vicinity of the discovery. Should human remains or other cultural

items, as defined by NAGPRA, be discovered during project construction, construction work would immediately cease until the FMMD Cultural Resources Manager, Maryland SHPO, and selected Native American Tribes are contacted to properly identify and appropriately treat discovered items in accordance with applicable state and federal law(s). Implementation of these measures would ensure that the Proposed Action would have no adverse effect on historic properties or cultural resources.

4.5.2.2. Impacts from Operation of the Proposed Action

There would be no cultural resources adversely affected by the operation (including maintenance thereof) of the Proposed Action. As previously stated, the landfill has been heavily disturbed over the years. As stated in the Solar PEA, operation and maintenance of the Proposed Action will have no impact on visitor and maintenance worker access to the cemeteries.

4.5.2.3. Impacts from the No Action Alternative

Under the No Action Alternative, there would be no impacts to cultural resources at the Proposed Action site because there would be no construction activities.

4.6. HAZARDOUS AND TOXIC MATERIALS AND WASTE

A hazardous substance is defined as any substance that is 1) listed in Section 101(14) of the CERCLA; 2) designated as a biologic agent and other disease causing agent which after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any person, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions (including malfunctions in reproduction) or physical deformations in such persons or their offspring; 3) listed by the U.S. Department of Transportation as hazardous materials under 49 CFR 172.101 and appendices; or 4) defined as a hazardous waste per 40 CFR 261.3 or 49 CFR 171. Hazardous materials are federally regulated by the USEPA in accordance with the Federal Water Pollution Control Act, CWA, Toxic Substance Control Act (TSCA), RCRA, CERCLA, and the Clean Air Act.

The promulgation of 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. Toxic chemical substances regulated by USEPA under TSCA include asbestos and lead.

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 serious 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.

FMMD's Directorate of Public Works Environmental Division is responsible for managing hazardous materials and waste. FMMD operates under a Spill Prevention Control and Countermeasures Plan (SPCCP)/Installation Spill Contingency Plan (ISCP) for all facilities where hazardous materials are stored. The SPCCP/ISCP Plan delineates measures and practices that require implementation to prevent and/or minimize spill/release from storage and handling of hazardous materials to protect ground and water surfaces. The ISCP provides emergency response instructions for spills and uncontrolled releases of hazardous materials. Instructions include notification, probable spill routes, control measures, exposure limits, and evacuation guidelines. Material Safety Data Sheets that provide information about health hazards and first-aid procedures are included in the ISCP.

Installation Hazardous Waste Management

FMMD also has an Installation Hazardous Waste Management Plan (FMMD, 2011). Those who handle or manage hazardous materials or hazardous waste are trained in accordance with federal, state, local, and Army requirements. Each facility has appointed an emergency management coordinator who is responsible for emergency response actions until relieved by hazardous materials spill response personnel.

Pesticides and Herbicides

The FMMD Integrated Pest Management Plan provides a framework through which pest problems can be effectively addressed at FMMD. The latest plan was prepared in 2017 and is a five-year plan valid for 2017-2022. Elements of the program, including health and environmental safety, pest identification, pest management, pesticide storage, transportation, use, and disposal are defined within the plan. Used as a tool, this plan reduces reliance on pesticides, enhances environmental protection, and maximizes the use of integrated pest management techniques. Pesticides are stored at the entomology building and used on FMMD in accordance with all applicable federal, state, and post guidelines. Insect infestation is not a problem for this project; therefore, pesticides and herbicides will not be analyzed further in this EA. That said, if the USFWS suggestion of creating pollinator habitat in and around the solar panels at the Proposed Action site is viable, then herbicides will need to be discussed further. This is because USFWS indicated during the September 2022 meeting with FMMD (discussed briefly in Section 4.4.1.3 above) that herbicide spray may need to be utilized prior to the habitat seeding.

National Priorities List

USEPA placed FMMD on the National Priorities List (NPL) in 1998 after an evaluation of contamination due to past storage and disposal of hazardous substances at the Defense Reutilization and Marketing Office, CSL, Clean Fill Dump, and Post Laundry Facility. Contaminants at these sites included solvents, pesticides, polychlorinated biphenyls (PCBs), heavy metals, waste fuels, and waste oils. Based on the Army's conclusion that all actions necessary to protect human health and the environment have been conducted for the Tipton parcel, USEPA removed the Tipton parcel from the FMMD NPL listing on 1 November 1999. The FMMD NPL includes the entire current post, from fence line to fence line (Stell, 2022).

Installation Restoration Program

The DoD established the Installation Restoration Program (IRP) in 1975 to provide guidance and funding for the investigation and remediation of hazardous waste sites caused by historical disposal activities at military posts. The fundamental goal of the FMMD IRP is to protect human health, safety, and the environment. The IRP is carried out in accordance with all federal, state, and local laws. The primary federal laws are CERCLA and Superfund Amendments and Reauthorization Act. In 2009, FMMD signed a Federal Facility Agreement with the USEPA and the U.S. Department of the Interior. This document establishes the role that FMMD and USEPA each play in the restoration of the post and the formal mechanisms of this process. The IRP's staff works closely with the USEPA, MDE, and local government agencies to ensure that cleanup processes are conducted properly and efficiently. The staff also receives input from community groups and nearby residential areas.

Military Munitions Response Areas

In addition, the DoD developed the Military Munitions Response Program (MMRP) in 2001 to address munitions-related concerns, including explosive safety, environmental, and health hazards from releases of unexploded ordnance, discarded military munitions, and munitions constituents (MC) found at locations other than operational ranges on active BRAC Installations and Formerly Used Defense Sites properties. The MMRP addresses non-operational range lands with suspected or known hazards from munitions and explosives of concern (MEC) which occurred prior to September 2002 but are not already included with an IRP site cleanup activity.

FMMD maintains an active MMRP, which includes two Munitions Response Areas (MRAs): Inactive Landfill No. 2, located south of the Tipton Airport, and the Former Mortar Range (Stell, 2022).

4.6.1. Affected Environment

The Proposed Action area includes a CSL site managed under CERCLA and RCRA. Beginning in 1958, mixed residential, commercial, and nonhazardous industrial waste was processed into the landfill using the trench and fill method, which involved deposition of debris into unlined trenches 10-12 feet deep, 20 feet wide and 600 feet long (Arcadis, 2021). The landfill was covered with 2 feet of final cover material in 1976. In 1980, a Refuse Disposal Permit was issued by the Maryland Department of Health and Hygiene (now MDE) for continued use of what is now the capped portions of the CSL using the area fill method, in which waste is placed and compacted above the ground surface.

The active landfill operations ceased in 1996, at which time the area began to be managed as the CSL. One area of the CSL was capped with clay and closed between 1995 and 1997 (approximately 46 acres), and the remaining area was capped and closed between 1997 and 1998 (approximately 24 acres). A flexible membrane liner was incorporated into the final cap system for both areas (Arcadis, 2021). A landfill gas collection system was installed and continues to operate along the eastern edge of the landfill to control methane emissions from the capped landfill. A federal/state mandated landfill monitoring program was initiated in March 1994 for the capped portions of the CSL and is ongoing.

As required by landfill closure regulations, FMMD has conducted semi-annual groundwater monitoring since 1994. When elevated concentrations of benzene, metals and nitrate were detected during the shallow groundwater monitoring, FMMD began an investigation under its environmental restoration program in 2002. Part of this investigation included a detailed analysis of various response alternatives and associated costs, which was made available for public review and comment in 2017. An Interim Record of Decision (ROD) was finalized in March 2020. The preferred alternative implemented under the ROD was air sparging wells installed adjacent to the landfill to form a cutoff barrier to groundwater contaminant migration, namely benzene and arsenic, along Fort Meade's eastern property boundary. This system became operational in December 2020 (Stell, 2022). The system is slated to operate for approximately 30 years. Additional remedial actions include land use controls restricting shallow groundwater use on-post. Semiannual groundwater and surface water monitoring, along with the active methane collection system, continue at the CSL.

Within the boundary of the CSL lies another AOI regulated under CERCLA. This site, known as Ammunition Supply Point Number 1 (ASP No. 1), was used in the 1950s for storage of chemical munitions (including smoke grenades and riot control agents) for training (Stell, 2022). This site has been addressed under the umbrella of management for the CSL. As a result of soil sampling, as well as shallow and deep groundwater sampling, the site was recommended for No Further Action (NFA) under the Focused Feasibility Study (FFS) completed in 2014.

The northernmost portion within the CSL has been managed as a separate AOI under CERCLA. This portion is not a defined disposal area, so it was not capped or included in the RCRA permit. In 2013, it was discovered that this area may be larger than originally thought, requiring additional remedial investigation (RI) work that was conducted between 2016-2020 (Stell, 2022). A removal action was completed on a 6.2-acre area in the western portion of this site between 2019 and 2020 to prevent direct contact by current and future receptors with waste materials and to control surface water runoff and erosion (AECOM, 2021). The majority of the eastern 31.6 acres of this landfill portion is overlain with up to 20 feet of soil from various soil stockpiles, and the remainder supports erosion and sediment control measures and access roads.

4.6.2. Environmental Consequences

The Solar PEA states that "[i]mpacts from hazardous material and waste would be considered significant if the Army actions were to result in substantial additional risk to human health or safety, to include direct human exposure; substantial increase in environmental contamination; exceedance of facility or system capacity for hazardous material/waste management; or a violation of laws and regulations governing the management of hazardous material and waste, to include noncompliance with an installation's hazardous waste permit, if applicable." (USAEC, 2016, p. 92)

4.6.2.1. Impacts from Construction of the Proposed Action

A frequently voiced concern about siting solar array panels on landfills is the possibility that the solar development may damage the landfill cap causing hazardous materials to leach out of the landfill and into the groundwater; these concerns can be mitigated by working with experienced

contractors that understand the dynamics of landfills with solar panels and know how to keep the integrity of the cap and the workers safe (Millard, 2019).

The Proposed Action involves placing solar panels on closed, capped landfills. According to the Solar PEA, "[f]or previously developed sites which are lined and/or capped, key design criteria include minimal settlement and the continued need for maintaining the integrity and functionality of any existing cap and liner." (USAEC, 2016, p. 93) Accordingly, design considerations for this project will need to include eliminating penetration of caps and liners, continuing the functionality of evapotranspirative or water-balance covers, ensuring stormwater is appropriately managed, and ensuring the design is appropriate for the average wind conditions on FMMD (See Solar PEA, Section 4.15.2.3 for a detailed design discussion for solar panels sited on previously developed sites, such as landfills).

Any proposed alterations to the existing cap of the CSL, the northernmost portion of the landfill currently undergoing remediation, or disturbance exposing landfill material during construction must be approved and coordinated through the MDE Solid Waste Program (SWP) and MDE Land and Materials Administration (LMA) under RCRA. Approval from SWP and LMA is required, and information needed to obtain approval from LMA can be found in the fact sheet titled, "Solar Panel Installation on Closed and Capped Landfills," included as **Appendix E**. The SWP would require plans and an installation and operation manual or similar document that describes how the system would be built and operated, and what impact it might have on existing pollution controls such as the landfill cap, vegetative stabilization, sediment and erosion controls, groundwater and soil gas monitoring wells, and landfill gas controls. Additional EPA and MDE regulator coordination and approval may be required.

The Proposed Action does include the risk of accidental spill and leaks from construction vehicles. This risk, however, can be mitigated with protection measures from BMPs and SOPs; therefore, resulting short-term impacts are anticipated to be minor and long-term impacts, negligible (USAEC, 2016).

With careful site selection and proper design, along with practices and SOPs discussed in Section 4.15.2.2 of the Solar PEA (USAEC, 2016), the Proposed Action is anticipated to result in negligible to moderate/less than significant impacts to the environment both short- and long- term, from hazardous and toxic material and waste as a result of the construction of a solar PV over a closed landfill.

4.6.2.2. Impacts from Operation of the Proposed Action

According to the Solar PEA (USAEC, 2016), solar PV systems are "almost entirely benign in operation, and potential environmental hazards occur primarily at the production and disposal stages which would be done off-site. PV solar modules may contain small amounts of hazardous materials that would pose no threat under normal circumstances. However, if damaged, those materials could potentially release hazardous substances into the environment. Operation of the solar modules would not generate any hazardous waste." (USAEC, 2016, p. 92)

Based on the above, adverse impacts from hazardous materials and waste as the result of operation of the Proposed Action are anticipated to be negligible.

4.6.2.3. Impacts from the No Action Alternative

Under the No Action Alternative, no change to hazardous material usage nor generation of hazardous waste would occur.

4.7. UTILITIES

The location of existing utility lines influences development. Using existing infrastructure is cost-effective, efficient, and encourages more compact development. FMMD has a well-connected grid of utilities that encompasses the entire installation. This coverage provides flexibility in locating facilities.

4.7.1. Affected Environment

Wastewater

FMMD is served by a wastewater utility responsible for operating and maintaining the sanitary sewer system that collects effluent through a network of gravity sewers, force mains, and pump stations to then be processed at a treatment plant.

Solid Waste

No active landfills are located at FMMD; all solid waste is transported to a permitted facility located off site. The CSL on which the solar array would be constructed ceased accepting waste in 1996.

Electric

Electrical power is supplied to FMMD by BGE. Emergency generators are maintained across the installation in the event of a power outage.

Natural Gas

Natural gas is provided and maintained by BGE for FMMD.

4.7.2. Environmental Consequences

The Proposed Action would result in significant adverse impacts to infrastructure and utilities if it (1) reduces water availability or supply to existing users, (2) results in noncompliance with the existing FMMD solid waste management plan, (3) overdrafts groundwater basins or (4) exceeds safe annual yield of water or energy supply sources.

4.7.2.1. Impacts from Construction of the Proposed Action

As stated in Section 4.14.2.2 of the Solar PEA, short-term, negligible, and adverse impacts to wastewater would be anticipated during the construction period to ensure that the construction

workers are provided restroom facilities while on the job site. Portable restroom facilities and disposal services to a permitted wastewater treatment facility would be the responsibility of the contracted construction company (USAEC, 2016).

The contracted construction company will also be responsible for properly disposing of constructed-related waste and construction and demolition (C&D) debris. Impacts to landfills from the construction of the Proposed Action waste generated (e.g., packaging material of the solar PV system's component parts) are anticipated to be minor. This is due in part to the requirement in AR 420-1, *Army Facilities Management*, that requires the Army to divert C&D waste (i.e., via eliminating or recycling packaging, etc.) at a minimum of 50 percent waste, by weight, from landfill disposal (DA, 2012). No other impacts to other utilities on FMMD (i.e., electricity and natural gas) are anticipated as a result of the construction of the Proposed Action.

4.7.2.2. Impacts from Operation of the Proposed Action

Operation of the Proposed Action would have a beneficial effect on FMMD's electrical power usage. This is because as previously stated, during normal operations, the power produced by the project will feed into the regional power grid, improving the resilience of the grid by adding distributed generation sources and diversifying the power supply chain. During a grid outage the project would support FMMD for up to 14 days if the project is operated under a community solar agreement.

There will be some water required for maintenance of the solar PV project to periodically wash the modules. As stated in Section 4.14.2.2 of the Solar PEA, compared to the several million gallons of water used by the typical Army installation, the water needed for module washing is minimal. Consequently, the anticipated impacted to water usage/wastewater generation is negligible to minor (USAEC, 2016). No other impacts to other utilities on FMMD (i.e., solid waste and natural gas) are anticipated as a result of the Proposed Action.

4.7.2.3. Impacts from the No Action Alternative

Assuming that another renewable energy technology is not used in place of the Proposed Action and that the Proposed Action implementation does result in a decrease in fossil fuel use, electric power is the only utility that would be impacted from implementation of the No Action Alternative. This impact, however, would likely only be a very negligible, adverse impact on electric power at FMMD. There would be no change in the other utilities on FMMD under the No Action Alternative (USAEC, 2016).

4.8. TRANSPORTATION AND TRAFFIC

4.8.1. Affected Environment

Section 4.11 of the Solar PEA discusses vehicular traffic as rated on level of service (LOS), a qualitative measure graded on a letter scale from A to F, with A being the highest LOS and F being the lowest LOS. At LOS F, the traffic volume has exceeded the capacity of the roadway and there are no passing opportunities (USAEC, 2016).

As stated in Section 1.1.2 above, FMMD is surrounded and served by the following major roads:

- Baltimore-Washington Parkway (Maryland [MD] Route 295) to the northwest
- MD Route 175 (Annapolis Road) to the east
- MD Route 32 (Patuxent Freeway) to the south and west

While the majority of MD 198 does not immediately surround FMMD, it is also considered a major road as it is located near the southwest vicinity of FMMD and runs eastward toward FMMD where it joins with MD Route 32.

FMMD is currently accessible from the following access control gates, also known as Access Control Points (ACPs) (FMMD, 2022b):

- Mapes Road and MD Route 175 (open 24/7)
- Mapes Road and MD Route 32 (open Mon.-Fri. from 5:30 a.m. to 9 p.m.; open on weekends from 9 a.m. to 5 p.m.)
- Rockenbach Road and MD Route 175 (open Mon.-Fri. 5:30 a.m. to 9:00 p.m.)

In addition, the Reece Road and MD Route 175 ACP (also known as the "Reece Road Gate") normally serves as the main gate and the only gate available to visitors without DoD identification/or other approved access credentials (e.g., Common Access Card [CAC]). This gate, however, is currently closed for construction. Likewise, the Demps Visitor Control Center (VCC) located at the Reece Road Gate is also closed. A temporary VCC is now located at 4215 Roberts Avenue, which is just south of Burba Lake. The VCC is open Mon-Fri. from 7:30 a.m. to 3:30 p.m. and closed on weekends and federal holidays.

While the Reece Road Gate is closed, alternative ACPs are the Rockenbach Road and MD Route 175 or the Mapes Road and MD Route 175 Gate. One-day visitors or deliveries can go directly to the Rockenbach Road and MD Route 175 gate's visitor lane (far right lane) Mon.-Fri. 5:30 a.m. to 5 p.m. Visitors and deliveries outside of these hours should go to the Mapes Road and MD Route 175 gate, which is open 24/7 (FMMD, 2022b).

Access to the CSL, for purposes of the solar array construction, would be determined by the developer in conjunction with FMMD as the design progresses. As stated in the Proposed Action, existing developed areas would be used as pathways to connect the array and its controlling systems to existing facilities.

4.8.2. Environmental Consequences

A project is considered to have a significant effect on traffic and roadways if the additional traffic caused by the Proposed Action results in a decrease in Level of Service (LOS). In addition, a project may contribute toward a substantial cumulative effect if its traffic, when taken together with traffic from past, present, and reasonably foreseeable future projects, causes intersection LOS to decline. Following the Solar PEA analysis, impacts to traffic would be significant if the Proposed Action causes a reduction of more than two LOSs at roads and intersections within the

ROI (USAEC, 2016). The ROI for traffic is within the boundaries of FMMD and on nearby, off-post roadways within the surrounding community of Odenton, Maryland.

4.8.2.1. Impacts from Construction of the Proposed Action

The Proposed Action would have a short-term, negligible, direct, adverse impact on traffic and roadways in the form of construction traffic within the boundaries of the post. Construction of the array and ancillary structures would not impact any transportation infrastructure outside of FMMD and therefore have no impact on LOS.

The roadway network within FMMD provides sufficient access for any heavy equipment that may be required for the construction phase of the Proposed Action; therefore, none of the equipment used to construct the array or transport materials to the CSL would require modifications to transportation infrastructure or traffic patterns. The number of construction workers associated with the project would add a negligible increase (less than 1% increase) in overall traffic volume within FMMD daily.

As stated in Section 4.11.2.2 of the Solar PEA, "[m]itigation measures to minimize traffic impacts during construction could include limiting what ACP(s) would be permitted to be used by the construction vehicles and scheduling deliveries to avoid poorly rated roads (e.g., LOS E or F) and intersections during peak usage times." (USAEC, 2016, pp. 78-79)

4.8.2.2. Impacts from Operation of the Proposed Action

There would be no perceptible increase in vehicle traffic associated with the operation and maintenance of the Proposed Action. Section 4.11.2.2 of the Solar PEA notes that the operations and maintenance activities associated with a solar PV system requires only minimal vehicle and equipment support (USAEC, 2016). In addition, solar PV systems operate passively without the need for onsite personnel. Lastly, the Solar PEA provides that periodic system inspections, solar PV panel cleaning, and as needed equipment repairs would likely result in less than one vehicle trip per week (USAEC, 2016). Therefore, no impacts to traffic on FMMD and the surrounding roadway network is anticipated due the implementation of the Proposed Action.

4.8.2.3. Impacts of the No Action Alternative

There would be no change to traffic on or around FMMD as a result of the No Action Alternative.

4.9. NOISE

Noise is traditionally defined as unwanted sound that interferes with normal activities in a way that reduces the quality of the environment. Magnitudes of sound, whether wanted or unwanted, are usually described by sound pressure. There are two primary types of sound sources that generate noise: stationary and transient. Sounds produced by these sources can be intermittent or continuous. A stationary source is usually associated with a specific land use or site, such as construction activities or the operation of generators. Transient sound sources, such as vehicles and aircraft, move through the area.

The Noise Control Act of 1972 establishes a national policy to promote an environment for all Americans free from noise that jeopardizes their health and welfare. The Act also serves to (1) establish a means for effective coordination of federal research and activities in noise control; (2) authorize the establishment of federal noise emission standards for products distributed in commerce; and (3) provide information to the public with respect to the noise emission and noise reduction characteristics of such products. The Act provided the framework for states and local authorities to establish noise regulations.

Sound pressure levels are quantified in decibels (dB); the dB are then "weighted" to account for differences in how people respond to sound in what is known as the "A-weighted" decibel (dBA) scale (FAA, 2022). Sound levels, in dBA, for common activities and construction work are presented in **Table 4** below. Noise levels and durations from these activities would vary depending on the specific equipment being used, and the impact from this noise on a receptor would depend on the distance between the receptor and the source of the noise. Generally, noise levels decrease by approximately 6 dBA for every doubling of distance for point sources (such as a single piece of construction equipment) and approximately 3 dBA for every doubling of distance for line sources (such as a stream of motor vehicles on a busy road at a distance) (Federal Highway Administration [FHWA], 2006).

Table 4. Common Sound Levels and Exposure Conditions

Source	Decibel Level (in dBA)	Exposure Concern
Silent Study Room	20	Normal safe level
Library	35	
Soft Whisper (5 ft. away)	40	
Average Home in an urban area	50	
Dishwasher in next room	55	
Conversational speech (3 ft. away)	65	
Classroom Chatter	70	
Freight Train (100-ft. away)	80	May affect hearing in some individuals depending on sensitivity, exposure length, etc.
Heavy Traffic	90	
Construction Site	100	
Operating Heavy Equipment	120	
Live Rock Band	130	Above 140 decibels may cause pain.
Fighter Jet Launch	150	
Shotgun Blast	160	
Rocket Launch	180	

Source: Table adapted from the following three references: FAA, 2022; Occupational Safety and Health Administration (OSHA), 2022; and Pulsar Instruments, 2022.

Another important noise metric is the day-night average sound level (DNL). DNL is used to reflect a person's cumulative exposure to sound over a 24-hour period (FAA, 2022). According to the U.S. Department of Housing and Urban Development (HUD) criteria, residential units and other noise-sensitive land uses are "unacceptable" in areas where the noise exposure exceeds the DNL of 75 dB, "normally unacceptable" in regions exposed to noise between the DNL of 65 to 75 dB, and "acceptable" in areas exposed to noise where the DNL is 65 dB or less (HUD, 2022).

4.9.1. *Affected Environment*

FMMD is relatively quiet with no notable sources of noise beyond personal and commercial vehicular traffic. Noise elements in and around the Proposed Action areas are consistent with that of any residential military post and its surrounding area that include business and administrative activities. Personal and commercial vehicles accessing the area, along with lawn maintenance, would be part of the normal noise environment in the area. The use of heavy equipment typically occurs sporadically throughout the daytime hours on FMMD. Methods for creating the interconnection pathways would involve crossing areas with urban-related noise from sources such as vehicular traffic.

4.9.2. *Environmental Consequences*

Noise impacts would be significant if the Proposed Action creates appreciable long-term noise increases in areas of incompatible land use. Additionally, continuous construction noises above 60 dBA may be considered to have a significant adverse effect if audible at residential properties or other sensitive receptors during daytime hours, or results in excessive ground-borne vibration to persons or property.

Although anticipated to be minor, the potential environmental consequences related to noise from solar panel projects is adequately addressed in the Solar PEA's Section 4.5.2 (USAEC, 2016). Accordingly, those discussions found in the Solar PEA's Section 4.5.2 are incorporated by reference and not repeated below (USAEC, 2016). The overall conclusions regarding noise impacts are included below; please refer to the Solar PEA's Section 4.5.2 for a more thorough discussion (USAEC, 2016).

4.9.2.1. *Impacts from Construction of the Proposed Action*

While noise would increase locally around the project site during construction resulting from construction vehicles and equipment, these are anticipated to be short-term minor adverse effects that would cease upon completion of project construction. In addition, construction personnel would wear adequate personal hearing protection to limit exposure.

4.9.2.2. *Impacts from Operation of the Proposed Action*

As explained in the Solar PEA (USAEC, 2016), overall operation of the Proposed Action would result in either no noise or very minor noise. The minor noise generated during the operation of the Proposed Action would come from the solar array's power conditioning unit. According to the Solar PEA (USAEC, 2016), the "power conditioning unit can produce audible noise ranging from approximately 50-70 dBAs, depending on the size of the inverter/transformer," which is consistent with the range of noise levels associated with common speech (USAEC, 2016, p. 41). Furthermore, because the solar PV facility will not be generating electricity at night, noise from inverters would be less than at peak levels (USAEC, 2016).

4.9.2.3. Impacts from the No Action Alternative

Under the No Action Alternative, the noise environment on FMMD and its surrounds would remain unchanged; therefore, there would be no effect on noise from implementation of the No Action Alternative.

4.10. AIR QUALITY AND GREENHOUSE GASES

4.10.1. Affected Environment

USEPA Region 3 and MDE regulate air quality in Maryland. The Clean Air Act (CAA) (42 U.S. Code [USC] 7401–7671q), as amended, gives the USEPA the responsibility to establish the primary and secondary National Ambient Air Quality Standards (NAAQS) (40 CFR Part 50, National Primary and Secondary Ambient Air Quality Standards, amended 1 July 2016, hereafter referred to as 40 CFR 50), acceptable concentration levels for seven criteria pollutants: particulate matter less than 10 microns (PM₁₀), particulate matter less than 2.5 microns (PM_{2.5}), sulfur dioxide (SO₂), carbon monoxide (CO), nitrogen oxides (NO_x), ozone (O₃), and lead (Pb). Short-term standards (i.e., 1-, 8- and 24-hour periods) have been established for pollutants that contribute to acute health effects, while long-term standards (i.e., annual averages) have been established for pollutants that contribute to chronic health effects (see **Table 5**). Each state has the authority to adopt standards stricter than those established under the Federal program. MDE has adopted the NAAQS and is responsible for maintaining air quality standards for the State of Maryland.

Primary and secondary NAAQS for the aforementioned criteria are presented in areas that exceed the NAAQS ambient concentration (i.e., have poor air quality) and are labeled as nonattainment areas designated by Federal regulations. According to the severity of the pollution problem, areas exceeding the established NAAQS are categorized as marginal, moderate, serious, severe, or extreme nonattainment. Maintenance areas have recently met NAAQS but are considered to be at risk of not remaining in attainment if efforts are not continued to maintain better air quality.

FMMD is within the Metropolitan Baltimore Intrastate Air Quality Control Region for Maryland (40 CFR Part 81.28). Anne Arundel County is classified as a nonattainment area for the 8-hour O₃ and for SO₂ NAAQS, and in attainment for all other criteria pollutants (USEPA, 2023).

Table 5. Federal and State Ambient Air Quality Standards

NAAQS Pollutant	Primary/ Secondary	Averaging Time	Level ⁽¹⁾	Form
Carbon Monoxide	Primary	8-hour	9 ppm	Not to be exceeded more than once per year
		1-hour	35 ppm	
Nitrogen Dioxide	Primary	1-hour	100 ppb	98 th percentile, averaged over 3 years
	Primary and secondary	Annual	53 ppb	Annual Mean
Ozone	Primary and secondary	8-hour	70 ppb	Annual fourth-highest daily maximum 8-hr concentration, averaged over 3 years

NAAQS Pollutant	Primary/ Secondary	Averaging Time	Level ⁽¹⁾	Form
Particular Matter (PM _{2.5})	Primary	Annual	12 µg/m ³	Annual mean, averaged over 3 years
	Secondary	Annual	15 µg/m ³	Annual mean, averaged over 3 years
	Primary and secondary	24-hour	35 µg/m ³	98 th percentile, averaged over 3 years
Particular Matter (PM ₁₀)	Primary and secondary	24-hour	150 µg/m ³	Not to be exceeded more than once per year on average over 3 years
Lead	Primary and secondary	Rolling 3-month average	0.15 µg/m ³	Not to be exceeded
Sulfur Dioxide	Primary	1-hour	75 ppb	99 th percentile of 1-hour daily maximum concentrations, averaged over 3 years
	Secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

1 - Units of measure for the standards are parts per million (ppm) by volume, parts per billion (ppb) by volume, and micrograms per cubic meter of air (µg/m³)

Hazardous Air Pollutants

In addition to the ambient air quality standards for criteria pollutants, national standards exist for hazardous air pollutants (HAPs). The National Emission Standards regulate 188 HAPs based on available control technologies (USEPA, 2022a). The majority but not all HAPs are Volatile Organic Compounds (VOCs). Sources of HAP emission at FMMD include stationary, mobile, and fugitive emissions, none of which currently occur at the proposed project site. Stationary sources elsewhere at FMMD include boilers, generators, water heaters, incinerators, fuel storage tanks, fuel-dispensing facilities, vehicle maintenance shops, laboratories, degreasing units, and similar testing units. Mobile sources of emissions include private and government-owned vehicles. Fugitive sources include dust generated from construction activities and roadway traffic.

State agencies (in Maryland, MDE) develop air quality plans, which are also referred to as State Implementation Plans (SIPs), designed to attain and maintain the NAAQS and to prevent significant deterioration of air quality in areas which demonstrate air that exceeds NAAQS standards. Maryland has individual SIPs for various pollutants, including NO₂, PM_{2.5}, 8-hour O₃, regional haze, lead, etc. Federal agencies must ensure that their actions conform to the SIP in a nonattainment area, and do not contribute to new violations of ambient air quality standards, or an increase in the frequency or severity of existing violations, or a delay in timely state and/or regional attainment standards. The 1990 amendments to the CAA require Federal agencies to ensure that their actions conform to the SIP in a nonattainment area. The purpose of the General Conformity Rule (GCR) is to:

- Ensure Federal activities do not interfere with the budgets in the SIPs
- Ensure the attainment and maintenance of NAAQS
- Ensure actions do not cause or contribute to new violations of NAAQS

USEPA has developed two distinctive sets of conformity regulations: one for transportation projects and one for non-transportation projects. Non-transportation projects are governed by general conformity regulations (40 CFR Part 93, Determining Conformity of Federal Actions to State or Federal Implementation Plans, dated November 24, 1993, hereinafter referred to as 40 CFR 93). The Proposed Action is a non-transportation project within a nonattainment area. Therefore, a general conformity analysis is required with respect to the 8-hour O₃ and the SO₂ NAAQS.

The GCR specifies threshold emissions levels by pollutant to determine the applicability of conformity requirements for a project. Due to the proximity to the urbanized east coast of the United States, Baltimore County is considered an Ozone Transport Region (OTR), as is Anne Arundel County. The OTR has a moderate 8-hour ozone (2015) and moderate 8-hour ozone (2008) nonattainment classification (USEPA, 2023). Because ozone formation is driven by other direct emissions, the air quality analyses focus on ozone precursors that include VOCs and NO_x. In accordance with USEPA policy, precursors that form PM_{2.5} (NO_x and SO₂) have also been evaluated. The applicable emission *de minimis* thresholds established by USEPA are summarized in **Table 6**.

Regulated under 40 CFR 93(b), the GCR also prohibits any department, agency, or instrumentality of the Federal Government from engaging in, providing financial assistance for, approving, or supporting any activity that does not conform to applicable SIP designated for areas being in nonattainment of established NAAQS. A SIP is a compilation of a state's air quality control plans and rules, approved by the USEPA, in an effort to reduce or eliminate the severity and number of NAAQS violations and achieve expeditious attainment of these standards.

Sensitive Receptors

CEQ NEPA regulations require evaluation of the degree to which the Proposed Action affects public health (40 CFR 1508.27). Children, elderly people, and people with illnesses are especially sensitive to the effects of air pollutants; therefore, hospitals, schools, convalescent facilities, and residential areas are considered to be sensitive receptors for air quality impacts, particularly when located within one mile from the emissions source. FMMD houses religious institutions, residential areas, one ambulatory care center, seven schools, Child and Youth Services Centers and four Child Development Centers. There are several sensitive receptors, including other hospitals, schools, religious institutions, and elderly and childcare facilities within one mile of FMMD. Within the vicinity of the Proposed Action there are no sensitive receptors.

Section 4.4 of the Solar PEA provides additional background information on the regulatory framework for air quality and greenhouse gasses (GHGs) (USAEC, 2016). Refer to the Solar PEA for more detailed explanations of the following:

- Clean Air Act of 1963
- National Ambient Air Quality Standards
- Hazardous air pollutants and National Emission Standards for Hazardous Air Pollutants

- The General Conformity Rule (GCR) (40 CFR Part 51, Subpart W), Conformity Determination, and Record of Non-applicability (RONA)
- State Implementation Plan
- GHGs

Greenhouse Gases

Greenhouse gases (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 in the atmosphere. 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. A warmer climate is expected to increase the risk of heat-related illnesses and death, worsen conditions for air quality, allow some diseases to spread more easily, and increase the frequency and strength of extreme events (such as floods, droughts, and storms) that threaten human health and safety (USAEC, 2016).

Gases exhibiting greenhouse properties come from both natural and human sources. Water vapor, carbon dioxide (CO₂), methane (CH₄), and nitrous oxide (N₂O) 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. Reduction goal requirements applicable to federal agencies are set forth in EO 13693, *Planning for Federal Sustainability in the Next Decade* (USAEC, 2016).

4.10.2. Environmental Consequences

Section 4.4.2.2 of the Solar PEA summarizes the overall air quality and GHG effects of installing and operating a solar PV project (USAEC, 2016):

The construction, operation, and maintenance of solar PV projects along with ancillary power control systems, substations, and transmission or distribution lines, could improve existing air quality conditions at an installation by directly displacing electricity produced from the combustion of fossil fuels, and accompanying emissions, with renewable solar-derived energy... During construction of solar PV systems...temporary short-term adverse air quality impacts would be expected as a result of vehicle exhaust from the construction vehicles and equipment and from fugitive dust as a result of ground-disturbing activities and, if unpaved roads are utilized, construction vehicles traversing to and from the project site...Operation of solar PV projects could result in long-term beneficial impacts to air quality and overall GHG emissions at an installation and within the region. By off-setting a commensurate amount of electricity using solar-produced electricity, Army installations would consume less fossil fuel-derived electricity attributable to an installation's electrical demand.

This section provides a discussion of the possible environmental impacts to air quality and impacts to GHGs that could result from the No Action and Proposed Action alternatives. Impacts to air

quality and GHGs would be considered significant if the Proposed Action would result in a NAAQS attainment area becoming a nonattainment area or if the Proposed Action would generate substantial GHG emissions nationwide ($> 75,000$ tons COs equivalents per year) (USAEC, 2016).

To meet the requirements under NEPA, this EA examines GHGs as a category of air emissions. This EA does not attempt to measure the actual incremental impacts of GHG emissions from the proposed action, as there is a lack of consensus on how to measure those impacts. Under the proposed action, all construction activities combined would generate approximately 853 tons of carbon dioxide. No direct ongoing GHG emissions would result from operation of the solar PV array. The estimated increase from construction would be relatively small, and the effect would be negligible. By installing the solar PV arrays, FMMD would be taking steps to help the Army reach its GHG reduction goals.

4.10.2.1. Impacts from Construction of the Proposed Action

Details of the solar array design, to include final acreage and layout of access roads and ancillary structures, would be determined once the third-party developer has been identified. For the purposes of this EA, generalized assumptions for the acreage of site preparation and development have been drawn from the 2016 PEA. The PEA estimates that to construct a 10-MW solar PV project, approximately 90 trucks carrying materials (e.g., solar modules, inverters, racking) and vehicles to transport 40 to 80 construction workers daily would be required. During equipment delivery, there may be 5 to 7 truck deliveries per week. A 10 MW project would require approximately 5 to 10 months for construction with variables including weather and site conditions. (USAEC, 2016).

Ground-disturbing activities which may result in fugitive dust include grading and excavation (e.g., for ancillary power control systems, substation, transmission line poles, inverter boxes). Fugitive dust may also result if vehicles supporting construction or maintenance have to travel on unpaved roads. Dust from construction traffic and ground-disturbing activities can be controlled using standard construction practices such as watering of exposed surfaces and covering of disturbed areas. Dust from construction and maintenance traffic can be controlled by limiting speed limits. When there are periods of high wind during excavation and grading, temporary suspension of those activities would reduce the volume of fugitive dust expected during high winds.

The Proposed Action may also include the construction, operation, and maintenance of back-up power generators to meet reliability standards. As currently envisioned, the back-up power generation is not considered as ‘additional’ to existing infrastructure, but rather higher efficiency replacement generation that would be located/re-located once the proposed solar PV, energy storage, and/or microgrid systems became operational, and a power flow assessment confirmed the need for location-specific back-up power generation (USAEC, 2016). Though commonly associated with fossil-fired engines using diesel or fuel oil, more recent microgrid-based systems incorporate low emissions/high efficiency natural gas or biogas-based equipment. Solar PV projects including back-up power generation systems would be required to determine what, if any,

changes would be required to existing CAA permits and whether any new permits would be required for any of the projects' associated generator sources.

During construction of solar PV systems, short-term, minor, direct adverse air quality impacts would be expected as a result of vehicle exhaust from the construction vehicles and equipment and from fugitive dust as a result of ground-disturbing activities and, if unpaved roads are utilized, construction vehicles traversing to and from the project site. Construction-related impacts to air quality are expected to be relatively minor, with impacts reduced through environmental protection measures, some of which may be required by construction permits. Examples of environmental protection measures are detailed in above paragraphs and include dust control measures, emissions control devices, and vehicle maintenance.

No long-term increases in fugitive dust are expected to occur, because this source of emissions is limited and would cease upon completion of the Proposed Action. Particulate matter emissions would be moderated through dust reduction measures (e.g., watering of exposed soils) as needed, thereby minimizing the total quantity of fugitive dust emitted during construction activities. In addition, project construction equipment would emit minor amounts of HAPs. The main sources of HAPs would occur from the combustion of diesel fuel. Construction would be temporary and minor HAPs emissions could be further moderated through implementation of BMPs such as restricting excessive idling, adherence to equipment maintenance programs, use of particulate filters, and use of ultra-low sulfur diesel fuel if applicable.

4.10.2.2. Impacts from Operation of the Proposed Action

Operation of solar PV projects could result in long-term beneficial impacts to air quality and overall GHG emissions on FMMD and within the region. By off-setting a commensurate amount of electricity using solar-produced electricity, Army installations would consume less fossil fuel-derived electricity attributable to an installation's electrical demand. For example, a 10 MW solar PV project would save approximately 4,300 kilograms (kg) of CO₂ per MW hour (MWh) of solar power production (USAEC, 2016).

Short-term, minor adverse and long-term beneficial effects on air quality would be expected from implementing the proposed action. As discussed in the Solar PEA, short-term effects would be attributable to air emissions generated during construction and long-term effects would be attributable to reduced fossil fuel use (USAEC 2016). FMMD would permit an emergency generation block installed as part of the proposed action. Long-term adverse effects to air quality from back-up generators is expected to be negligible, as technology for this type of equipment becomes increasingly more fuel efficient. The proposed action would not generate emissions greater than the GCR (40 CFR 93 Subpart B) *de minimis* threshold values or contribute to the violation of any federal, state, or local air regulation.

Criteria Pollutants and General Conformity. To determine whether the GCR applies and what the level of effects would be under NEPA, FMMD estimated all direct and indirect emissions and compared them to the *de minimis* thresholds (**Table 6**). Construction emissions were estimated for fugitive dust, on- and off-road diesel equipment and vehicles, and worker trips during the installation of the PV systems. To ensure a conservative estimate, it was assumed that all

construction activities would be accomplished within one 12-month period. Regardless of the ultimate implementation schedule (i.e., whether accomplished within one 12-month period or longer), annual emissions would be less than or equal to those estimated in this EA. Small changes in the siting of the facilities, the final design, and moderate changes in the quantity and types of equipment used would not substantially influence the emissions estimates or change the determination under the GCR or the level of effects under NEPA.

The solar PV arrays and associated ESS would lessen FMMD's dependence on its existing emergency generators and, with those used less frequently, the fuel stored onsite would last longer, reducing the number of fuel deliveries. The total emissions of all nonattainment pollutants and their precursors would be less than the *de minimis* thresholds and the GCR would not apply; therefore, a formal conformity determination under Section 176(c) of the CAA would not be required. **Table 6** presents a summary of the estimated construction and operational emissions due to implementation of the Proposed Action. Detailed emission calculations and a Record of Non-Applicability (RONA) are provided in **Appendix F**. Army guidance dictates that a RONA be prepared for federal actions in which proposed emissions are clearly *de minimis* to comply with the GCR.

Table 6. Estimated Annual Construction and Operational Emissions

Emission Source:	Emissions (tons/year)					
	VOC ²	CO	NO _x ¹	SO ₂ ²	PM ₁₀ ¹	PM _{2.5} ¹
Proposed Action Construction Emissions	0.66	3.66	6.28	0.47	26.55	26.53
Proposed Action Operation Emissions	0.215	1.844	8.046	0.004	0.235	0.235
General Conformity <i>de minimis</i> threshold	50	--	--	--	--	100
New Source Review threshold	--	250	250	250	250	--
Exceeds <i>de minimis</i> or NSR threshold?	No	No	No	No	No	No

Mitigation Measures and BMPs

No mitigation measures for effects on air quality and GHGs would be required. The developer and its contractors would use standard BMPs for air quality protection. Emissions from the emergency generation block would be regulated under installation air permits issued to FMMD.

Construction vehicles transporting excavation and fill material would be minimized through site design as movement of large amount of dirt would be prohibitively expensive for these projects. Air quality impacts from emissions can be mitigated with emission control devices and keeping vehicles and construction equipment in good working order.

4.10.2.3. *Impacts from the No Action Alternative*

Long-term, negligible to minor adverse effects on air quality and GHGs would result from implementing the No Action Alternative. This assumes there would be no short- or long-term changes to energy demand and emissions, meaning energy demands would continue to be met by fossil-fuel generated electricity which would continue the release of air pollutants and GHGs from combustion of fossil fuels. Ambient air-quality would remain unchanged compared to existing conditions.

4.11. CLIMATE CHANGE

4.11.1. *Affected Environment*

According to National Aeronautics and Space Administration (NASA)'s "Global Climate Change: Vital Signs of the Planet" website at "climate.nasa.gov," climate change is defined as "a long-term change in the average weather patterns that have come to define Earth's local, regional and global climates." (NASA, 2022) Climate change key indicators are as follows: global land and ocean temperature increases; rising sea levels; ice loss at Earth's poles and in mountain glaciers; frequency and severity changes in extreme weather such as hurricanes, heatwaves, wildfires, droughts, floods, and precipitation; and cloud and vegetation cover changes (NASA, 2022).

According to the CEQ, "Federal courts consistently have held that NEPA requires agencies to disclose and consider climate impacts in their reviews" (86 Fed. Reg. 10252). As previously discussed in the Air Quality section above, in March of 2016, CEQ issued "Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews"—also known as the "2016 GHG Guidance"—to assist agencies with this requirement (CEQ, 2016). Although CEQ is currently working on updating this guidance document, CEQ states that "[i]n the interim, agencies should consider all available tools and resources in assessing GHG emissions and climate change effects of their proposed actions, including as appropriate and relevant, the 2016 GHG Guidance (86 Fed. Reg. 10252).

Per CEQ, FMMD is considering all available tools and resources in assessing GHG emissions and climate change related to the Proposed Action. For example, the Army has been utilizing the USACE-developed Army Climate Assessment Tool (ACAT) to help Army installations identify climate-related threats that could degrade mission readiness (Surash and Dornbos, 2020). Thus far, the ACAT has proven very helpful in improving installation resiliency. Accordingly, the DoD has adopted and scaled the ACAT as the Defense Climate Assessment Tool and is using it to prioritize the most climate change vulnerable installations across DoD (DA, 2022).

FMMD is also adhering to both the Department of Defense Climate Adaption Plan (DoD, 2021) and the Department of the Army (DA) United States Army Climate Strategy ("Army Climate Strategy") (DA, 2022). The Proposed Action is already in line with the Army Climate Strategy in that it involves solar arrays and a microgrid. The Army Climate Strategy provides examples of several Army solar projects and recognizes solar project microgrids as good sources of carbon-

pollution-free electricity that helps mitigate climate change. In fact, the document states that the Army will install a microgrid on every installation by 2035 (DA, 2022).

4.11.2. Environmental Consequences

4.11.2.1. Impacts from Construction of the Proposed Action

The construction of the Proposed Action would likely result in short-term, minor, and indirect impacts on climate. This is because the manufacturing of solar panels generates a substantial amount of GHGs. However, according to an article by the National Renewable Energy Laboratory (NREL), solar PV systems can "repay" back the energy investment to make/install them in about 2 years with the amount of cumulative PV energy production this system will provide over its assumed life expectancy of 30 years (NREL, 2004). Therefore, these impacts are mitigatable by the long-term operation of the solar PV system.

4.11.2.2. Impacts from Operation of the Proposed Action

As previously stated above in Section 1.9, Air Quality, operation of the Proposed Action would result in long-term beneficial impacts to air quality and overall GHG emissions on FMMD and within the region. By off-setting a commensurate amount of electricity using solar-produced electricity, Army installations would consume less fossil fuel-derived electricity attributable to an installation's electrical demand.

4.11.2.3. Impacts from the No Action Alternative

Implementation of the No Action Alternative will not result in any impacts to climate change.

4.12. HUMAN HEALTH AND SAFETY

4.12.1. Affected Environment

Under NEPA, federal agencies are required to consider the environmental consequences of their proposed actions. This consideration is broad in scope and includes an analysis of effects the action could have on the human environment, including on human health and safety. This section will consider existing conditions at the proposed project site relative to human health and safety. With the exception of the interconnection pathways, the Proposed Action project site is located in a more remote area of FMMD. That said, the potential for existing or future hazards to arise with construction and operation still exists. This section will describe the existing health and safety conditions and protocols pertaining to workers and the general public.

With regard to protecting worker health and safety, workers would be expected to comply with all federal laws such as OSHA regulations, state and local regulations, and general contractor safety plans during the installation and maintenance of the solar arrays and interconnection pathways. The electrical work on the interconnection pathways would conform to applicable electrical and fire code requirements.

As previously stated in the Utilities section above, there are no "active" landfill sites on FMMD. The word "active" here means accepting municipal solid waste, commonly referred to as "trash" or "garbage."

Except for the possibility of having to cross the northernmost portion of the landfill that is under remediation to get to the capped portions of the CSL, there should be minimal worker contact with this part of the landfill area at the outset of this project because this site is currently excluded from the project. The current exclusion is due to the fact that this part of the Proposed Action site has in some places a soil cover that is eroding and has areas undergoing remediation. While not "active" as defined above, this portion is "open" in that it is currently being filled with dirt. The capped portions of the CSL, however, are "inactive" and are not receiving any material.

"Capping" of a landfill involves placing a cover over the landfill waste and/or contaminated soil. The cap is put in place to prevent workers, employees, visitors, and wildlife from being exposed to the buried waste. It prevents exposure in several ways. For example, according to the USEPA's "A Citizen's Guide to Capping" (USEPA, 2012a), caps can:

- Stop rain and snowmelt from seeping through the contaminated material and carrying contaminants to the groundwater;
- Keep stormwater from carrying contaminants offsite or into other bodies of water;
- Prevent wind from blowing the contaminants offsite;
- Control releases of gas from wastes; and,
- Keep people and wildlife from coming into contact with the contaminated material and tracking the contaminants offsite (USEPA, 2012a).

There is also a fence surrounding the CSL to minimize exposure of the public to potential safety hazards at the site.

To further protect humans from potentially contaminated groundwater at the landfill sites, FMMD utilizes a process called "air sparging." Air sparging involves injecting the groundwater-soaked soil below the water table with air. As air bubbles through the groundwater-soaked soil, it carries contaminant vapors upward into the soil above the water table (USEPA, 2012b). The vapors are then pulled out of the ground for treatment using a technique called "soil vapor extraction" or "SVE" (USEPA, 2012b). In addition, the CSL is currently monitored and maintained.

4.12.2. Environmental Consequences

Impacts to human health and safety would be considered significant if the Proposed Action results in direct human exposure to a health hazard or a safety risk substantially increases due to the Proposed Action.

Although anticipated to be minor, the potential environmental consequences to Human Health and Safety from the Proposed Action are adequately addressed in the Solar PEA's Section 4.16.2 (USAEC, 2016). Accordingly, those discussions found in the Solar PEA's Section 4.16.2 are incorporated by reference and not repeated below (USAEC, 2016). The overall conclusions

regarding impacts are included below; please refer to the Solar PEA's Section 4.16.2 for a more through discussion (USAEC, 2016).

4.12.2.1. Impacts from Construction of the Proposed Action

The discussion in the Solar PEA Section 4.16.2 is incorporated by reference (USAEC, 2016). Overall, adverse impacts to human health and safety as a result of the construction of the Proposed Action are anticipated to be minor and short-term.

4.12.2.2. Impacts from Operation of the Proposed Action

The discussion in the Solar PEA Section 4.16.2 is incorporated by reference (USAEC, 2016). Overall, adverse impacts to human health and safety as a result of the operation of the Proposed Action are anticipated to be minor.

4.12.2.3. Impacts from the No Action Alternative

As stated in the Solar PEA (USAEC, 2016), no construction would take place under the No Action Alternative; therefore, no construction-related impacts related to human health and safety would occur. Under the No Action Alternative, a negligible, adverse impact on human health and safety could be expected due to people in the FMMD area's continued exposure to fossil fuel derived air pollutants and GHGs assuming another renewable energy technology is not used in place of the Proposed Action. Overall, impacts to human health and safety from the No Action Alternative are anticipated to range from none to negligible (USAEC, 2016).

4.13. SOCIOECONOMICS

4.13.1. Affected Environment

Socioeconomic Environment

FMMD is located in Anne Arundel County, Maryland. The population of Anne Arundel County was 537,656 in 2010 and 588,261 in 2020 based on the decennial census data collected (United States Census Bureau [USCB], 2021a), which shows a 9 percent increase in population. There was an estimated 0.4 percent growth in population between 2020 and 2021 (USCB, 2021a) based on American Community Survey (ACS) data.

FMMD is the Army's second largest post by population with more than 60,000 employees that represent the Army, Navy, Air Force, Marines and Coast Guard (FMMD Alliance, 2020). FMMD and its tenant organizations together generate a total of \$17.8 billion in economic activity in Maryland, or 49.4% of the total \$36 billion in economic impact from all the military posts (FMMD Alliance, 2020). It is the largest source of employment, payrolls and purchases in Maryland. FMMD creates or supports 125,729 jobs earning an estimated \$9.2 billion in employee compensation. The direct FMMD employment of 48,389 accounts for 1.4% of all employment in Maryland and when multiplier impacts are included, the 125,729 jobs created or supported by FMMD account for 3.6% of all employment in Maryland.

Demographics and Environmental Justice

This section describes socioeconomic characteristics and environmental justice (EJ) communities in the Proposed Action area. The Proposed Action area includes all Census Tract (CT) Block Groups (BGs) that fall within or along the Proposed Action area: CT 7403.04 BG 3, CT 7406.03 BG 1, CT 7406.03 BG 2, CT 7407.01 BG 3, and CT 7409.00 BG 4. CT 7406.03 BG 1 is part of the Proposed Action area but has a population of zero since most of the BG includes Patuxent Wildlife Research Center (PWRC); therefore, no data is reflected in **Table 7** for this BG. FMMD considered USCB socioeconomic data for the Proposed Action area, Anne Arundel County, and the State of Maryland to provide a comparative analysis. This Proposed Action area was selected because it represents the geographic area that is most directly and indirectly impacted by the project.

EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, requires Federal Agencies to consider whether their actions will result in disproportionate adverse impacts to minority (People of Color) and low-income populations.

As shown in **Table 7**, the BGs and Proposed Action area have higher percentages of People of Color compared to Anne Arundel County. One BG has a higher percentage (Census Tract 7409.00 BG 4) of People of Color in comparison to the State of Maryland, 52 and 50 percent respectively. The average percentage of People of Color across the four BGs is 44 percent which is lower than the State of Maryland at 50 percent.

Table 7. People of Color in the Proposed Action Area

Race/Ethnicity	Census Tract 7403.04 BG 3	Census Tract 7406.03 BG 2	Census Tract 7407.01 BG 3	Census Tract 7409.00 BG 4	Project Area	Anne Arundel County	MD
Total Population Count	2,470	3,245	3,145	3,333	3,048	575,414	6,037,624
Hispanic or Latino	3%	12%	2%	18%	9%	8%	10%
White	60%	66%	61%	57%	61%	71%	54%
Non-Hispanic White	59%	57%	59%	48%	56%	67%	50%
Hispanic White	2%	9%	2%	8%	5%	4%	4%
Non-White	40%	35%	39%	44%	40%	29%	47%
Black or African-American	12%	17%	15%	14%	15%	17%	30%
American Indian and Alaska Native	0%	1%	0%	0%	0%	<1%	<1%
Asian	15%	5%	14%	17%	13%	4%	6%
Native Hawaiian & Other Pacific Islander	0%	0%	0%	0%	0%	<1%	<1%
Some other race	0%	1%	0%	10%	3%	3%	5%
Two or more races	13%	11%	10%	3%	9%	5%	6%

Total People of Color Population	1,025 (41%)	1,388 (43%)	1,278 (41%)	1,728 (52%)	1,355 (44%)	189,552 (33%)	3,009,130 (50%)
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Source: EJ Screen ACS Summary Report 2016-2020; ACS 2015-2019; Table DP05 ACS Demographic

*Hispanic population can be of any race. * May not sum to totals due to rounding. * CT 7406.03 BG 1 has a population of 0.

Alignment is slightly in this BG. Population is zero because of PWRC.

Poverty data is not reported at the BG level. Therefore, poverty levels within the Proposed Action area have been determined using census tract data. The poverty rate across these four census tracts is 5.2 percent compared to 5.6 percent for Anne Arundel County and 9.2 percent for the State of Maryland. Two census tracts (7403.04 and 7409.00) had poverty rates at 5.7 percent and 6 percent, respectively (USCB, 2021b).

Table 8 shows income characteristics for the BGs and the Proposed Action area. Only one BG has a median household income that is below the Proposed Action area, county and state level (7403.04 BG 3). However, this BG has a per capita income than the Proposed Action area, county and state. Census Tract 7406.03 BG 2 has a per capita income below the Proposed Action area, county and state, but the median household income is above the Proposed Action area and the State of Maryland.

Table 8. Income Characteristics in the Proposed Action Area

Income and Poverty Characteristics	Census Tract 7403.04 BG 3	Census Tract 7406.03 BG 2	Census Tract 7407.01 BG 3	Census Tract 7409.00 BG 4	Project Area	Anne Arundel County	Maryland
Median household income	\$74,200	\$97,378	\$102,827	\$104,554	\$94,740	\$107,823	\$90,203
Per capita income	\$52,572	\$28,365	\$67,655	\$ 46,761	\$48,838	\$44,979	\$40,517

Source: 2020 ACS Median Household Income in Past 12 Months (in 2021 inflation adjusted dollars) Table B19013, Table B19301 Per Capita Income in Past 12 Months. Table S1901. Data for CT 7403.04 BG 3 was obtained from EJ Screen.

Aerial mapping showed mobile home communities directly adjacent to the landfill site outside of the installation border. A windshield survey was conducted on September 12, 2022, to confirm that these communities were present. New single family home communities were also located in the same vicinity.

USEPA EJScreen was also used to evaluate potential EJ communities. This tool looks at 12 environmental indicators, combined with socioeconomic information. The EJ index highlights BGs with the highest intersection of low-income populations, people of color, and a given environmental indicator (USEPA, 2022b). USEPA EJ Screen rated the project in the 80-90th percentile across the nation for Ozone and superfund proximity for approximately 80 percent of the project area (USEPA, 2022c). Therefore, based on this information and some of the demographic data, the Proposed Action area is considered an EJ community.

Protection of Children

EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, requires federal agencies to identify, assess, and address disproportionate environmental health and safety risks to children from federal actions. EO 13045 recognizes that a growing body of scientific knowledge demonstrates that children may suffer disproportionately from environmental health and safety risks due to still developing neurological, immunological, physiological, and behavioral systems. With regard to solar PV systems, risks to health and safety are attributable to solar PV system construction and operation-related products or substances that a child would be likely to come in contact with or ingest (USAEC, 2016).

The ROI for determining compliance with EO 13045 is within the boundaries of FMMD and immediately surrounding communities. As stated above, EPA's EJScreen was utilized to analyze the ROI. The data in the mapping layers available through EJScreen is provided by the USCB's American Community Survey 5-year summary estimates and includes the percent of individuals under the age of five as a fraction of the population (USEPA, 2022c).

Impacts to protection of children from the Proposed Action would be considered significant if they were to cause substantial change or decline in the health, wellbeing, and safety of children in the ROI. Currently, EJScreen is indicating that the Proposed Action's ROI has issues with Ozone (level in the air). EJScreen also indicates that the ROI has "Superfund proximity." This indicator includes the count of proposed and listed NPL sites within 5 km (or nearest one beyond 5 km), each divided by distance in km. The count excludes deleted sites (USEPA, 2022c).

4.13.2. Environmental Consequences

4.13.2.1. *Impacts from Construction of the Proposed Action*

During construction the Proposed Action there may be minor, short-term adverse impacts to EJ communities that are in close vicinity to the landfill site. Minor impacts experienced by these communities may include minor adverse impacts to air quality, viewshed and noise.

This EA has identified no environmental health and safety risks from construction of the Proposed Action that would disproportionately affect children. All proposed construction would be carried out in an area of FMMD where no children reside or visit. Temporary construction safety fencing would be erected around the construction area, preventing unauthorized access to the site by any age group, including children.

4.13.2.2. *Impacts from Operation of the Proposed Action*

Long-term impacts to EJ communities from the Proposed Action will be beneficial and include minor improvements to air quality and greenhouse gases.

This EA has identified no environmental health and safety risks from operation of the Proposed Action that would disproportionately affect children. Operation of the Proposed Action would be carried out in an area of FMMD where no children reside or visit. During operation, access would continue to be restricted to authorized personnel, none of whom would be children. In addition,

there would be a minor beneficial effect on the health of children as the operation of the Proposed Action would slightly replace fossil-fuel fired air pollution with emission-free PV-generated electricity.

4.13.2.3. Impacts from the No Action Alternative

Under the No Action Alternative, the Proposed Action would not be constructed, so no effect on area children's health and safety would occur.

4.14. AIRSPACE

4.14.1. Affected Environment

Tipton Airport is a public airport just south of the FMMD installation boundary, and approximately 1.9 miles west of the Proposed Action area. As of April 2020, approximately 104 aircraft operations per day are conducted at the airfield, primarily by local general aircraft (FMMD, 2022a). Approach paths to the Tipton runway are oriented in an east-west direction. Commercial planes are not permitted to fly over the FMMD installation.

4.14.2. Environmental Consequences

Impacts to airspace would be considered significant if the Army actions lead to a violation of Federal Aviation Administration (FAA) regulations that undermines the safety of military, civil, or commercial aviation; result in substantial infringement of current military, private, and commercial flight activity and flight corridors; or substantially impacts military aviation missions (USAEC, 2016). The ROI for this resource area is the airspace above FMMD and surrounding aviation assets, namely, the Tipton Airport.

An airspace consideration is whether the momentary “glint” or longer duration “glare” reflecting off solar systems presents a hazard to aircraft and air traffic control tower operations. The amount of light reflected off a solar panel surface depends on the amount of sunlight hitting the surface, its surface reflectivity, geographic location, time of year, cloud cover, and solar panel orientation (FAA, 2018). As described in the Solar PEA, PV solar modules use silicon to convert sunlight to electricity and silicon is naturally reflective. As a result, all solar modules are designed with a layer of anti-reflective material that allows the sunlight to pass through to the silicon but minimizes reflection. Recent generations of modules have included an anti-reflective material on the outer surfaces of the glass and have the protective glass surface roughened to further limit glint (a momentary flash of light) and glare (a more continuous source of excessive brightness relative to the ambient lighting) [referred to henceforth as just glare]. The area of the aluminum frame is very thin and therefore reflection from the aluminum is not a concern (USAEC, 2016).

For off-airport projects, local governments, solar developers, and other stakeholders in the vicinity of an airport have the responsibility to inform the FAA about proposed projects so that the agency can determine if the project, especially if large, presents any safety or navigational problems (FAA, 2018). Solar installations are presently operating at a number of airports, including megawatt-sized solar facilities covering multiple acres. During design of these facilities, potential impacts from glare were effectively modeled and addressed.

4.14.2.1. Impacts from Construction of the Proposed Action

The developer will need to coordinate design of the solar array field with FAA to address glare concerns, with the potential need to conduct a glare study. Several resources are currently available for this assessment. Installation of the panels and associated supporting infrastructure would not be expected to result in any impacts to airfield operations.

4.14.2.2. Impacts from Operation of the Proposed Action

Provided any recommendations and/or requirements that result from the site-specific assessment are incorporated into the project design, adverse impacts to airspace would be long-term but minor in nature.

4.14.2.3. Impacts from the No Action Alternative

Under the No Action Alternative, there would be no changes to the landfill area. The CSL area would remain in place with a vegetative cover and no additional structures other than the existing remediation equipment.

4.15. ELECTROMAGNETIC SPECTRUM

4.15.1. Affected Environment

The electromagnetic spectrum is the entire range of electromagnetic radiation characterized by frequency and wavelength. The Solar PEA notes:

The policies and procedures for spectrum use by federal agencies are contained in the *Manual of Regulations and Procedures for Federal Radio Frequency Management*, commonly referred to as the *National Telecommunications and Information Administration Manual*. In addition to the manual, DoD has well-established and detailed policies and procedures for the use of the electromagnetic spectrum by DoD agencies. Finally, DA has its own policies and procedures guiding the spectrum-dependent activities of Army entities. Regulations and procedures relevant to Army spectrum management issues are addressed in AR 5-12, *Army Use of the Electromagnetic Spectrum* (USAEC, 2016).

4.15.2. Environmental Consequences

While solar panels and their supporting infrastructure have the potential to emit electromagnetic radiation, due to their low profiles, solar PV systems typically represent little risk of interfering with radar transmissions. In addition, solar panels do not emit electromagnetic waves over distances that could interfere with radar signal transmission, and any electrical facilities that do carry concentrated current are buried beneath the ground and away from any signal transmission (FAA, 2018).

The DoD Siting Clearinghouse, discussed in Section 4.12 of the Solar PEA, coordinates and oversees the military's review of project applications submitted for permitting through the FAA's

Obstruction Evaluation/Airport Airspace Analysis (OE/AAA) process. The DoD Siting Clearinghouse review also considers electromagnetic interference impacts on aircraft safety operations and critical test activities. This review is required for renewable energy projects which require an FAA permit through the FAA's OE/AAA process.

Construction activities are not anticipated to provide any short-term, adverse impacts to the electromagnetic spectrum. Operations and maintenance of the proposed solar PV project is not anticipated to be a significant source of electromagnetic interference nor are any major impacts to electromagnetic spectrum use anticipated. The Solar PEA describes in more detail the potential impacts from electromagnetic radiation as a result of solar project construction and operation. No impacts on radio frequency and spectrum use would occur from the No Action Alternative because no construction activities would occur.

4.16. CUMULATIVE IMPACTS

4.16.1. Definition of Cumulative Impacts

CEQ regulations stipulate that the cumulative impacts analysis within an EA should consider the potential environmental impacts resulting from “the incremental impacts of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions” (40 CFR 1508.7). CEQ guidance in *Considering Cumulative Effects under the National Environmental Policy Act* affirms this requirement, stating that the first steps in assessing cumulative impacts involve defining the scope of the other actions and their interrelationship with a Proposed Action (CEQ, 1997). The scope must consider geographic and temporal overlaps among the Proposed Action and other actions. It must also evaluate the nature of interactions among these actions (CEQ, 1997).

Cumulative impacts are most likely to arise when a relationship or synergism exists between a Proposed Action and other actions expected to occur in a similar location or during a similar time period. Actions overlapping with or in close proximity to the Proposed Action would be expected to have more potential for a relationship than those more geographically separated. Similarly, actions that coincide, even partially, in time would tend to offer a higher potential for cumulative impacts.

To identify cumulative impacts the analysis needs to address three fundamental questions:

- Does a relationship exist such that affected resource areas of the Proposed Action might interact with the affected resource areas of past, present, or reasonably foreseeable actions?
- If one or more of the affected resource areas of the Proposed Action and another action could be expected to interact, would the Proposed Action affect or be affected by impacts of the other action?
- If such a relationship exists, then does an assessment reveal any potentially significant impacts not identified when the Proposed Action is considered alone?

The scope of the cumulative effects analysis involves both the geographic extent of the effects and the time frame in which the effects could be expected to occur. For this EA, the geographic extent of the cumulative effects analysis is the FMMD property and surrounding roadways. **Table 9**

identifies projects occurring within the same general time frame at FMMD and the immediate vicinity, and whose effects, when added to those of the Proposed Action, may result in cumulative effects.

Table 9. Actions at FMMD and Vicinity Potentially Causing Cumulative Effects of Importance

Project	Description
FMMD Stream Improvements Project	Restoration of eight impaired stream reaches in Midway Branch, Franklin Branch, Rogue Harbor, and Severn Run watersheds at FMMD to improve water quality, reduce flooding, enhance fish habitat, prevent further stream degradation, and provide numerous co-benefits for FMMD and neighboring communities, while also helping FMMD maintain compliance with federal and state water quality requirements. Total combined design and construction costs are expected to be approximately \$1.57 million for the Severn Run reach (FMMD, 2021).
Operations Facility	Construct a new two-story operational building with associated parking on available space within the southeast portion of Meade.
Programmatic EIS for a Tenant Organization at FMMD	Final Environmental Impact Statement (EIS) completed in 2017 for a new operational complex.
Proposed Road Improvements at FMMD	November 2017 EA completed for eleven road improvement projects within FMMD. Projects include the widening of Cooper Avenue and Rose Street from two to four lanes to increase safety, efficiency, and traffic flow and connect primary roads and widening of Reece Road where the new four lane road ends. Sidewalks would be rebuilt to regulation and design standards. All projects would include stormwater management (SWM), Low-Impact Development (LID), and landscaping (including street trees, lighting, and street furniture) would be added in accordance with Maryland state law, Army and Installation Design Guidelines, policy and regulations.
Air Force Defense Cyber Crime Center	This project proposes the construction and operation of a new, approximately 59,000 SF headquarters facility, to include parking, secure perimeter fencing, and stormwater management features. The project would consolidate the unit's operations into one main, secure headquarters facility that encourages collaboration with other agencies with similar missions on FMMD and would allow the unit to surrender multiple spaces currently under lease in the vicinity.
Navy MARFORCYBER	Includes the construction and operation of a three-story cyberoperations facility with an associated surface parking area for Marine Corps Forces Cyberspace Command (MARFORCYBER)

Project	Description
CDC V	This project involves construction of an approximately 24,440 square foot, full daycare child development center (CDC) to accommodate approximately 303 children. The proposed facility would include parking, a storage shed, and fenced outdoor playgrounds. The site is located at the northeastern intersection of Ernie Pyle Street and Macarthur Road, adjacent to the existing CDC 2.
Cyber Brigade Headquarters	Construct an approximately 94,500 square foot headquarters facility to support the 780 th Military Intelligence Brigade which is currently operating out of relocatables on the installation.
Phased Barracks Construction	FMMD proposes to design and construct a total of up to nine new barracks facilities to house 1,600 to 1,800 unaccompanied enlisted personnel, to be constructed in three phases at three sites in close proximity on FMMD. The first phase is currently under design.
Physical Training (PT) Training Site with Running Trails and Confidence Course	These short- and mid-range future projects are noted on the FMMD ADP and sited in the forested buffer between the CSL and the western border of the installation where it meets the Patuxent Research Refuge.
Joint Communications Integration Element	This includes three proposed facilities on Mapes Road, east of O'Brien Road, totaling approximately 63,000 square feet.
Logistic Readiness Center (LRC) Improvements	Improvements to the existing LRC include construction of an LRC maintenance facility (14,400 square feet), fuel point (200 square feet), and a warehouse and administration building (33,500 square feet). Each project would be completed in a separate construction phase, which would contribute to the overall upgrade of the LRC complex. These projects would replace inadequate and dilapidated facilities, pavement, and fueling areas.
Anne Arundel County Potable Water Transmission Line	Anne Arundel County proposes to install approximately 20,000 linear feet of new potable water transmission main, along MD 32 across the southern portion of Fort Meade and northern portion of the Patuxent National Wildlife Refuge. The corridor includes a portion of FMMD on the southern side of MD 32.
Maryland Department of Transportation (MDOT), State Highways Administration (SHA)	Two SHA projects in the area include roadway improvements along Annapolis Road, from Mapes Road to MD 32; and roadway and interchange improvements where Annapolis Road intersects MD 295.

4.16.2. Potential Cumulative Impacts

The following analysis examines the potential cumulative impacts on the natural and human-made environment that would result from the cumulative impact of the Proposed Action, in combination with the other actions described above. Based on the assessment of past, present, and reasonably foreseeable future actions at and in the vicinity of the Proposed Action at FMMD, a limited number

of resource topics analyzed in this EA would be reasonably expected to experience cumulative impacts. These include land use, stormwater, air quality and GHGs, noise, soils, utilities, and traffic and transportation.

Together, the Proposed Action, in combination with the other construction projects listed in **Table 9**, could cumulatively result in the loss of open space at FMMD. However, implementation of the Proposed Action would be consistent with existing designated land uses and policies. As such, no adverse cumulative impacts to land use are expected. The Proposed Action would add elements of a human-built environment to the regional viewshed, replacing an expanse of herbaceous vegetation on the CSL with a solar panel array. The arrays would be no greater than one story in height and largely shielded from view by surrounding forest.

Development projects at FMMD that individually or collectively increase stormwater volume beyond the capacity of the existing facilities for stormwater retention would be considered a detriment. The Proposed Action would increase impervious surface area, namely as a result of support pads for a battery ESS and/or emergency generator, as well as the collective area of the panels themselves; however, rainfall would still be able to fall to the ground under the panel arrays. Further, the developer would obtain all necessary stormwater management permits prior to construction to account for increased impervious surface and include stormwater management features to adequately and appropriately capture stormwater on the Proposed Action site.

Other construction projects on the installation could have minor adverse effects like those of the Proposed Action, including on air quality, noise, soils, and traffic. As with the Proposed Action, however, no construction projects would have long-term adverse effects on those resource areas.

The cumulative impacts on utilities and air quality/GHG resources are expected to be beneficial on a long-term basis, as energy demands of FMMD, and the local community are met using renewable, solar radiation rather than combustion of fossil fuels. Impacts on all other resources would be temporary and confined to the construction phases of the projects. Thus, all other environmental resource topics were omitted from impact analysis because temporary, negligible, or no environmental impacts would occur when considered on a cumulative basis. No significant adverse cumulative effects on any resource area would be expected from the combined effects of the proposed action and local projects.

The No Action Alternative would foster the continued combustion of fossil fuels to meet energy demands and contribute to increasingly adverse cumulative environmental impacts occurring to air quality and GHGs, over time, when considered with other activities using fossil fuels.

5. SUMMARY OF ENVIRONMENTAL CONSEQUENCES

As described throughout Section 4 of this EA, the construction and operation of the Proposed Action would not generate any significant adverse impacts, while significant beneficial impacts would be achieved during operation of the Proposed Action. Therefore, an Environmental Impact Statement is not warranted.

As detailed in this EA, less-than-significant adverse impacts would result from construction activities associated with the Proposed Action. Impacts would be temporary, lasting approximately twelve months during the construction phase of the project. The intensity of the adverse impacts would be limited to the area immediately surrounding the Proposed Action area. Additionally, the number of receptors would be limited to a relatively small number of Service members, staff, and personnel within FMMD. These adverse impacts would end once the construction phases are completed.

During operation, long-term, significant, beneficial impacts would be realized through replacement of fossil-fuel derived energy with solar power. The Proposed Action would require minor, routine operational and grounds maintenance and generally be a passive, unobtrusive land use. **Table 10** summarizes the potential consequences the Proposed Action and No Action Alternative would have on resources evaluated in the EA.

Table 10. Summary of Environmental Consequences

Resource	Construction	Operation	No Action
Land Use	Short-term, negligible, direct, adverse impact on land use. Short-term, negligible adverse viewshed impacts.	Long-term, minor, and direct adverse effects on installation land use. Long-term, minor adverse effects on viewshed.	No impact.
Geology, Topography, and Soils	No impacts to geology. Negligible, short-term, and direct adverse effects to topography. Short-term, minor, adverse effect on soils.	No impacts to geology. No impacts to topography. Long-term, minor, indirect, adverse impact to soils from natural erosive forces.	No impact.
Water Resources	Short-term, negligible, direct, adverse impacts to surface water from sedimentation of stormwater run-off. No impact on floodplains (provided all practicable steps to avoid the floodplain encroachment and impacts are undertaken). Short-term, direct, minor adverse impact on wetlands.	Long-term, minor, adverse effects adverse impacts to surface water. No impact on floodplains. Negligible indirect, adverse impacts to wetlands. No impacts to groundwater. No impact on coastal zone resources.	No impact.

Resource	Construction	Operation	No Action
	Short-term, indirect, negligible, adverse impact on groundwater from incidental spills. Short-term, direct, negligible adverse impact on stormwater. No impact on coastal zone resources.		
Biological Resources	Minor long-term, direct, impacts to vegetation. Minor, indirect, temporary, adverse impacts would occur to wildlife. Minor, adverse, short-term effects would occur to rare, threatened, or endangered species.	Negligible, long-term adverse effects on vegetation. Negligible, permanent, direct, adverse impacts on terrestrial wildlife. No impact on rare, threatened, or endangered species or aquatic species and habitat.	No impact.
Cultural Resources	No impact.	No impact.	No impact.
Hazardous and Toxic Materials and Waste	Short- and Long-term negligible to moderate/less-than-significant adverse effects.	Long-term, negligible adverse impacts.	No impact.
Utilities	Short-term, negligible, direct, adverse impacts.	Long-term, negligible to minor, direct, adverse impact on selected utilities.	No impact.
Transportation and Traffic	Temporary, negligible, direct, adverse impact.	No impact.	No impact.
Noise	Short-term, minor, direct, adverse impact.	Long term, negligible, direct, adverse impact.	No impact.
Air Quality and Greenhouse Gases	Short-term, minor, direct, adverse impact.	Long-term beneficial impact.	Long-term, negligible to minor adverse impact.
Climate Change	Short-term, minor, and indirect impact.	Long-term beneficial impact.	Long-term, negligible adverse impact.
Human Health and Safety	Short-term, minor adverse impact.	Minor adverse impact.	Long-term, negligible, adverse impact.

Resource	Construction	Operation	No Action
Socioeconomics, Environmental Justice, and Protection of Children	Short-term, minor, direct, adverse impacts on Socioeconomics, namely Environmental Justice communities. No impact on Protection of Children.	Long-term, minor, beneficial impact on Socioeconomics.	No impact.
Airspace	No impact.	Long-term, minor adverse impact	No impact.
Electromagnetic Spectrum	No impact.	Long-term, negligible impact.	No impact.

Table 11. Summary of Requirements and Mitigation Measures

Requirements/Mitigation Measures	Applicable Criteria	Section
Erosion and Sediment Control <ul style="list-style-type: none"> Minimize grading requirements by using variable elevation heights of support posts 	Solar Programmatic Environmental Assessment (PEA)	Section 4.2.2
Stormwater Management Plan reviews and approvals with applicable BMPs, including: <ul style="list-style-type: none"> Sandbags Silt fences Earthen berms Fiber rolls Sediment traps Erosion control blankets Check dams in medium-sized channel Straw bale dikes in smaller channels 	<ul style="list-style-type: none"> State and Federal projects that disturb over 5,000 square feet of land area Section 438 of the Energy Independence and Security Act (EISA) of 2007 	Section 4.2.2
Stormwater Pollution Prevention Plan (SWPPP) with applicable BMPs, prepared by developer, includes implementation of BMPs, performing frequent visual inspections, and conducting benchmark monitoring to determine BMP effectiveness.	General Permit for Stormwater Associated with Construction Activity, pursuant to National Pollutant Discharge Elimination System (NPDES)	Section 4.2.2 Section 4.3.1.5

Environmental Site Design (ESD) requires a developer to demonstrate that all reasonable opportunities for meeting stormwater requirements using ESD have been exhausted by using natural areas and landscape features to manage runoff from impervious surfaces and that structural BMPs have been used only where absolutely necessary.	<ul style="list-style-type: none"> • Code of Maryland (COMAR) Title 26.17.02.05 and COMAR 26.17.02.09 • 2015 Stormwater Management Guidelines for State and Federal Projects 	Section 4.3.1.5
Direct impacts to wetlands and their buffers would be avoided and minimized to the maximum extent practicable; for impacts that cannot be avoided, applicable permits would be obtained and mitigation proffered (if required by the permit).	<ul style="list-style-type: none"> • Section 404 of the Clean Water Act (CWA) • COMAR, Title 26, <i>Department of the Environment</i>, Subtitle 23, <i>Nontidal Wetlands</i> 	Section 4.3.2.1
Time of year restriction for tree removal: 1 June to 31 July	<ul style="list-style-type: none"> • Endangered Species Act • Migratory Bird Treaty Act (16 U.S.C. §703) 	Section 4.4.1.3
Site developments must preserve or establish 20 percent forest cover, regardless of whether or not the site was forested before the construction.	<ul style="list-style-type: none"> • Fort Meade Forest Conservation Act (FCA) and Tree Management Policy • Fort Meade Integrated Natural Resources Management Plan (INRMP) 	Section 4.4.1.1
<ul style="list-style-type: none"> • Invasive vegetation removal and reseedling with native seed mix. • Install panels minimum 24 inches off ground surface to allow vegetation growth. 	INRMP, Section 8.9	Section 4.4.2.1

Implement Pollinator Habitat Planting Plan	INRMP (Goals), U.S. Fish and Wildlife Service Policy Endangered Species Act	Section 4.4.1.3
<ul style="list-style-type: none"> Site design will ensure that impacts to any nearby cemeteries are avoided. Accidental Discovery Plan 	<ul style="list-style-type: none"> Solar PEA NHPA*; NAGPRA; ARPA; Executive Order 13007 to which access is afforded under AIRFA; and 36 CFR Part 79 (*see Section 7 for acronym definitions) 	Section 4.5.2.1
Maintain spill kits on-site during construction; stage equipment and construction stockpiles on existing fill areas to minimize clearing and the risk of contaminants being released off-site.	Fort Meade Spill Prevention, Control and Countermeasures Plan	Section 4.3.2.1
Any proposed alterations to the existing cap of the Closed Sanitary Landfill (CSL), Cell 3, or disturbance exposing landfill material during construction, must be approved and coordinated through the Maryland Department of the Environment (MDE) Solid Waste Program (SWP) and MDE Land and Materials Administration (LMA).	Resource Conservation and Recover Act (RCRA)	Section 4.6.2.1
Developer would need to coordinate connection pathway and requirements for right of access to cross a Maryland State Highway Administration (SHA) easement.		Section 4.8.2.1
Truck beds would be covered while in transit to limit fugitive dust emissions; water would be sprayed on any unpaved roads or stockpiles to limit fugitive dust emissions; ultra-low sulfur diesel would be used as a fuel source where appropriate to minimize oxides of sulfur emissions; clean diesel would be used in construction equipment and	Air quality permits would be obtained, as necessary, in compliance with Federal, state, and local standards.	Section 4.10.2.1

vehicles through the implementation of add-on control technologies such as diesel particulate filters and diesel oxidation catalysts, repowers, and/or newer and cleaner equipment; when feasible, electric-powered equipment would be used in lieu of diesel-powered equipment; control measures for heavy construction equipment and vehicles, such as minimizing operating and idling time, would be implemented to limit criteria pollutant emissions.		
The developer will need to coordinate design of the solar array field with the Federal Aviation Administration (FAA) to address glare concerns, with the potential need to conduct a glare study.	FAA's Obstruction Evaluation/Airport Airspace Analysis (OE/AAA) process (49 U.S.C. § 44718)	Section 4.14.2.1

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7. ACRONYMS AND ABBREVIATIONS

ACAT	Army Climate Assessment Tool
ACP	Access Control Point
ACS	American Community Survey
AIRFA	American Indian Religious Freedom Act of 1987
AOI	Area of Investigation
APE	Area of Potential Effect
ARPA	Archaeological Resources Protection Act of 1979
ASP	Ammunition Supply Point
BG	Block Group
BGE	Baltimore Gas and Electric
BMP	Best Management Practice
BO	Biological Opinion
BRAC	Base Realignment and Closure
CAA	Clean Air Act
CAC	Common Access Card
C&D	Construction and Demolition
CDC	Centers for Disease Control
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH ₄	Methane
CO	Carbon monoxide
CO ₂	Carbon dioxide
COMAR	Code of Maryland Regulations
CSL	Closed Sanitary Landfill
CT	Census Tract
CWA	Clean Water Act
CZM	Coastal Zone Management
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Plan
DA	Department of the Army
dB	decibel
dBA	A-weighted decibel
DCAT	Department of Defense Climate Assessment Tool
DCS	Defense Courier Service
DINFOS	Defense Information School
DISA	Defense Information System Agency
DMA	Defense Media Activity
DNL	Day Night Average Sound Level
DoD	Department of Defense
DODCAF	Department of Defense Consolidated Adjudication Facility
DPW	Department of Public Works

EA	Environmental Assessment
EIS	Environmental Impact Statement
EISA	Energy Independence and Security Act
EJ	Environmental Justice
EO	Executive Order
ESA	Endangered Species Act
ESD	Environmental Site Design
ESS	Energy Storage System
FAA	Federal Aviation Administration
FCA	Forest Conservation Act
FDP	Future Development Plan
FEMA	Federal Emergency Management Agency
FFS	Focused Feasibility Study
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FMMD	Fort George G. Meade
FNSI	Finding of No Significant Impact
GCR	General Conformity Rule
GHGs	Greenhouse Gases
GPM	Gallons Per Minute
HAP	Hazardous Air Pollutants
HTMW	Hazardous and Toxic Materials and Waste
HUD	U.S. Department of Housing and Urban Development
ICRMP	Integrated Cultural Resources Management Plan
IEWP	Installation Energy and Water Plan
INRMP	Integrated Natural Resources Management Plan
IPaC	Information for Planning and Consultation
IRP	Installation Restoration Program
ISCP	Installation Spill Contingency Plan
Kg	Kilogram
LMA	Land and Materials Administration (Maryland)
LOD	Limits of Disturbance
LOS	Level of Service
MARC	Maryland Area Regional Commuter
MC	Munitions Constituents
MD	Maryland
MDE	Maryland Department of the Environment
MDNR	Maryland Department of Natural Resources
MEC	Munitions and Explosives of Concern
MGD	Million Gallons per Day
MGS	Maryland Geological Survey
MHT	Maryland Historical Trust
MMRP	Military Munitions Response Program
MOU	Memorandum of Understanding

MRA	Munitions Response Area
MS4	Municipal Separate Storm Sewer System
msl	mean sea level
MW	megawatt
N ₂ O	Nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act of 1979
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act
NFA	No Further Action
NHPA	National Historic Preservation Act
NLEB	Northern Long-Eared Bat
NREL	National Renewable Energy Laboratory
NRHP	National Register of Historic Places
NOI	Notice of Intent
NO _x	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
NWR	National Wildlife Refuge
IPaC	Information for Planning and Consultation
O ₃	Ozone
OEI	U.S. Army Office of Energy Initiatives
OSHA	Occupational Safety and Health Administration
OTR	Ozone Transport Region
Pb	Lead
PCBs	Polychlorinated Biphenyls
PEA	Programmatic Environmental Assessment
PEM	Palustrine Emergent
PFO	Palustrine Forested
PM	Particulate Matter
POW	Prisoner of War
PSS	Palustrine Scrub-Shrub
PV	Photovoltaic
PWRC	Patuxent Wildlife Research Center
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD	Record of Decision
RONA	Record of Non-Applicability
ROI	Region of Influence
RTE	Rare, Threatened and Endangered
SDWA	Safe Drinking Water Act

SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO ₂	Sulfur Dioxide
SOP	Standard Operating Procedures
SPCCP	Spill Prevention Control and Countermeasures Plan
SR	State Road
SVE	Soil Vapor Extraction
SWP	Solid Waste Program (Maryland)
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
TSCA	Toxic Substance Control Act
U.S.	United States
USACE	United States Army Corps of Engineers
USAEC	United States Army Environmental Command
USCB	United States Census Bureau
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VCC	Visitor Control Center
VOC	Volatile Organic Compound
WWII	World War II

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APPENDICES

Appendix A

Environmental Checklist for Solar Photovoltaic Projects

Appendix B

Coastal Zone Management Act Consistency Determination

Appendix C

Draft Finding of No Practicable Alternative (FONPA)

Appendix D

Agency Coordination

Appendix E
MDE Solar Panel Installation on Closed & Capped Landfills
Factsheet

Appendix F

Record of Non-Applicability (RONA)