SKYHAWK SOLAR PROJECT
Obion County, Tennessee

FINAL
ENVIRONMENTAL ASSESSMENT

Prepared for:
TENNESSEE VALLEY AUTHORITY
Knoxville, Tennessee

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January 2020

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LIST OF ABBREVIATIONS

Abbreviation	Term/Phrase/Name
AADT	Annual Average Daily Traffic
AC	alternating current
AGL	above ground level
ALP	Airport Layout Plan
APE	Area of Potential Effects
ARAP	Aquatic Resource Alteration Permit
BGEPA	Bald and Golden Eagle Protection Act
BMP	best management practice
BZA	Board of Zoning Appeals
CBMPP	construction best management practices plan
CEQ	Council on Environmental Quality
CFR	Code of Federal Register
CN	Canadian National Railroad
CO	Carbon monoxide
CRA	Cultural Resource Analysts
CWA	Clean Water Act
dBA	A-weighted decibel
dbh	diameter at breast height
DC	direct current
DNL	day-night sound level
ECD	erosion control device
EA	Environmental Assessment
EO	Executive Order
ESA	Endangered Species Act
ES&PC	Erosion, Sedimentation and Pollution Control
FAA	Federal Aviation Administration
F-A-R	Forestry-Agriculture-Recreation
FEMA	Federal Emergency Management Agency
Fiber	fiber-optic overhead groundwire
FIRM	Flood Insurance Rate Map
FPPA	Farmland Protection Policy Act
GEMC	Gibson Electric Membership Corporation
GHG	greenhouse gas
IRP	Integrated Resource Plan
kV	kilovolts
Lmax	maximum noise level

Abbreviation	Term/Phrase/Name
µg/m^3	micrograms per cubic meter
MLRA	major land resource area
MPT	main power transformer
MVT	mid-voltage transformer
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHL	National Historic Landmark
NHPA	National Historic Preservation Act
NLEB	Northern long-eared bat
NO_2	nitrogen dioxide
NOI	Notice of Intent
NPDES	National Pollution Discharge Elimination System
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSA	Noise sensitive area
NWP	Nationwide Permit
OHGW	overhead groundwire
OHWM	ordinary high-water mark
OPGW	fiber-optic overhead groundwire
OSHA	Occupational Safety and Health Administration
PAB	Palustrine Aquatic Bed (wetland type)
PCN	Pre-construction Notification
PGA	Peak ground acceleration
PM_{10}	particulate matter having a diameter of less than or equal to 10 microns
$PM_{2.5}$	particulate matter having a diameter of less than or equal to 2.5 microns
PPA	power purchase agreement
ppb	parts per billion
ppm	parts per million
Project or Proposed Action	the proposed Skyhawk Solar Facility, TVA's connection facilities, and the PPA between TVA and TN Solar
PUB	Palustrine Unconsolidated Bottom (wetland type)
PV	photovoltaic
RFP	Request for Proposal
ROW	right-of-way
RSO	Renewable Standard Offer
SGHAT	Solar Glare Hazard Analysis Tool

Abbreviation	Term/Phrase/Name
SGOHP	Solar Glare Ocular Hazard Plot
SHPO	State Historic Preservation Office
SO_2	sulfur dioxide
SR	State route
SWPPP	Stormwater Pollution Prevention Plan
TDEC	Tennessee Department of Environment and Conservation
TDOA	Tennessee Division of Archaeology
TEMA	Tennessee Emergency Management Agency
T&E	Threatened and Endangered
THC	Tennessee Historical Commission
TL	transmission line
TMDL	total maximum daily load
TN	Tennessee
TN Solar	TN Solar 1, LLC
TVA	Tennessee Valley Authority
TVARAM	Tennessee Valley Authority Rapid Assessment Method
UCY	Everett-Stewart Regional Airport
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USCB	U.S. Census Bureau
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey

GLOSSARY OF TERMS

Area of Potential Effect: The geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist. The Area of Potential Effect (APE) for the Skyhawk Solar Project consists of the Project Site and the entire 16-mile-long existing TVA Weakley to Union City Transmission ROW. The Physical APE for the Project was enlarged by a 0.5-mile buffer to account for potential visual impacts to architectural resources.

Fencerow: A fencerow is typically located along the perimeter of a parcel that is comprised of agricultural land, pastureland, or open space. It may actually contain a fence or did at one point in the past. There is typically a row of trees or shrubs that grow along the fencerow. Most of the parcels associated with the Skyhawk Solar Facility have fencerows along the perimeter of the parcels.

Project or Proposed Action: Together, the proposed Solar Facility, TVA's connection facilities, structural improvement along TVA's Weakley to Union City Transmission ROW, and the Power Purchase Agreement (PPA) between TVA and TN Solar 1, LLC comprise the Project or Proposed Action. Total land impacts for implementation of the Project or Proposed Action would be approximately 760 acres.

Project Area: The "Project Area" includes the Skyhawk Solar Facility and Transmission ROW, as defined below, and the land, roadways, businesses, and homes within approximately ½ mile of the Project Site.

Skyhawk Solar Facility: The Skyhawk Solar Facility (or "Solar Facility") includes the four parcels that would contain solar arrays, inverters, collection lines, permanent access roads, the Skyhawk Substation, and the Skyhawk Switching Station. The Skyhawk Solar Facility would result in 100 MW of AC generating capacity. It does not include the new tie-in easement from TVA's proposed Switching Station to the existing electric transmission line. The Skyhawk Solar Facility is approximately 690 acres.

Survey Area: The Survey Area includes the proposed Project Site and TVA's existing Weakley to Union City Transmission ROW, as well as additional areas that were surveyed by environmental and cultural resources specialists. Seven parcels totaling about 895 acres were surveyed as part of the Skyhawk Solar Facility. The survey area for TVA's existing transmission line corridor included the approximately 100-foot-wide, 16-mile-long right-of-way, which totaled approximately 195 acres. It also included access roads that totaled about 25 acres. The total Survey Area for the Project is 1,115 acres.

Transmission ROW: The Transmission ROW represents the approximately 16-mile-long existing TVA Line No. 2 Weakly to Union City 161-kV transmission line. Certain locations within the existing TVA right-of-way would undergo structural upgrades as a result of the Skyhawk Solar Project. Construction impacts associated with the Transmission ROW include individual approximately ½-acre workspaces at each structure as well as the access roads that would be used to reach the workspaces. No additional easements would be obtained along the Transmission ROW. Total construction impacts would be approximately 67 acres. All workspaces would be temporary.

TVA Tie-In: TVA's proposed approximately 675-foot-long tie-in would connect the proposed Skyhawk Switching Station to the existing TVA Weakley to Union City 161-kV transmission line. Approximately 3 acres would be utilized for installation of the tie-in. TVA's permanent easement would be 100 feet wide.

1 INTRODUCTION

The Tennessee Valley Authority (TVA) has entered into a power purchase agreement (PPA) with TN Solar 1, LLC (referred to herein as "TN Solar"), to purchase the power and environmental attributes generated by the proposed Skyhawk Solar Facility (Solar Facility) in Obion County, Tennessee. The Solar Facility would be constructed and operated by TN Solar and include up to approximately 100 megawatts (MW) of alternating current (AC) generating capacity. Under the terms of the conditional PPA between TVA and TN Solar, dated December 23, 2019, TVA would purchase the electric output and environmental attributes generated by the Solar Facility for an initial term of 15 years, subject to satisfactory completion of all applicable environmental requirements. Additionally, TVA would install a new permanent switching station and perform structural upgrades along its existing 16-mile Weakley to Union City 161-kilovolt (kV) transmission line (TL). Together, the proposed Solar Facility, TVA's connection facilities, and the PPA between TVA and TN Solar are herein referred to as the "Project" or the "Proposed Action."

The proposed Solar Facility would occupy approximately 690 acres of a Project Site consisting of four individual parcels of predominantly agricultural land (Figure 1-1). Three of these four parcels would enter into long-term lease agreements with TN Solar; and the remaining would be purchased by TN Solar. A fifth parcel would hold TVA's newly proposed gen-tie easement. The Project Site, which includes the solar array footprints, collection lines, Skyhawk Substation, and Skyhawk Switching Station, is approximately 3.5 miles southeast of Union City, Tennessee. The Solar Facility would consist of multiple parallel rows of photovoltaic (PV) panels on single-axis tracking structures, along with direct current (DC) and AC inverters and transformers. The Solar Facility would connect to TVA's existing TL, which traverses the proposed Project Site on the east side. Modifications and upgrades along TVA's existing TL right-of-way (herein referred to as the "Transmission ROW") and 675-foot-long interconnection (gen-tie) would add another approximately 70 acres to the Proposed Action. The entire Project would affect approximately 760 acres.

1.1 Purpose and Need for Action

The Tennessee Valley Authority is a corporate agency of the United States that provides electricity for business customers and local power companies serving nearly 10 million people in parts of seven southeastern states called the Tennessee Valley. TVA's mission is to serve the people of the Tennessee Valley region through three main areas of work – energy, the environment, and economic development.

TVA produces or obtains electricity from a diverse portfolio of energy sources, including solar, hydroelectric, wind, biomass, fossil fuel, and nuclear. In June 2019, TVA completed an Integrated Resource Plan (IRP) and associated Environmental Impact Statement (TVA 2019a and TVA 2019b). The IRP identified the various resources that TVA intends to use to meet the energy needs of the TVA region over the 20-year planning period while achieving TVA's objectives to deliver reliable, low-cost, and cleaner energy while reducing environmental impacts. The energy resources from the 2019 IRP include the addition of between 1,500 and 8,000 MW (AC) of solar capacity by 2028 and up to 14,000 MW by 2038 (TVA 2019a). Customer demand for cleaner energy prompted TVA to release a Request for Proposal (RFP) for renewable energy resources (2019 TVA Renewable RFP to solar developers). The TN Solar PPA that resulted from this RFP will help TVA meet immediate needs for additional renewable generating capacity in response to customer demands while fulfilling the renewable energy goals established in the 2019 IRP. The Proposed Action would provide cost-effective renewable energy consistent with the IRP and TVA goals.

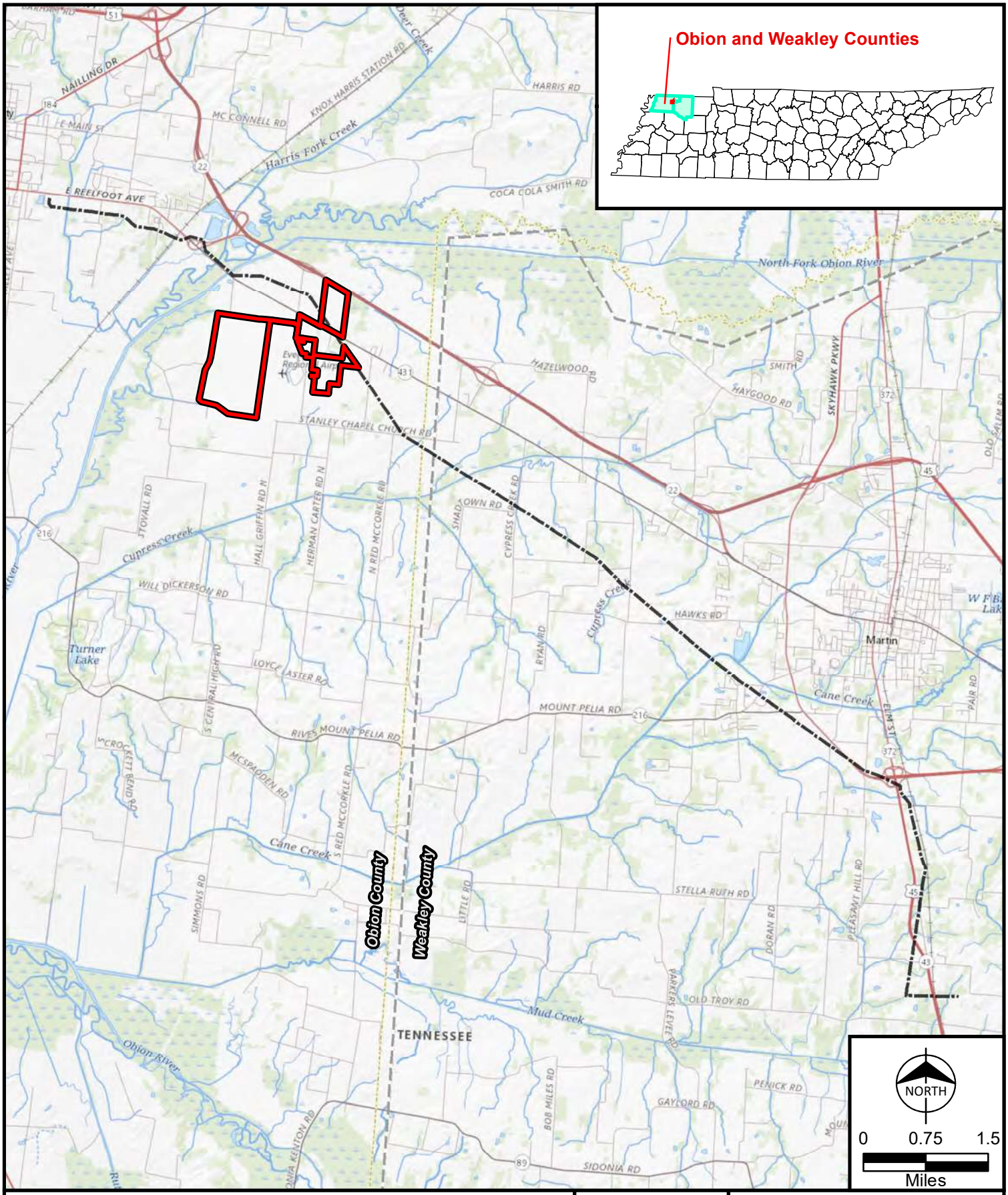


Figure 1-1
General Vicinity Map
Skyhawk Solar Project
Obion and Weakley Counties, TN

BURNS McDONNELL

Source: Esri, TN Solar 1, LLC, Burns & McDonnell

Issued: 10/7/2020

Path: C:\Users\dlhaney\Desktop\Projects\121610_SkyhawkSolar\GIS\MXDs\EA\GenVicinityMap_Combined.mxd dlhaney 10/7/2020
Service Layer Credits: USGS The National Map / National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System / National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems. U.S. Census Bureau TIGER/Line data; USFS Road Data. Natural Earth Data. U.S. Department of State Humanitarian Information Unit, and NOAA National Centers for Environmental Information. U.S. Coastal Relief Model. Data refreshed October 2018.

1.2 Scope of this Environmental Assessment

Pursuant to the National Environmental Policy Act of 1969 (NEPA), federal agencies are required to evaluate the potential environmental impacts of their proposed actions. This Environmental Assessment (EA) was prepared consistent with Council on Environmental Quality (CEQ) regulations for implementing NEPA at 40 CFR 1500-1508 issued in 1978 (43 FR 55990, Nov. 29, 1978), with minor revisions in 1979 and 1986, as well as TVA regulations at 18 CFR 1318 issued in 2020 (85 FR 17434, Mar. 27, 2020). Because TVA began this EA before CEQ issued revised NEPA regulations (85 FR 43304-43376, Jul. 16, 2020), TVA applied the previously promulgated 1978 CEQ regulations and TVA's 2020 NEPA regulations in the preparation of this EA (see 40 CFR 1506.13).

The Proposed Action being evaluated is TVA's purchase of energy and environmental attributes under its PPA with TN Solar, which requires the construction and operation of a new Solar Facility and substation by TN Solar and actions by TVA, including a new switching station and structural upgrades along the Transmission ROW to connect the Solar Facility to the TVA transmission system. The scope of this EA therefore covers both the impacts related to construction and operation of the Skyhawk Solar Facility as well as impacts related to the associated modifications to the TVA transmission system.

This EA describes the existing environmental conditions at the Project Site and analyzes potential impacts associated with the Proposed Action and the No Action Alternative. The EA also identifies and quantifies areas where the Proposed Action could contribute to potential cumulative impacts when considered with other ongoing or reasonably foreseeable activities proposed within and surrounding the Project Area.

Under the PPA, TVA's obligation to purchase renewable power is contingent upon the satisfactory completion of the appropriate environmental reviews and TVA's determination that the Proposed Action is "environmentally acceptable." To be deemed acceptable, TVA first must assess the impact of the Project on the human environment to determine whether:

- Significant impacts would result from the location, operation, and/or maintenance of the proposed Project and/or associated facilities; and
- The Project would be consistent with the purposes, provisions, and requirements of applicable federal, state, and local environmental laws and regulations.

Based on internal scoping and identification of all known applicable laws, regulations, executive orders, and policies, TVA identified the following resource areas for analysis within this EA:

- Land Use
- Geology, Soils, and Prime Farmland
- Water Resources
- Biological Resources
- Visual Resources
- Noise
- Air Quality and Climate Change
- Cultural Resources
- Utilities
- Waste Management
- Public and Occupational Health and Safety
- Transportation
- Socioeconomics
- Environmental Justice

This EA consists of six main sections which discuss Project alternatives, resource areas potentially impacted by the Project, and the analyses of these impacts. Additionally, this EA includes five appendices, which contain additional studies and details on certain technical analyses as well as supporting information. The structure of the EA is as follows:

- **Section 1.0:** Introduces the Project and describes the purpose and need for the Proposed Action as well as the decision to be made, associated environmental reviews and regulatory agency consultations, required environmental permits or licenses, and the EA overview.

- **Section 2.0:** Describes the Proposed Action and No Action Alternatives, provides a comparison of alternatives, and discusses the Preferred Alternative.

- **Section 3.0:** Discusses the affected environment and the potential direct and indirect impacts on these resource areas. Includes applicable proposed mitigation measures where appropriate.

- **Section 4.0:** Discusses the potential cumulative impacts the Project could contribute when combined with other ongoing and reasonably foreseeable proposed activities within the surrounding or overlapping area of the Project Site.

- **Section 5.0:** Contains a List of Preparers of this EA.

- **Section 6.0:** Contains a List of Literature Cited in the development of this EA.

1.3 Public Involvement

This EA was provided to local, state, and federal agencies and individuals who indicated an interest in the Project. TVA notified interested federally recognized Native American Tribes, elected officials, and other stakeholders that the draft EA was available for review and comment for a 30-day period. An electronic version of the document was posted on the TVA website where comments could also be submitted electronically. Public notices were published in local newspapers soliciting comments from other agencies, the general public, and any interested organizations. Federal agencies that received the notification consisted of the United States Department of Agriculture (USDA) Natural Resource Conservation Service, the United States Army Corps of Engineers (USACE), and the U.S. Fish and Wildlife Service (USFWS). State and local agencies that received the notification consisted of the Tennessee Department of Agriculture, Tennessee Department of Economic and Community Development, Tennessee Department of Environment

and Conservation (TDEC), and Tennessee Wildlife Resources Agency (TWRA). Tribes that received notification on the Project consisted of Absentee Shawnee Tribe of Indians of Oklahoma, Alabama-Quassarte Tribal Town, Cherokee Nation, The Chickasaw Nation, Eastern Shawnee Tribe of Oklahoma, Jena Band of Choctaw Indians, Kialegee Tribal Town, The Muscogee (Creek) Nation, Quapaw Nation, Shawnee Tribe, Thlopthlocco Tribal Town, and United Keetoowah Band of Cherokee Indians in Oklahoma.

During the 30-day public review and comment period of the draft EA, a total of three (3) comments were received from the general public and interested agencies: specifically, one federal agency, one state agency, and one individual. TVA carefully reviewed all comments received on the draft EA and addressed them, as appropriate, in the final EA. The comments and responses are included as Appendix G. If a comment is addressed within this EA, the Final EA section is identified in the response.

1.4 Permits and Approvals

Table 1-1 provides a list of potential environmental permits, consultations, and clearances assessed for the construction and operation of the Skyhawk Solar Facility.

Table 1-1: Potential Permits and Approvals for the Skyhawk Solar Project

Permit/Approval	Associated Documentation	Lead Agency
Federal		
Endangered Species Act Section 7 (ESA)	Informal consultation report presenting results of biological survey and protected species habitat assessment.	U.S. Fish and Wildlife Service (USFWS)
Bald and Golden Eagle Protection Act (BGEPA)		
Section 404 of the Clean Water Act – Nationwide Permit 51	None anticipated for Solar Facility.	U.S. Army Corps of Engineers (USACE)
Section 404 of the Clean Water Act – Nationwide Permit 12	Pre-construction Notification (PCN) if improvements to T-Line structures results in loss of 1/10 acre or more	U.S. Army Corps of Engineers (USACE)
Farmland Protection Policy Act (FPPA)	None. FPPA applies to Projects receiving federal funding. The Solar Facility would be funded by TN Solar.	Natural Resources Conservation Service (NRCS)
Obstruction Evaluation/Airport Airspace Analysis	All T-Line structures, permanent or temporary (including construction cranes), to be checked using FAA Notice Criteria Tool	Federal Aviation Administration (FAA)
State		
Section 106 National Historical Preservation Act consultation	Cultural Resources Survey Report/Results	Tennessee Historical Commission (THC or SHPO)
Aquatic Resource Alteration Permit (ARAP)/Section 401 Water Quality Certification	Wetland Delineation Report for Transmission ROW impacts.	Tennessee Department of Environment and Conservation (TDEC) – Division of Water Resources

Permit/Approval	Associated Documentation	Lead Agency
Erosion and Sediment Control General Permit No. TNR 100000	Stormwater Pollution Prevention Plan (SWPPP)	TDEC – Division of Water Resources
Encroachment Agreement	Permit Application	Tennessee Department of Transportation (TDOT)
New private domestic groundwater well Permit	$75 fee. Must use TN licensed driller	TDEC – Division of Water Resources
Septic System Permit	Form CN-0971, $400 permit fee. Must be installed by a TN licensed septic system installer.	TDEC, Division of Water Resources – Septic System Assistance (Jackson, TN)
County/Municipal		
Floodplain Development Permit	Flood study to establish base flood elevations (BFE): Survey, Geological/Soil Information. Memorandum detailing solar panels at one foot above BFE at lowest point	Obion County Planning Office Floodplain Administrator
Land Disturbance Permit	Approved TDEC General Construction Stormwater Permit Approval	Obion County Planning Office
Building Permit	Site, Structural, and Electrical Plans	Obion County Planning Office

1.4.1 Solar Facility

1.4.1.1 Endangered Species Act of 1973

The Endangered Species Act of 1973 (ESA), as amended, was enacted to protect and recover imperiled species and the ecosystems upon which they depend. The act requires federal agencies, in consultation with the U.S. Fish and Wildlife Service (USFWS) and/or the NOAA Fisheries Service, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. The ESA also prohibits any action that causes a "taking" of any listed species of endangered fish or wildlife. Consultation with the USFWS is required for listed species that may occur within the Project Site, as well as eagles protected under the BGEPA. Further details regarding species listed as Threatened and Endangered (T&E) under the ESA are included in section 3.4.

1.4.1.2 Clean Water Act and Rivers and Harbors Act

The U.S. Army Corps of Engineers (USACE) administers Section 404 of the Clean Water Act (CWA), which regulates dredge and fill activities in waters of the U.S. (Title 33 U.S. Code Section 1344 [33 USC 1344]), as well as Section 10 of the Rivers and Harbors Act of 1899, which regulates the placement of structures in, over, or under waters of the U.S. (33 USC 403). The Project is located within the USACE Memphis District.

Impacts to jurisdictional waters of the U.S. (as defined in 40 CFR 230.3[s]) requires authorization from USACE under Section 404 of the CWA (S404). The USACE established the Nationwide Permit (NWP) program to streamline the Section 404 permitting process for actions that will have no more than a minimal

effect on the environment. If permanent wetland impacts (i.e., permanent fill resulting in the loss of wetland function) exceed 0.1 acre, a pre-construction notification to USACE is required for authorization to impact waters of the U.S. under NWP 51. After the wetland and waterbody field surveys were completed, the Solar Facility layout was designed to minimize impacts on water resources. No impacts on wetlands are anticipated for activities associated with the Solar Facility.

Temporary impacts on wetlands are anticipated during activities associated with Wetlands and waterbodies are discussed in greater detail in section 3.3 of this EA.

1.4.1.3 National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to take into account the effects of their undertakings (including issuance of permits) on historic properties and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment. State Historic Preservation Officers (SHPOs) and Tribal Historic Preservation Officers (THPOs) serve a critical role in implementing many responsibilities under the NHPA. Central to this framework is the National Register of Historic Places (NRHP), which is the official list of historic properties worthy of preservation. The Tennessee Historic Commission (THC) serves as SHPO for the State of Tennessee. The SHPO does not issue permits; however, approvals by other federal agencies cannot be final without review by and clearance from the SHPO. A phase I cultural resources survey, utilizing pedestrian and shovel tests along pre-approved transects, was required for this Project. Further detail is provided in section 3.8 of this EA.

1.4.1.4 Farmland Protection Policy Act of 1981

The Farmland Protection Policy Act (FPPA) requires federal agencies to consider the adverse effects of their actions on prime or unique farmlands. The purpose of the FPPA is "to minimize the extent to which federal programs…contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses; [to] encourage alternative actions, if appropriate, that could lessen the adverse effects on farmland; and assure that Federal programs are operated in a manner that, to the extent practicable, will be compatible with State, local government, and private programs that protect farmland." (NRCS 2012). Because development of the Solar Facility would be designed, permitted, and constructed by a private company without the use of federal funds, the Project is exempt from FPPA requirements (Appendix C). However, TN Solar proposes to remove equipment and structures from the Project Site if decommissioning and closure occurs, and farming could subsequently be resumed with limited long-term loss of potential agriculture production.

1.4.1.5 Tennessee Department of Environment and Conservation – Division of Water Resources

The TDEC requires a separate Water Quality Certification for most projects qualifying under the USACE Nationwide Permit Program. For impacts to waters of the state or activities that involve an alteration to a stream, river, lake or wetland, TN Solar would obtain a water quality permit from the Division of Water Resources. To obtain an ARAP, a permit application would be submitted to the Division of Water Resources. If the proposed activity qualifies for coverage under a general permit, the work can proceed upon receipt of written authorization from the division.

TDEC also administers the National Pollutant Discharge Elimination System (NPDES) construction stormwater permitting program in Tennessee and authorizes point source discharges of stormwater into

waters of the state. A Notice of Intent (NOI) for Erosion and Sediment Control General Permit (Permit No. TNR100000) would be required for the Project. The NOI form and Stormwater Pollution Prevention Plan (SWPPP) would be submitted at least 30 days prior to the commencement of land disturbing activities. These documents include specific information about the construction site, construction Best Management Practices (BMPs), and stormwater discharge receiving waters.

1.4.1.6 County and Municipality Permitting and other State Notifications

No ordinances or requirements specific to solar facilities currently exist in Obion County; however, it is anticipated that Obion County would require a development review process, especially for new developments occurring within a floodplain. Since portions of the Project would occur within a floodplain, TN Solar would be required to satisfy any floodplain review requirements. Based on conversations with the County, a memorandum detailing that the proposed panels will be one foot above the Federal Emergency Management Agency (FEMA) 100-year base flood elevation will be submitted for review and approval to receive the floodplain development permit. Construction of the Skyhawk Solar Facility could require a Land Disturbance Permit for ground disturbances greater than one acre. A Land Disturbance Permit would be acquired from Obion County. An approved general construction stormwater permit from TDEC is required to receive County land disturbance approval.

Vegetative waste from clearing activities would be burned or chipped onsite. If open burning of debris from vegetation clearing or trimming of tree limbs on the site is planned, the appropriate open burning permits would be obtained from the Tennessee Department of Agriculture Division of Forestry. Information on open or surface burning issued by the Division of Forestry would be followed. Only limbs and brush from the Project Site would be burned. Weather conditions would be monitored and considered to ensure safety and minimize degradation to air quality during the open burning of any vegetation cleared from the Project Site.

A notification is required for the removal, renovation and/or demolition of asbestos where quantities exceed 260 linear feet or more on pipes, 160 square feet or more on other facility components, or 35 cubic feet or more off facility components where the length or area could not be measured previously. The need for demolition of existing structures or buildings within the Project Site is not anticipated. However, if demolition is identified as a necessary activity during construction, the appropriate notifications would be made to the Tennessee Division of Air Pollution Control as required by the Tennessee asbestos regulations at least 10 days before any demolition begins.

1.4.2 Transmission ROW and Interconnection

Construction of a new TVA switching station, approximately 675-foot-long tie-in (“gen-tie”), and upgrades along the existing 16-mile Weakley to Union City 161-kV TL would require a Land Disturbance Permit from Union City if ground disturbances are greater than one contiguous acre within the municipality. Because of the Project’s proximity to Everett-Stewart Regional Airport, the FAA must determine whether structures that are proposed to be built or altered and are 200 feet AGL or higher or near the airport, pose a hazard to the airspace. TVA would submit information pertaining to its proposed construction/modifications to the FAA online Notice Criteria Tool. Each structure or line submitted by TVA will be certified with a Level 1A Survey Certificate and included in the data submitted to the FAA.

An Encroachment Agreement would be required from TDOT to upgrade TL facilities within the TDOT ROW between Weakley and Union City. Additionally, TVA would acquire county permits, where necessary, to work within county road rights-of-way. TVA would prepare the required NOI, SWPPP, Erosion, Sedimentation, and Pollution Control (ES&PC) Plan, surveys, and engineered drawings and coordinate with the appropriate state and local authorities to obtain the necessary permits and clearances.

2 DESCRIPTION OF THE PROPOSED SOLAR PROJECT AND ALTERNATIVES

This section explains the rationale for identifying the alternatives to be evaluated, describes each alternative, provides a comparison of alternatives with respect to their potential environmental impacts, and identifies the Preferred Alternative. This EA evaluates two alternatives: The No Action Alternative and the Proposed Action Alternative.

2.1 No Action Alternative

Under the No Action Alternative, TVA would not purchase the power generated by the Project under the 15-year PPA with TN Solar, and TVA would not be involved with the Project. If TVA were to select this alternative, and TN Solar elected not to proceed with the Project, then TN Solar would not construct any facility on any tracts of land in Obion County, Tennessee, and TVA would not make the associated modifications to its transmission system. TN Solar would not complete the purchase or lease agreements of the properties necessary to construct the Solar Facility. Existing conditions would remain unchanged (i.e., property would remain as agricultural land) and agricultural activities would likely continue. In addition, TVA would continue to rely on other sources of generation described in the 2019 IRP (TVA 2019a) to ensure an adequate energy supply and to meet its goals for increased renewable and low greenhouse gas (GHG)-emitting generation.

Under the No Action Alternative, there would be no project-related changes to land use, natural resources, or socioeconomics in the immediate future.

2.2 Proposed Action

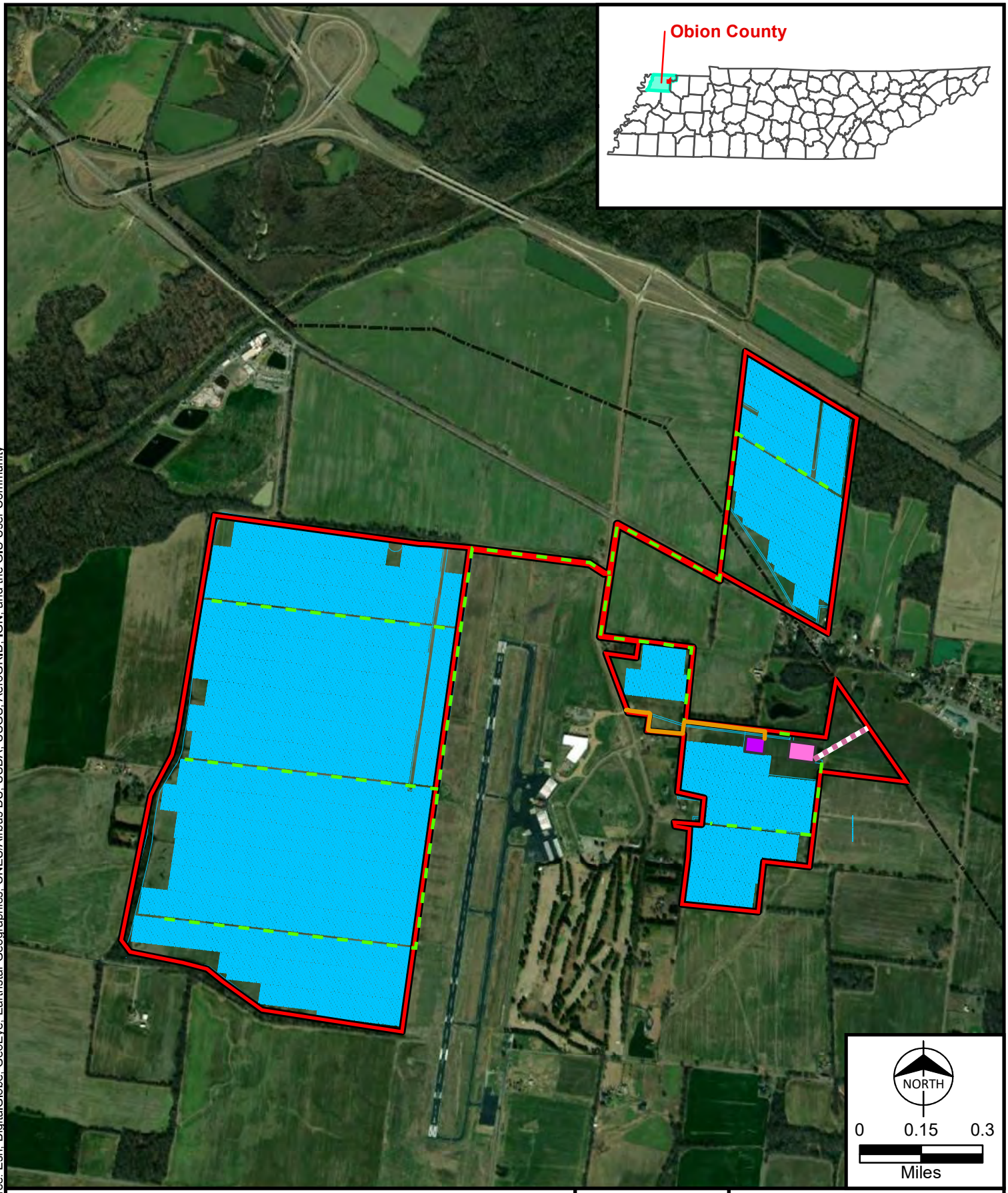
Under the Proposed Action Alternative, TN Solar would construct and operate a single-axis tracking PV Solar Facility in Obion County, and TVA would purchase renewable energy from the facility in accordance with the 15-year PPA with TN Solar. The Solar Facility would generate up to 100 MW AC output for transmission to the electrical network and would occupy approximately 690 acres of land located on four individual parcels in Obion County, Tennessee, approximately 3.5 miles southeast of Union City. The entire 100-MW output of the Solar Facility would be sold to TVA under the terms of the PPA. The Project would connect to the existing TVA electrical network (the 16-mile Weakley to Union City 161- kV TL) via a 675-foot-long tie-in originating at TVA's new Skyhawk Switching Station.

This EA assesses the impact of TVA's action of entering into the PPA with TN Solar, the associated impacts of the construction and operation of the proposed Solar Facility and Skyhawk Substation by TN Solar, and the new transmission interconnection, switching station, and structural modifications along 16 miles of the Transmission ROW by TVA.

2.2.1 Project Description

The proposed Solar Facility and associated TVA interconnection components together would occupy approximate 705 acres (Figure 2-1) of predominantly flat agricultural land. The perimeter of the developed portion of the Solar Facility site, containing blocks of solar panels, inverters, associated equipment, and infrastructure (including a new onsite substation, access roads, and electrical cabling), would be enclosed by security fencing.

The Solar Facility would be located within a rural agricultural area south of the North Obion River and State Route (SR) 22 and abutting the Everett-Stewart Regional Airport. Within the Project Site, several linear forested areas associated with water features are around the perimeter of agricultural fields and along fence rows. Additional details regarding existing land use conditions are discussed in section 3.



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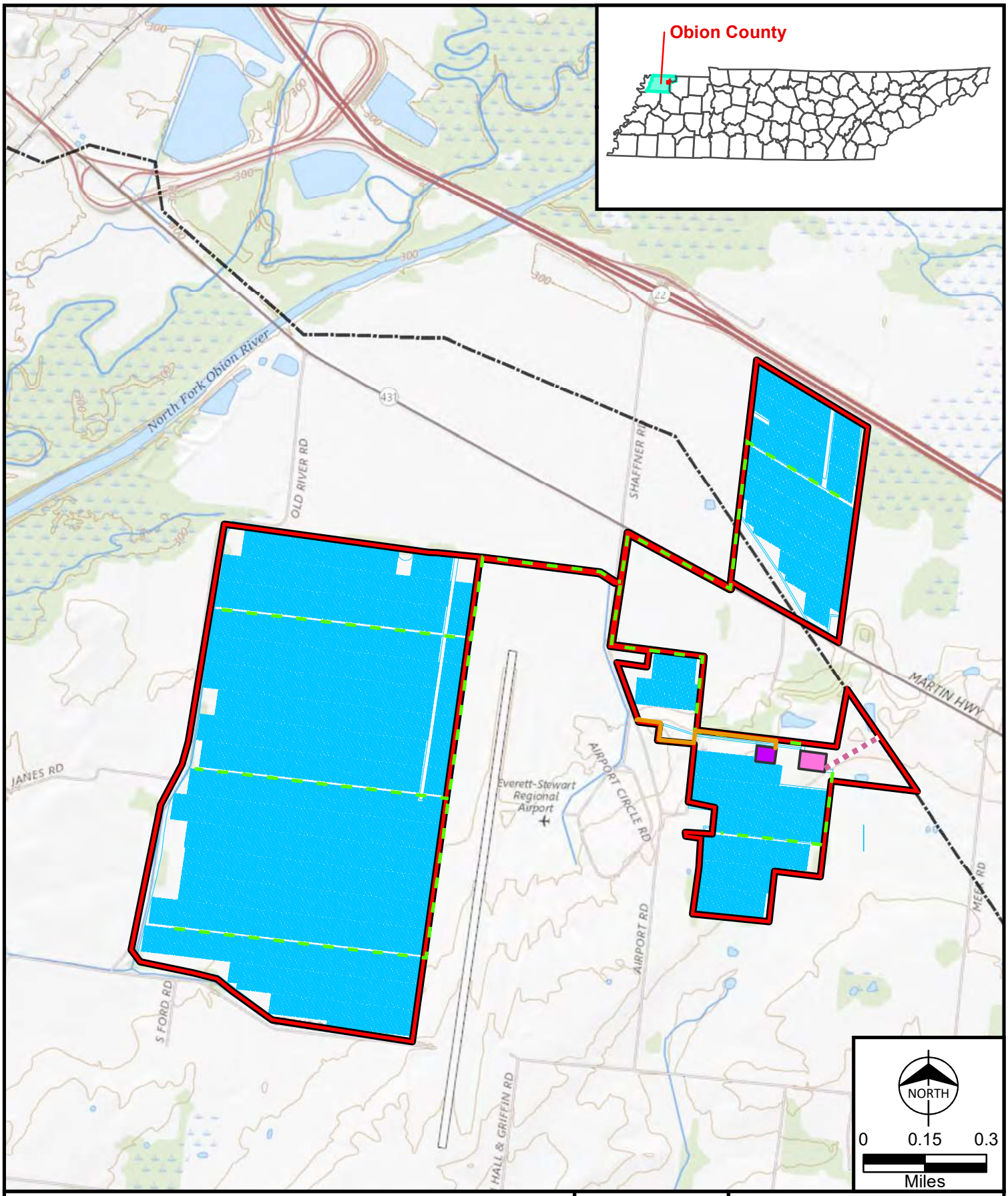
BURNS McDONNELL

Figure 2-1
General Vicinity Map
Skyhawk Solar Project
Obion County, TN

Source: Esri, TN Solar 1, LLC, Burns & McDonnell

Issued: 10/7/2020



Project Site
AC Collection Line
Interconnection
Permanent Facility Access Road
Existing Weakley to Union City 161 kV Transmission Line
Skyhawk Substation
Skyhawk Switching Station
Solar Array

BURNS McDONNELL

Figure 2-2
Vicinity Map Skyhawk Solar Project Obion County, TN

Source: Esri, TN Solar 1, LLC, Burns & McDonnell

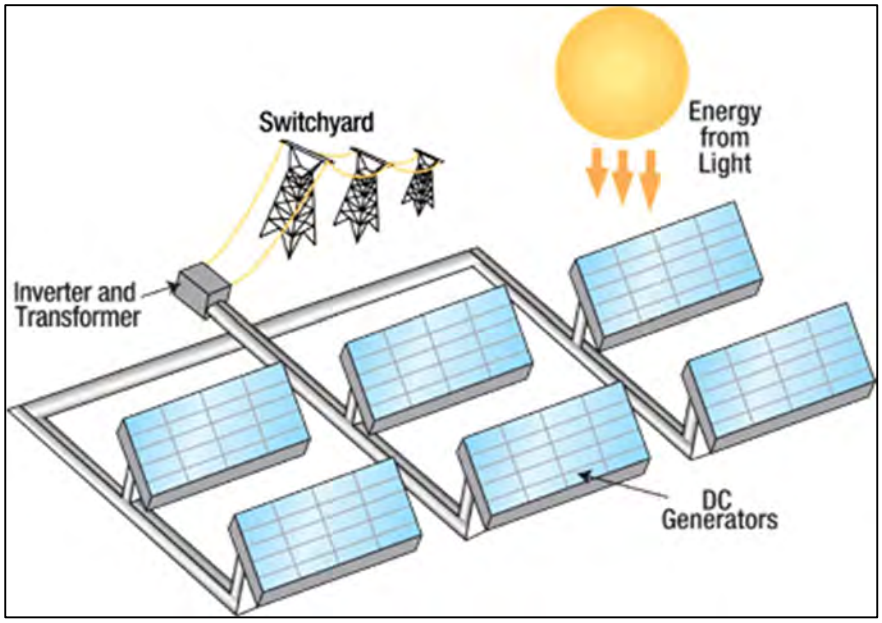
Issued: 10/7/2020

Path: C:\Users\olhaney\Desktop\Projects\121610_SkyhawkSolar\GIS\MXDs\EA\GenVicinityMap_USGS.mxd olhaney 10/7/2020

Service Layer Credits: USGS The National Map | National Boundaries Dataset, USEPA Program, Geographic Names Information System | National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems. U.S. Census Bureau TIGER/Line data; USFS Road Data; Natural Earth Data; U.S. Department of State Humanitarian Information Unit; and NOAA National Centers for Environmental Information, U.S. Coastal Relief Model. Data refreshed October 2018.

The Solar Facility would convert sunlight into DC electrical energy within the PV panels (modules) as very generally depicted in Figure 2-3. PV power generation is the direct conversion of light into electricity at the atomic level. Some materials exhibit a property known as the photoelectric effect that causes them to absorb energy as photons of light and then release energy as electrons. When the free electrons are captured, an electric current is produced, which can be used as electricity (TVA 2014).

Figure 2-3: PV Solar System Energy Flow Diagram



The Solar Facility would be composed of PV modules mounted together in arrays. Groups of panels would be connected electrically in series to form "strings" of panels, with the maximum string size chosen to ensure that the maximum inverter input voltage is not exceeded by the string voltage at the Project's high design temperature. The anti-reflective (AR) coated panels, approximately 6.5 feet by 4 feet, would be located in individual blocks consisting of the PV arrays and an inverter station on a concrete pad or steel piles, to convert the DC electricity generated by the solar panels into AC electricity. The portions of the Project Site outside the fenced-in areas would not be developed. The modules would be attached to single-axis trackers that allow the panels to pivot along an axis to follow the path of the sun from east to west across the sky. The trackers would likely be attached to steel pile foundations.

Collections of strings or rows of panels would be connected by underground DC cabling to a central converter that would convert the DC electricity into AC electricity so that it could be transmitted to the electrical grid. Each inverter would have a collocated mid-voltage transformer (MVT) which boosts the AC voltage to account for the standard electrical loss between the central inverters and the onsite substation. From the MVTs, a network of underground AC power cables would connect to a single main power transformer (MPT) which would be located within the 161-kV Skyhawk Substation. Cables would be installed in trenches approximately 3- to 4-feet deep and 2- to 12-inches wide.

Other Project components would include security equipment, facility access roads, communications equipment, meteorological stations, and operations and maintenance building, and supporting Project water

well and septic system located near the operations and maintenance building. At this time, the Solar Facility layout is conceptual. The solar array layout, Skyhawk Substation, Skyhawk Switching Station, gen-tie, and the permanent facility access road location have been determined (Figures 2-1 and 2-2). The location of the operations and maintenance building is expected to be near the substation and along the permanent facility access road.

Compacted earth access roads throughout the Solar Facility would provide access to each module and inverter block for maintenance and repairs. The placement of these internal facility access roads would be contained within the Solar Facility site along the periphery of arrays.

2.2.2 Construction

Construction activities would take approximately 12 months to complete using a crew that ranges from 150 -300 workers. Work would generally occur seven days a week during daylight hours. Additional hours after dark could be necessary to make up schedule deficiencies or to complete critical construction activities. Night-time construction, if determined necessary, would require lighting in some areas of the Project Site. Any additional night-time lighting would be downward-facing and timer- and/or motion-activated to minimize impacts to wildlife and any surrounding receptors, including the airport and nearby households.

Site preparation is generally required prior to construction of the Solar Facility and assembly of the solar arrays. Site preparation typically includes: surveying and staking; removal of tall vegetation/trimming tree branches; light grading, clearing, and grubbing; installation of security fencing around components near one another and not separated by public roads; erosion prevention and sediment control BMPs; and preparation of construction laydown areas. Solar array assembly and construction includes driving steel piles into the ground for the tracker support structures, installation of solar panels, and electrical connections and testing/verification.

There would be multiple locations around the Solar Facility Project Site designated as construction assembly areas (also called laydown areas) for worker assembly, safety briefings, vehicle parking, temporary offices, and material storage during construction. Some of these areas would be staged within the locations proposed for the PV arrays. The laydown areas would be located outside of the floodplain and remain onsite for the duration of construction. Temporary construction trailers for material storage and office space would be parked onsite near the Skyhawk Substation. Following completion of construction activities, trailers, unused materials, and construction debris would be removed from the Project Site. TN Solar may keep one trailer onsite to be converted into the operations and maintenance building.

Construction materials would be transported by truck and/or rail to the Project Site, where materials would be staged, assembled, and moved into place. Temporary construction laydown areas for materials, equipment, and parking would be required within the Project Site.

TN Solar would use the existing landscape, such as slope, drainages, and roadways where feasible, minimizing grading work where possible. Grading activities that could not be avoided would be performed using mobile earthmoving equipment, resulting in a fairly consistent slope on land. Native topsoil would be preserved to the greatest possible extent during grading. Native topsoil would be stockpiled onsite and preserved for redistribution over the disturbed area after grading is complete. After construction, the

disturbed areas would be seeded with a native seed mixture consisting of certified weed-free, low-growing, noninvasive grass and herbaceous plants. A flowering plant mixture component in this seed mix would be incorporated where feasible to promote pollinator habitat. Erosion control BMPs would be regularly inspected and maintained until vegetation in the disturbed areas has been established and meets permit restoration requirements. Water would be used for dust control and/or soil compaction during construction on an as-needed basis. Water would be trucked in from a municipal source from one of the nearby towns.

To manage stormwater during construction, onsite temporary sedimentation basins, sediment traps, or diversion berms could be necessary within the Solar Facility. If needed, a diversion berm would be constructed along portions of the Project Site perimeter to contain stormwater onsite. Any necessary sedimentation basins and/or traps would be compliant with TDEC and local floodplain administration requirements. If necessary, sedimentation basins and traps would be constructed either by impoundment of natural depressions or by excavating the existing soil. The floor and embankments of the basins would be allowed to naturally reestablish native vegetation after construction (or replanted as necessary) to provide natural stabilization and minimize subsequent erosion. Sediment traps would be placed in strategic drainage areas to prevent sediment from entering onsite jurisdictional streams and wetlands. Offsite sediment migration would be minimized by the placement of silt fence around each area of ground disturbance within the Project Site. These stormwater BMPs would minimize the potential for sediment to enter jurisdictional streams and wetlands and minimize sediment migration offsite during construction. BMPs would remain in place for the duration of the Project and would be removed once the Project Site is stabilized and revegetation efforts meet permit requirements.

Construction activities would be sequenced to minimize the time that bare soil in disturbed areas is exposed. In addition to the silt fencing described above, other appropriate controls, such as temporary cover, would be used as needed to minimize exposure of soil and eroded soil from leaving the work area. Disturbed areas, including road shoulders, construction office and laydown areas, ditches, and other Project-specific locations, would be seeded post-construction. If conditions require, soil may be further stabilized by mulch or sprayable fiber mat. Where required, hay mulch would be applied at three tons per acre and well distributed over the area. As part of NPDES permit authorization (see section 1.4), the site-specific SWPPP would be finalized with the final grading and civil design and would address all construction-related activities prior to construction commencement.

The design of the tracker support structures for the Solar Facility could vary depending on the final PV technology and vendor selected. Based on preliminary geotechnical survey results for the Project Site, the trackers would likely be attached to driven steel pile foundations. The steel pile foundations are typically galvanized and used where high load bearing capacities are required. The pile is driven with a hydraulic ram. Soil disturbance is restricted to the pile insertion location to a depth typically less than 20-feet below grade; there is also potential for temporary soil disturbance from the hydraulic ram machinery, which is about the size of a small tractor. The tracker design and pile foundation design would be sealed by a registered Professional Engineer and Structural Engineer, respectively. Screw piles are another option for PV foundations which are drilled into the ground with a truck-mounted auger. Screw piles create a similar soil disturbance footprint as driven piles.

Solar panels would be manufactured offsite and shipped to the Project Site ready for installation. All final electrical collection cables would be underground, and electricians and assistants would run the electrical cabling throughout the Solar Facility. The trenches to hold the cabling would be approximately 3- to 4-feet deep and 2- to 12-inches wide. The trenches would be backfilled with native soil and appropriately compacted.

The MPT would be supported on a concrete foundation. An aboveground transmission cable would be constructed to connect the MPT through a circuit breaker. The MPT would be located within the Skyhawk Substation boundaries.

After the equipment is electrically connected, electrical service would be tested, motors would be checked, and control logic would be verified. As the solar arrays are installed, the balance of the facility would continue to be constructed and installed, and the instrumentation would be installed. Following the testing of all of the individual systems, integrated testing of the Project would occur. Electrical interconnection details are provided in the following section.

2.2.3 TVA Electrical Interconnection

Under the Proposed Action, TVA would construct the Skyhawk 161-kV Switching Station (Switching Station) adjacent to the Skyhawk Substation, resulting in a 675-foot-long gen-tie line. Figures 2-1 and 2-2 provide the proposed location of these facilities which would be placed on the eastern side of the overall Solar Facility, outside of the FEMA 100-year floodplain.

TVA proposes to construct the Switching Station on the immediate west side of the 34.5–kV 161-kV TL (Figure 2-2). Three 161-kV breakers would be installed in a ring bus configuration along with associated metering, communication, and protective equipment. TVA would also install a switch house.

TVA would clear vegetation on the Switching Station site, remove the topsoil, and grade the property in accordance with TVA's *Site Clearing and Grading Specifications* (TVA 2017a). Minor tree limb trimming may be needed; however, tree clearing is not anticipated, as the site is predominantly cropland. If necessary, any woody debris and other vegetation would likely be piled and burned, chipped, or taken off-site. Prior to any burning, TN Solar would obtain any necessary permits including NPDES construction stormwater general permit and USACE Nationwide Permit No. 12 or 51 as part of the overall Solar Facility permit effort. Further guidance for clearing and construction activities can be found in Appendix A.

2.2.4 TVA Transmission Line Upgrades

TVA proposes to replace the existing overhead groundwire (OHGW) with new fiber-optic overhead groundwire (OPGW) (Fiber) along the existing 16-mile Weakley – Union City 161-kV TL from the Weakley 500-kV Substation to the Union City 161-kV Substation. The new Fiber would be installed by helicopter. TVA would replace one of the two existing OHGWs with an OPGW. Designated pull points/splice case locations along the TL corridor would be used to set up cable reels of OPGW for installation at approximately 11 locations. To support the new Fiber, modifications to the existing TL would be required, which would include approximately 83 pole replacements and six new pole installations along the length of the TL. Existing access roads would be used for the pull point locations and TL modifications. Each work location would occur within TVA's existing maintained easement. TVA has established a 50-

foot-wide radius around each work location in order to identify and address potential construction impacts. Each work location and the associated access roads are presented on maps in Appendix B.

TVA Best Management Practices

TVA utilizes standard practices for transmission and interconnection-related construction activities. These guidance and specification documents are taken into account when considering the effects of the Proposed Action and include:

- TVA Environmental Quality Protection Specifications for Transmission Line Construction,
- TVA Transmission Construction Guidelines Near Streams,
- TVA Environmental Quality Protection Specifications for Transmission Substation or Communications Construction, and
- A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities – Revision 3 – 2017 (TVA 2017b).

All of these documents are available on TVA's transmission system projects web page under the heading "Related Guidelines and Specifications" (https://www.tva.com/energy/transmission/transmission-system-projects) (TVA 2020a). TVA transmission projects also utilize BMPs to provide guidance for clearing and construction activities.

2.2.5 Operations

Operation of the Skyhawk Solar Facility would require up to four on-site full-time staff to manage the facility and conduct regular inspections. Inspections would include identifying any physical damage of panels, wiring, central inverters, transformers, and interconnection equipment, and drawing transformer oil samples. Vegetation on developed portions of the Project Site would be maintained to control growth and prevent overshadowing or shading of the PV panels. Trimming and mowing would likely be performed several times per year, depending on growth rate, to maintain an appropriate ground cover height of no more than approximately 12 to 18 inches. During operation of the Solar Facility, selective use of U.S. Environmental Protection Agency (USEPA)-approved spot herbicides may also be employed around structures to control invasive weeds.

The proposed Solar Facility would be monitored remotely from TN Solar's Control Center in Austin, Texas, 24 hours a day, seven days a week to identify security or operational issues. In the event a problem is discovered during non-working hours, a repair crew or law enforcement personnel would be contacted if an immediate response were warranted.

Moving parts of the Solar Facility would be restricted to the east-to-west tracking motion of the single-axis solar modules, which amounts to a movement of less than a one degree angle every few minutes. This movement is barely perceptible. In the late afternoon, module rotation would start to move from west-to-east in a similar slow motion to minimize row-to-row shading. At sunset, the modules would track to a flat or angled stow position. Otherwise, the PV modules would simply collect solar energy and transmit it to the TVA power grid. Four full-time workers would be reporting to the site each work day in their personal vehicles, With the exception of fence repair, vegetation control, and periodic array inspection, repairs, and

maintenance, the Solar Facility would have relatively little human activity during operation with the exception of morning and evening arrivals and departures of up to four workers. No significant physical disturbances would occur during operation. Permanent lighting is anticipated as a potential onsite need during facility operations, independent of the potential operations and maintenance building which would require a new groundwater well and septic system. Permanent lighting would be downward-facing and timer- and/or motion-activated to minimize impacts to surrounding areas.

Rainfall in the region should be adequate to remove dust and other debris from the PV panels while maintaining acceptable energy production; therefore, manual panel washing is not anticipated unless a site-specific issue is identified. If later identified, module washing would occur no more than twice a year and would comply with appropriate BMPs to minimize soil erosion and/or stream and wetland sedimentation. Module wash water would be trucked in from a municipal source.

2.2.6 Decommissioning and Reclamation

TN Solar would operate the Project and sell power and environmental attributes to TVA under the terms of the PPA for the first 15 years of its life. At the end of the term of the PPA, TN Solar would assess whether to cease operations at the Solar Facility or replace equipment and attempt to enter into a new power purchase agreement or make some other arrangement to sell the power. If operations were ceased, the facility would be decommissioned and dismantled, and the Project Site would be restored to original land use. In general, the majority of decommissioned equipment and materials would be recycled. Materials that could not be recycled would be disposed of at an approved facility. As the lease agreements with the landowners are for at least 35 years, site control would be maintained for longer than the 15-year PPA period, and TN Solar may attempt to renegotiate further PPA terms with TVA. At the end of the 15-year contract period, TVA may also choose to purchase and operate the facility. If additional PPA terms are arranged or if TVA chooses to operate the facility, these activities would be evaluated through separate NEPA processes.

2.3 Alternatives Eliminated from Further Consideration

Numerous criteria were considered by TN Solar throughout the process of identifying a suitable site within TVA's service area that would meet the purpose and need of the Project as well as support TVA's efforts to expand its renewable energy portfolio (TVA 2019a). The following is a list of key factors taken into consideration during the site selection process.

- Sites must be large-scale enough to accommodate enough PV panels to generate 100-MW AC output for transmission to the electrical network.
- Sites must contain large contiguous parcels of land with between 650 – 1,000 acres available for solar panel installation and additional acreage for related infrastructure.
- Sites must have availability of nearby electric infrastructure for interconnection to TVA's system with sufficient available transmission capacity.
- Sites must have generally flat landscape with minimal slope, preferably previously disturbed contiguous land with minimal existing infrastructure obstacles.
- There must be minimal presence of forested areas and wetlands.

- Parcels must have appropriate local zoning regulations and be located away from densely populated areas.
- Sites must be on land that would allow developers to avoid and/or minimize impacts on known sensitive biological, visual, and cultural resources.

Using the above criteria and ultimately eliminating sites that did not possess the necessary attributes led to the selection of the Project Site.

2.4 Comparison of Alternatives

This EA evaluates the potential environmental effects that could result from implementation of the No Action Alternative or the Proposed Action Alternative at the proposed Project Site in Obion County, Tennessee. The analysis of impacts described in this EA is based on current conditions as well as potential future conditions on the parcels associated with the Project and the surrounding area. A comparison of potential impacts from each alternative is summarized in the table below.

Table 2-1: Comparison of Impacts by Alternative

Resource Area	Impacts from the No Action Alternative	Impacts from the Proposed Action Alternative
Land Use	No direct or indirect impacts anticipated.	Minor direct impacts from the conversion of actively cultivated agricultural land to solar generation. The Project would be consistent with county land use and zoning requirements.
Geology, Soils, and Prime Farmlands	No direct or indirect impacts anticipated.	Geology: Minor direct impacts on potential shallow subsurface geological resources.
		Soils: Minor direct impacts on soils from potential minimal increases in erosion and sedimentation during construction. Once stabilized and the facility is operational, impacts on soils would be offset by the beneficial effects to soil health with the use of native and noninvasive vegetation.
		Farmlands: direct impacts on farmland from the conversion of agricultural land to solar for the duration of the Project.
Water Resources	No direct or indirect impacts anticipated.	Groundwater: Negligible direct impacts on the supply from use of a new water well during operation of Solar Facility. Minor short-term/temporary impacts from new transmission line poles, which would be 10 – 15 feet below ground. Minor benefits anticipated from the reduction in irrigation and fertilizer and pesticide application.
		Surface water: Direct impacts to jurisdictional surface water features will be avoided at the solar facility. Minor indirect impacts from soil erosion and sedimentation. Minor beneficial impacts on surface water due to the reduction in fertilizer and pesticide application once agricultural operations cease. Short-term impacts on surface waters during transmission upgrades.
		Wetlands: All jurisdictional wetlands within the Solar Facility would be avoided. Temporary/short-term impacts on PEM and PUB wetlands within the existing transmission line during construction of upgrades.

Resource Area	Impacts from the No Action Alternative	Impacts from the Proposed Action Alternative
		Floodplains: Approximately 56 percent of the Project Site would be located within designated floodplain areas. The Project layout has been designed to minimize the number of PV panels installed within floodplains with high BFEs. The Skyhawk Substation and Skyhawk Switching Station would be located outside of the 100-year floodplain. Consistent with EO 11988, the installation of underground electric lines and fencing are considered to be repetitive actions in the 100-year floodplain, which would result in minor impacts (TVA 1981).
Biological Resources	No direct or indirect impacts anticipated.	Vegetation: 690 acres of agricultural fields, which have historically produced corn and beans, would be converted to the Solar Facility for the duration of the Project. No removal of mature trees is anticipated. Tree limbing may occur to minimize shading of the panels. Native or noninvasive vegetation would be established within the Solar Facility – which would undergo routine mowing. No tree clearing is anticipated along TVA's existing TL.
		Wildlife: Temporary displacement of wildlife during clearing and construction. Significant impacts to migratory birds are not anticipated. Habitat at the Project Site would be improved for small mammals, songbirds, reptiles and amphibians, and pollinating insects through introduction of native vegetation.
		Protected Species: The Project would not significantly affect federal or state-listed species.
Visual Resources	No direct or indirect impacts anticipated.	Minor temporary impacts on visual resources would occur due to the alteration of the existing agricultural viewshed as well as the increased activity during construction. During operation of the Solar Facility, moderate direct adverse impacts to the viewshed from six residential structures could occur in the immediate Project vicinity. Installation of natural or man-made visual screening to minimize these impacts is being evaluated. Impacts on residents and visitors traveling to nearby towns would be minimized due to the distance from public roads and by the presence of natural features such as tree buffers. The Solar Facility would cause no adverse glare impacts to aviation.
Noise	No direct or indirect impacts anticipated.	Minor temporary noise impacts would be experienced during construction. Impacts from noise during operation would be negligible due to the use of mufflers or low sound emitting inverters within the Solar Facility.
Air Quality and Greenhouse Gas Emissions	No direct or indirect impacts anticipated.	Air Quality: Minor direct impacts on air quality could occur during site preparation involving heavy, earth moving construction equipment (temporary emissions). No adverse impacts on air quality from operations.
		GHG: Temporary and minor increases in GHG emissions would be expected during construction from operation of equipment. However, a net positive impact would occur from operation of nearly emissions-free power generation by the Solar Facility, offsetting power that would otherwise be generated by the combustion of fossil fuels.

Resource Area	Impacts from the No Action Alternative	Impacts from the Proposed Action Alternative
Cultural Resources	No direct or indirect impacts anticipated.	Archaeological Resources: Recommendation of no adverse impacts on known archeological or historic sites. There are no known NRHP-eligible or NRHP-listed sites within the APE.
		Architectural Resources: Recommendation of no adverse effect on architectural resources.
Utilities	No direct or indirect impacts anticipated.	There would be no direct or indirect adverse impacts anticipated to utilities. The region would experience long-term benefits to electrical services.
Waste Management	No direct or indirect impacts anticipated.	Construction debris would be contained onsite and hauled to an approved landfill on a monthly basis. Hazardous wastes would be handled, stored, and disposed of in accordance with the Project SPCC. Debris from decommissioning, if not reused elsewhere, would be recycled to the greatest extent practicable. For materials that were not recyclable, disposal at an approved location would occur.
Public and Occupational Health & Safety	No direct or indirect impacts anticipated.	Minor, temporary impacts during construction. Results of glint and glare analysis indicate acceptable levels. No public health or safety hazards would be anticipated during operation.
Transportation	No direct or indirect impacts anticipated.	Due to moderate increases from workers commuting to and from the Project Site as well as heavy haul truck deliveries during construction, moderate short-term impacts on transportation would be anticipated during construction. Negligible direct impacts and no indirect impacts on transportation would occur during operation.
Socioeconomics	No direct or indirect impacts anticipated.	Short-term beneficial economic impacts would result from construction, including the purchase of materials, equipment, and services and a temporary increase in employment, income, and population. Positive, long-term, direct impacts on economics and population from Project operation. The local tax base would experience an increase from construction of the Solar Facility which would benefit Obion County and the Skyhawk Solar Facility region of northwestern Tennessee.
Environmental Justice	No direct or indirect impacts anticipated.	There would be no disproportionately high or adverse direct or indirect impacts on minority or low-income populations.

2.5 Best Management Practices and Mitigation Measures

TN Solar would implement minimization and mitigation measures for resources potentially affected by the Project. These measures would be developed in conjunction with industry proven BMPs, requirements of regulatory permits, and adherence to the following plans:

- Stormwater Pollution Prevention Plan
- Spill Prevention, Containment, and Countermeasures Plan, and
- Unanticipated Discovery Plan.

Additional details are provided in the following section.

2.5.1 Skyhawk Solar Facility

TN Solar would implement the following BMPs and mitigation measures in relation to potentially affected resources, as follows:

BMPs include actions to:

- Avoid clearing forested areas to the greatest extent practicable, which would provide natural visual buffers.
- Install silt fences or other erosion control devices (i.e., hay bales, earthen berms) along the perimeter of areas that would be cleared.
- Maintain BMPs in each area until regrowth of vegetation provides satisfactory stabilization.
- Maintain buffers around jurisdictional wetlands and waterbodies and perennial and intermittent streams.
- Comply with stormwater management practices required by NPDES permit and any other permit requirements.
- Utilize BMPs to minimize soil erosion and runoff.
- Avoid stockpiling soil in floodplain areas if heavy rain events (>1-inch) are anticipated.
- Revegetate with native and/or noninvasive vegetation to reintroduce habitat, reduce erosion, and limit the spread of invasive species and utilize pollinator vegetation where possible.
- Utilize timer- and/or motion-activated downward facing security lighting to limit attracting wildlife, such as migratory birds and bats.
- Install temporary construction fencing around natural resources that should be avoided.
- Install anti-reflective, PV panel surfaces to minimize visual impacts such as glare and reflection.
- Ensure heavy machinery and vehicles utilized at the Project Site meet all state and local noise requirements.
- Mitigation Measures include:
    - If fill or soil removal were needed, the topsoil would first be stripped and segregated. Once fill or other intense earthwork was complete, the topsoil would be reapplied to the surface.
    - TN Solar would coordinate with the homeowners, construction contractors, and the array layout designers to determine the most suitable type of buffer to be used in each location where the visual environment for residents has undergone a long-term change due to the Project.
    - For residences that are within 500 feet of an inverter, a pre-construction sound study including an ambient survey would be conducted to quantify the existing ambient environment. After the project reaches commercial operation, TN Solar would measure the sound levels at residential property lines and identify any equipment that generates a Ldn sound level that exceeds 55 dBA at the property line. If there are locations where noise levels exceed that threshold, TN Solar would install sound buffers (walls, fences with screening, or vegetation) in order to minimize the noise levels from operating equipment.

- Should tree removal occur, TVA would be contacted first to evaluate the need for additional consultations or clearances.
- Should traffic flow become a problem, consider implementation of staggered work shifts during construction and a flag person along the roadside during heavy commute times to manage the flow of traffic near the Project Site.

2.5.2 TVA Electrical Interconnection

TVA employs standard practices when constructing, operating, and maintaining TLs, structures, associated facilities, and access roads. These practices can be found on TVA's transmission website (TVA 2020a). Some of the more specific routine measures that would be taken to reduce the potential for adverse environmental effects during the construction, operation, and maintenance of the proposed Skyhawk Switching Station are as follows:

- TVA would utilize standard BMPs, as described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities – Revision 3*, TVA's BMP manual (TVA 2017b), to minimize erosion during construction, operation, and maintenance activities.
- To minimize the introduction and spread of invasive species in the ROW, access roads, and adjacent areas, TVA would follow standard operating procedures consistent with Executive Order (EO) 13112 (Invasive Species) for revegetating the areas with noninvasive plant species as defined by TVA (2017b).
- In areas requiring chemical treatment, only USEPA-registered and TVA approved herbicides would be used in accordance with label directions designed, in part, to restrict applications near receiving waters and groundwater features, to prevent unacceptable aquatic and groundwater impacts.

2.6 The Preferred Alternative

TVA's preferred alternative for fulfilling its purpose and need is the Proposed Action Alternative. This alternative would enable TN Solar to generate renewable energy for TVA and its customers with only minor direct and indirect environmental impacts due to the implementation of BMPs and minimization and mitigation efforts, as described in Section 2.5.1 and Section 2.5.2. Implementation of the Project would help meet TVA's renewable energy goals and would help TVA meet customer-driven energy demands on the TVA system.

3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the importance, nature, and extent of environmental resources in their current setting at the Project Site. This chapter provides a measure for the assessment of potential effects of the alternatives described in Section 2.0. The scope of environmental consequences assessed in this EA for the Proposed Action focuses on impacts related to the construction and operation of the proposed solar energy system and associated electric interconnection.

3.1 Land Use

This section provides an overview of the existing and surrounding land use at the Project Site which includes the proposed Solar Facility and upgrades to occur along TVA's existing Transmission ROW. Potential impacts on land use associated with the alternatives are described below. There are no recreation or natural areas identified within ½ mile of the Project Site.

3.1.1 Affected Environment

Solar Facility

The U.S. Environmental Protection Agency (USEPA) defines "land use" as the human use of land for activities such as agricultural, residential, and recreational uses (USEPA, 2020a). The Project Site is located approximately 3.5 miles east-southeast of Union City in Obion County, Tennessee, and is separated into four parcels for construction and operation of the Solar Facility, plus portions of a fifth parcel for construction of TVA's Tie-In. Existing land use for the Project Site is primarily agricultural land (bean and corn crops) with manmade ditches and drainages present along the perimeter of the agricultural fields. There are intermittent forested riparian areas surrounding some of the streams along the perimeter of the Project Site. Imagery data collected from the National Land Cover Database identifies the Project Site as primarily cultivated cropland. Based on the results of environmental field surveys, Burns & McDonnell's biologists confirmed the parcels associated with the Project Site are all currently used for agricultural operations.

The Project Site is generally flat with minor changes in elevation that ranges from approximately 305 to 342 feet above mean sea level. Elevation is higher in the eastern portion of the Project Site east of Everett Stewart Regional Airport and gets lower towards the western portion of the Project Site near Old River Road and the Obion River.

The Solar Facility would be located within a rural agricultural area south of the North Obion River and State Route 22 and abutting the Everett-Stewart Regional Airport. Within the Project Site, several linear forested areas associated with water features are situated between agricultural fields and along fence rows. The forested areas are located along the perimeter of the agricultural fields, forming fence rows, and total less than one percent of the Project Site, while the agricultural fields encompass over 690 acres (99 percent). To the extent practicable, forested areas at the Project Site will remain as riparian and visual buffers. Some tree branches may be trimmed if it is determined that they will interfere with operation of the Solar Facility. Since the Solar Facility site is currently cultivated agricultural fields, TN Solar does not anticipate removal of mature trees. Water features at the site are primarily manmade drainage ditches situated at parcel boundaries. The table below provides a breakdown of land use and land cover within the Project Site as observed during site visits and environmental field surveys in 2019 and 2020.

Table 3-1: Land Use and Percent Cover within the Solar Facility Project Site

Project Site Component	Current Land Use	Approximate Area (acres)	Percent of Project Site
Solar Arrays, inverters, AC collections	Agriculture	684	>98%
Skyhawk Substation	Agriculture	1	<1%
Skyhawk Switching Station	Agriculture	5	<1%
TOTAL		**690**	**100%**

Transmission ROW

The northern terminus of the Transmission ROW is in Union City, TN, approximately 1.5 miles southeast of the city center, and extends southeast for 16.2 miles to Martin, TN, approximately 4.5 miles south of the city center. Imagery data collected from the National Land Cover Database identifies the land use for the Transmission ROW as primarily cultivated cropland, which has been field-verified during site investigations. There is an approximately 0.5-mile stretch of the Transmission ROW that parallels a residential neighborhood and passes near some small commercial areas on the southwest outskirts of Martin, TN.

According to the National Land Cover Database, approximately 53.2 acres (75 percent) of the Transmission ROW proposed for structural upgrades is in cultivated crops. Approximately 9.7 acres (14 percent) is developed to different degrees of intensity. As shown in the table below, approximately 2.4 acres (4 percent) is forested, 2.9 acres (4 percent) is woody wetlands, and 2.6 acres (4 percent) is hay or pasture. Appendix B provides additional details for land use and land cover within the Transmission ROW portion of the Project.

Table 3-2: Land Use and Percent Cover within the Transmission ROW Workspaces (includes tie-in)

Land Cover	Area (acres)	Percent of Project Site
Developed, Open Space	7.43	11%
Developed, Low Intensity	1.10	2%
Developed, Medium Intensity	0.34	<1%
Developed, High Intensity	0.30	0%
Deciduous Forest	1.74	3%
Evergreen Forest	0.62	1%
Hay/Pasture	2.62	4%
Cultivated Crops	53.17	75%
Woody Wetlands	2.89	4%
TOTAL	**70.21**	**100%**

3.1.2 Environmental Consequences

3.1.2.1 No Action Alternative

Under the No Action Alternative, the proposed Solar Facility would not be constructed, and TVA would not make the proposed modifications to its Transmission ROW; therefore, no project-related impacts to

land use would result. Existing land use would be expected to remain a mix of agricultural and undeveloped land for the foreseeable future.

3.1.2.2 Proposed Action

Solar Facility

Implementation of the Proposed Action would result in construction and operation of the Solar Facility and would therefore change the land use of the 705-acre Project Site from primarily agricultural to renewable energy production. Any undeveloped portions of the Project Site would remain undeveloped with no farming or other activities occurring other than general maintenance as required for operation of the facility. The Project Site is in a rural area with limited zoning restrictions and would be compatible with land uses in the surrounding areas. Everett Stewart Regional Airport is adjacent to the Project Site to the east. Installation of the Solar Facility would increase industrial development in a predominantly agricultural land use area between Union City, TN and Martin, TN. If the Solar Facility were to be decommissioned, the majority of land could be returned to agriculture or used for a variety of other development strategies as allowed by local zoning regulations. Minor direct impacts are anticipated from the conversion of actively cultivated agricultural land to solar generation.

There are no outdoor recreation areas in the vicinity of the Project Site, and development of the Project would not impact public recreational activities or facilities associated with recreational activities. Additionally, development of the Solar Facility would be consistent with local land use planning and zoning. Therefore, neither adverse direct or indirect impacts on land use are anticipated.

Transmission Upgrades

There would be no change in land use for upgrades to the existing Transmission ROW. All activities on the Transmission ROW would be temporary, and upgrades would be within the existing TVA ROW. Minor crop loss would occur if construction is proposed during a crop rotation. However, upon completion of construction, the Transmission ROW would continue to support agriculture and would continue to be maintained in its current condition in areas not used for agriculture.

3.2 Geology, Soils, and Prime Farmland

This section describes the existing geological resources at the Project Site and Transmission ROW and the potential impacts on these geological resources that would be associated with the No Action and Proposed Action Alternatives. Components of geological resources that are analyzed include geology, geological hazards, soils, and prime farmland.

3.2.1 Affected Environment

3.2.1.1 Geology

Solar Facility

The Project Site in northwest Tennessee is located within Southern Mississippi Valley Loess Major Land Resource Area (MLRA), which is characterized by generally smooth Atlantic and Gulf Coast marine terraces, abundant summer rain that favors agriculture production, and a hot and humid climate (NRCS 2019). This area is in the East Gulf Coastal Plain Section of the Coastal Plain Province of the Atlantic Plain.

This MLRA is mantled with loess of varying thickness underlain by unconsolidated sand, silt, and clay, mainly of marine origin (NRCS 2020).

Transmission Upgrades

TVA's existing Weakley to Union City 161-kV TL is in the same region as the Project Site and geologic characterizations are the same as those described above for the Solar Facility.

3.2.1.2 Geological Hazards

Geological hazards can include landslides, volcanoes, earthquakes/seismic activity, and subsidence/sinkholes. The Project Site and surrounding areas are relatively stable without significant slopes within several miles mitigating potential risk for landslides. There are no volcanoes within several hundred miles of the Project Site (USGS 2020a).

Sinkholes can be common when subsurface rock composition is evaporite rock (salt, gypsum, and anhydrite) and carbonates (limestone and dolomite) which can naturally be dissolved by groundwater circulating through them. When rock dissolves, spaces and caverns develop underground. These types of formations are referred to as karst topography. Land over sinkholes may stay intact until there is not enough support for the land above the spaces. Then, a collapse of the land surface can occur. Land collapses can vary greatly in size and shape (USGS 2016). Human activities can also expedite cavity formation in more susceptible materials and trigger a collapse or collapse an existing sub-surface cavity site.

Surface faulting, ground motion and deformation, liquification, and subsidence can all result from seismic activity at the Project Site. Susceptibility of structures or humans to experience seismic activity are often shown via the Modified Mercalli Scale. Values on the Mercalli scale are translated into a peak ground acceleration (PGA) value to measure the maximum force experienced. The PGA is the maximum acceleration experienced by a building or object at ground level during an earthquake on uniform, firm-rock site conditions. The PGA is measured in terms as a percentage "g," the acceleration due to gravity. The USGS Earthquake Hazards Program publishes seismic hazard map data layers that display the PGA with ten percent (one in 500-year event) probability of exceedance in 50 years.

Solar Facility

A geotechnical survey was performed within the Project Site in May 2020. Based on the results of this survey, it was determined that no carbonate bedrock units underlie the Project Site. Therefore, the development of karst features, solution channels, or sinkholes is unlikely (GEOServices 2020).

The potential ground motion for the Project Site is 0.8g, for PGA with a two percent probability of exceedance within 50 years (USGS 2014). A 0.8g earthquake will have a strong perceived shaking with moderate to severe potential for structural damage. The Project Site has high risk for earthquakes that could cause structural damage (USGS 2020b).

Transmission Upgrades

TVA proposes to replace the existing OHGW with Fiber along the existing TL from the Weakley 500-kV Substation to the Union City 161-kV Substation. To support the new Fiber, modifications to the existing TL would be required, which would include approximately 83 pole replacements and six new pole installations at discrete locations along the TL. Poles would be installed by augering to a depth of

approximately 10 - 15 feet, placing the poles in position, and backfilling with spoil materials. Excess spoils would be spread within the existing ROW or removed for disposal at an approved landfill site.

3.2.1.3 Soils

Solar Facility

There are 14 soil types mapped within the Project Site. Dominant soil types throughout the Project Site consist of Routon-Bonn silt loam complex (48 percent), Birds silt loam (19 percent), Grenada silt loam (11 percent), and Center silt loam (11 percent). A complete list of soil types mapped throughout the Project Site is detailed in Table 3-3 and illustrated in Figure 3-1.

The Project Site is located within MLRA-134 (Southern Mississippi Valley Loess). Most of the soils in this MLRA are used for farmland supporting cotton, corn, soybeans, and wheat. MLRA-134 soils are predominantly Udalfs which are deep medium textured, well drained soils that have a thermic temperature regime, udic moisture regime, and mixed mineralogy (USDA 2006). The Routon soil series are very deep, poorly drained soils typically found on low stream terraces and in depressions on uplands. These soils have a dark grayish brown “A” horizon to a light brownish gray “B” horizon and are derived from loess parent material (USDA 2018). The Birds soil series are also very deep, poorly drained soils with a dark graying brown to gray “A” horizon to a gray “C” horizon formed in silty alluvium on flood plains (USDA 2015). Grenada soil series are very deep, moderately well drained soils typically found anywhere from nearly level to strongly sloping surfaces in the Southern Mississippi Valley Silty Uplands. These soils have a dark graying brown “A” horizon to a yellowish brown “B” horizon and are derived from thick loess (USDA 2002).

Table 3-3: NRCS Soils Summary for the Solar Facility Project Site

Map Unit Name	Farmland Classification	Hydric Rating	Area (acres)	%
Birds silt loam	All areas are prime farmland	100	133.67	19%
Calloway silt loam	All areas are prime farmland	0	39.23	6%
Center silt loam, 0 to 2 percent slopes	All areas are prime farmland	8	74.30	11%
Falaya silt loam, 0 to 2 percent slopes, occasionally flooded, brief duration	All areas are prime farmland	5	5.27	1%
Feliciana silt loam, 12 to 20 percent slopes, moderately eroded, northern phase	Not rated or not available	0	0.02	0%
Fountain silt loam	All areas are prime farmland	100	8.51	1%
Grenada silt loam, 2 to 5 percent slopes	All areas are prime farmland	0	43.42	6%
Grenada silt loam, 2 to 5 percent slopes, eroded	All areas are prime farmland	0	25.61	4%
Grenada silt loam, 5 to 8 percent slopes, eroded	Not prime farmland	0	4.89	1%
Loring silt loam, 2 to 5 percent slopes	All areas are prime farmland	0	4.97	1%
Loring silt loam, 5 to 8 percent slopes, eroded	Not prime farmland	0	6.00	1%
Routon silt loam, 0 to 2 percent slopes	Not prime farmland	100	1.56	0%
Routon-Bonn silt loam complex	All areas are prime farmland	100	324.34	48%
Water	Not prime farmland	0	0.50	0%
Waverly silt loam	All areas are prime farmland	100	17.72	3%
		Totals	**690.01**	**100%**

Project Site
Existing Weakley to Union City 161 kV Transmission Line
Birds silt loam
Calloway silt loam
Fountain silt loam
Waverly silt loam
Center silt loam, 0 to 2 percent slopes
Grenada silt loam, 2 to 5 percent slopes
Falaya silt loam, 0 to 2 percent slopes, occasionally flooded, brief duration
Feliciana silt loam, 12 to 20 percent slopes, moderately eroded, northern phase
Grenada silt loam, 2 to 5 percent slopes, eroded
Grenada silt loam, 5 to 8 percent slopes, eroded
Loring silt loam, 2 to 5 percent slopes
Loring silt loam, 5 to 8 percent slopes, eroded
Routon silt loam, 0 to 2 percent slopes
Routon-Bonn silt loam complex
Water

Figure 3-1
NRCS Soils Map
Skyhawk Solar Project
Obion County, TN

BURNS McDONNELL

NORTH
0 0.15 0.3
Miles

Path: C:\Users\olhaney\Desktop\Projects\121610_SkyhawkSolar\GIS\MXDs\EA\Soils_Map.mxd olhaney 10/7/2020
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Source: Esri, NRCS Soil Survey Geographic Database, TN Solar 1, LLC, Burns & McDonnell

Issued: 10/7/2020

Transmission Upgrades

There are 29 soil units mapped within the Transmission ROW portion of the Project. Dominant soil types throughout the Transmission ROW consist of Loring silt loam (35 percent), Grenada silt loam (18 percent), and Falaya silt loam. Table 3-4 A complete list of soils types mapped throughout the Transmission ROW is detailed in Table 3-4 and illustrated in Appendix B.

Table 3-4: NRCS Soils Summary for the Transmission Upgrades (includes tie-in)

Map Unit Name	Farmland Classification	Hydric Rating	Acres	% of Transmission ROW
Calloway silt loam	All areas are prime farmland	0	3.61	5%
Center silt loam, 0 to 2 percent slopes	All areas are prime farmland	8	3.68	5%
Center silt loam, 0 to 3 percent slopes	All areas are prime farmland	9	0.36	1%
Collins silt loam, 0 to 2 percent slopes, occasionally flooded, brief duration	All areas are prime farmland	0	3.19	5%
Falaya silt loam, 0 to 2 percent slopes, occasionally flooded, brief duration	All areas are prime farmland	5	6.49	10%
Falaya silt loam, 0 to 2 percent slopes, occasionally flooded, brief duration	Prime farmland if drained	5	0.72	1%
Feliciana silt loam, 2 to 5 percent slopes, moderately eroded, northern phase	All areas are prime farmland	0	0.30	0%
Feliciana silt loam, 12 to 20 percent slopes, moderately eroded, northern phase	Not rated or not available	0	0.23	0%
Fountain silt loam	All areas are prime farmland	100	0.81	1%
Grenada silt loam, 2 to 5 percent slopes	All areas are prime farmland	0	1.49	2%
Grenada silt loam, 2 to 5 percent slopes, eroded	All areas are prime farmland	0	7.79	12%
Grenada silt loam, 5 to 8 percent slopes, eroded	Not prime farmland	0	1.51	2%
Grenada silt loam, 5 to 8 percent slopes, severely eroded	Not prime farmland	0	1.07	2%
Lexington silt loam, 12 to 20 percent slopes, severely eroded	Not prime farmland	0	0.25	0%
Loring silt loam, 2 to 5 percent slopes	All areas are prime farmland	0	0.78	1%
Loring silt loam, 2 to 5 percent slopes, eroded	All areas are prime farmland	0	7.25	11%
Loring silt loam, 5 to 8 percent slopes, severely eroded	Not prime farmland	0	4.85	7%

Map Unit Name	Farmland Classification	Hydric Rating	Acres	% of Transmission ROW
Loring silt loam, 8 to 12 percent slopes, eroded	Not prime farmland	0	0.10	0%
Loring silt loam, 8 to 12 percent slopes, severely eroded	Not prime farmland	0	6.21	9%
Memphis silt loam, 2 to 5 percent slopes, northern phase	All areas are prime farmland	0	1.17	2%
Memphis silt loam, 5 to 8 percent slopes, moderately eroded, northern phase	Not prime farmland	0	0.02	0%
Memphis silt loam, 8 to 12 percent slopes, moderately eroded, northern phase	Not prime farmland	0	0.03	0%
Memphis silt loam, 20 to 30 percent slopes, moderately eroded, northern phase	Not prime farmland	0	0.78	>1%
Ochlockonee loam, occasionally flooded	All areas are prime farmland	0	0.34	>1%
Routon silt loam, 0 to 2 percent slopes	Not prime farmland	100	5.59	8%
Routon-Bonn silt loam complex	All areas are prime farmland	100	8.30	8%
Waverly silt loam, rarely flooded	Not prime farmland	100	0.03	0%
Waverly, Rosebloom silt loams and Frequently flooded soils	Not prime farmland	90	1.94	3%
Waverly silt loam	All areas are prime farmland	100	1.30	2%
		Total	70.19	100%

3.2.1.4 Prime Farmland

Prime farmland, as defined by the USDA, "is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses (the land could be cropland, pastureland, rangeland, forest land, or other land, but not urban built-up land or water). The soils are of the highest quality and can economically produce sustained high yields of crops when treated and managed according to acceptable farming methods."

The Farmland Protection Policy Act ([FPPA]; 7 United States Code [U.S.C.] 4201 *et seq.*) requires federal agencies to take into account the adverse effects of their actions on prime or unique farmlands. The purpose of the FPPA is "to minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses."

Solar Facility

Approximately 677 acres (98 percent) of the Solar Facility are classified as prime farmland. All soil types on the Project Site are considered prime farmland with the exception of four: Grenada silt loam 5-8 percent

slopes, eroded; Loring silt loam 5-8 percent slopes, eroded; Loring silt loam 8-12 percent slopes, eroded; and Routon silt loam 0-2 percent slopes. Figure 3-2 shows the locations of prime farmland soils on the Project Site.

Transmission Upgrades

Approximately 48 acres (68 percent) of the Transmission Row are classified as prime farmland. Of the 29 soil types within the ROW, 13 soil types are not considered prime farmland: Feliciana silt loam, 12 to 20 percent slopes, moderately eroded, northern phase; Grenada silt loam, 5 to 8 percent slopes, eroded; Grenada silt loam, 5 to 8 percent slopes, severely eroded; Lexington silt loam, 12 to 20 percent slopes, severely eroded; Loring silt loam, 5 to 8 percent slopes, severely eroded; Loring silt loam, 8 to 12 percent slopes, eroded; Loring silt loam, 8 to 12 percent slopes, severely eroded; Memphis silt loam, 5 to 8 percent slopes, moderately eroded, northern phase; Memphis silt loam, 8 to 12 percent slopes, moderately eroded, northern phase; Memphis silt loam, 20 to 30 percent slopes, moderately eroded, northern phase; Routon silt loam, 0 to 2 percent slopes; Waverly silt loam, rarely flooded; and Waverly, Rosebloom silt loams and Frequently flooded soils

Project Site

Existing Weakley to Union City 161 kV Transmission Line

All areas are prime farmland

Not prime farmland

Not rated or not available

BURNS McDONNELL

Figure 3-2
Farmland Classification Map
Skyhawk Solar Project Obion County, TN

Source: Esri, NRCS Soil Survey Geographic Database, TN Solar 1, LLC, Burns & McDonnell

Issued: 10/7/2020

Path: C:\Users\olhaney\Desktop\Projects\121610_SkyhawkSolar\GIS\MXDs\EA\Farmland_Map.mxd olhaney 10/7/2020
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

3.2.2 Environmental Consequences

This section describes the potential impacts to Geology, Soils, and Prime Farmland from implementation of the Proposed Action or the No Action Alternative.

3.2.2.1 No Action Alternative

Under the No Action Alternative, the proposed Solar Facility would not be constructed; therefore, no Project-related impacts on geological, soil resources, or prime farmlands would result. Existing land use would be expected to remain a mix of agriculture and undeveloped land. If current land use remains unchanged, impacts to soils from continued agricultural use could result from a depletion of nutrients, causing a minor change to the site.

3.2.2.2 Proposed Action

The following sections describe the anticipated impacts on geology, soils, and prime farmlands should the Proposed Action be approved and implemented.

Geology

Solar Facility

Implementation of the Proposed Action could result in minor impacts to geology. In addition to minor grading, minor excavations may occur for construction of the Skyhawk Substation, Skyhawk Switching Station, gen-tie line, and stormwater retention areas. Excavations would be shallow and utilize existing topography to the extent practicable. Installation of pilings to support solar arrays would be mechanically driven down to depths of up to 20 feet. Trenching to approximately three feet would also be required for underground wiring connections between solar panels. Due to limited areas and shallow subsurface disturbances, minor direct impacts to shallow subsurface geological resources are anticipated.

Transmission Upgrades

Ground disturbance would occur at discrete locations within the Transmission ROW to install or replace poles to support the proposed Fiber. Poles would be installed at a depth of 10 - 15 feet. Due to the limited areas of disturbance and the shallow nature of subsurface disturbances, only minor impacts to geological resources are anticipated.

Geological Hazards

Solar Facility

The Project Site is in an area with carbonate bedrock geology and karst landforms associated with a risk for sinkholes. According to geotechnical investigation conducted for the Project Site, there are no known sinkholes within the Project Site, and the future formation of sinkholes is unlikely (GEOServices 2020). There is potential for moderate to high intensity seismic activity underlying the Project Site. However, the Project would be designed to comply with applicable standards. Potential impacts from either seismic activity and/or sinkholes would likely only cause minor impacts to the Solar Facility and associated infrastructure within the Project Site. Impacts to resources outside of the Project Site from potential geological hazards associated with construction of the proposed Solar Facility are unlikely.

Transmission Upgrades

The Transmission ROW traverses an area with carbonate bedrock geology and karst landforms associated with a risk for sinkholes. There is potential for moderate to high intensity seismic activity underlying the Transmission ROW. However, pole structures would be designed to comply with applicable standards. Potential impacts from either seismic activity and/or sinkholes would likely only cause minor impacts to the TL. Impacts to resources outside of the Transmission ROW from potential geological hazards associated with modifications to the TL are unlikely.

Soils

During construction, all soils within the Project Site could potentially be disturbed due to site preparation and construction activities. Soils would be segregated, stockpiled, and replaced as they originally occurred to the greatest extent practicable. Due to the limited vegetation clearing activities, it is unlikely that off-site soil resources would be necessary for construction. However, a nominal amount of off-site soil or hauling away of on-site soil may be required. If other borrow materials, such as sand, gravel, rip rap, or other aggregate are necessary during site preparation, resources may be obtained from on-site sources or nearby previously permitted off-site sources. Soils within the Project Site do not have characteristics that would require specific construction requirements or techniques.

Solar Facility

A limited number of impervious surfaces from construction of foundations for the Skyhawk Substation, Skyhawk Switching Station, and any maintenance facilities may result in a negligible to minor increase in stormwater runoff and a potential increase in erosion in those areas. Implementation of BMPs, outlined in the Erosion and Sediment Control Plan, during construction of these facilities would minimize the potential for increased soil erosion. Additionally, a re-vegetation strategy of seeding the site with native and non-invasive species would stabilize the site throughout the life of the Project. Therefore, it is anticipated that activities associated with construction of the Project would not result in adverse impacts to soils on the Project Site.

Minor disturbance to soils would occur during operation of the Proposed Action. Activities ranging from routine and non-routine maintenance of the solar arrays, array inspections, facility maintenance, fence repairs, and vegetation control would be an on-going potential for disturbance to soils within the Project Site. Vegetation control would be conducted using mechanized equipment such as tractors, mowers, and trimmers. TN Solar proposes to re-vegetate the Project Site with low-growing native vegetation in an effort to reduce the routine vegetation maintenance while also limiting interference with the solar arrays. Broad application of herbicides is not anticipated. However, if selective herbicides are necessary for small applications around problematic areas, selective use of USEPA-approved spot herbicides would be applied by a licensed contractor or qualified staff. Maintenance activities would not result in adverse impacts to soils on the Project Site during operation.

Transmission ROW

A limited amount of ground disturbance would occur along the Transmission ROW to implement TVA's upgrades to its TL. Ground disturbance would occur at discrete locations along the Transmission ROW where new poles would be installed, or existing poles would be replaced. Excess soils from pole installation would be spread within the Transmission ROW or hauled to an approved disposal site. Areas within the

Transmission ROW that are currently in cultivation would continue to be cultivated post-construction. Disturbed areas outside of actively cultivated areas would be re-seeded as necessary to prevent erosion within the ROW. Modifications to the existing TL are not anticipated to adversely impact soils within the Transmission ROW.

Prime Farmland

Solar Facility

Implementation of the Proposed Action would result in nearly all of the Project Site (up to 690 acres) being developed into the Skyhawk Solar Facility, changing the land use to renewable energy from the existing agriculture designation. Since the entire Project Site is essentially prime farmland or farmland, implementation of the Proposed Action would result in impacts to prime farmland throughout the Project Site. Any area within the Project Site not developed for the Project would remain undeveloped with no agricultural or other activities, aside from general mowing and maintenance of vegetation.

During site preparation and grading activities, topsoil would be stockpiled and re-applied to the respective surface areas once grading is complete. If the site is decommissioned and closure occurs, most facility components would be removed, and farming could subsequently be resumed with limited long-term loss of potential agriculture production. In the 15-acre workspace associated with TVA's Tie-In to its existing TL, the area would be returned to its preconstruction conditions once construction is completed.

Implementation of the Proposed Action would result in temporary adverse effects to prime farmland during operation of the Solar Facility. Adhering to BMPs during construction and operation of the Solar Facility, including installing erosion control devices (ECDs) during stockpiling events, would preserve topsoil and limit erosion, resulting in negligible impacts to prime farmland. If the Project is decommissioned and the Solar Facility is removed, the majority of the Project Site could be returned to agricultural and pastureland uses with a negligible loss to soil productivity. Beneficial impacts to soil health could result with a re-vegetation strategy using native and non-invasive species while terminating the need for broad application of herbicides, pesticides, and fertilizers. Selective use of USEPA-approved spot herbicides may be necessary to control weeds until the site vegetation has been established.

Transmission ROW

Approximately 48 acres (68 percent) of the Transmission Row are classified as prime farmland. Ground disturbances for upgrades to the TL would occur at discrete locations along the Transmission ROW and would be temporary. Upon completion, areas within the Transmission ROW that are actively cultivated would continue to be cultivated. No loss of prime farmland or changes to agricultural practices are anticipated from Project upgrades to the Transmission ROW.

3.3 Water Resources

This section provides an overview of existing water resources at the Project Site, and the potential impacts on these water resources that would be associated with the No Action and Proposed Action Alternatives. Water resources discussed in this section include groundwater and surface water. Wetlands and floodplains are included in the discussion of surface water.

3.3.1 Affected Environment

3.3.1.1 Groundwater

Solar Facility

Principal aquifers that underlie the Project Site are the upper Claiborn, middle Claiborn, middle Wilcox, and lower Wilcox aquifers which are all part of the Mississippi embayment aquifer system located in the Coastal Plain Physiographic Province (USGS 1995). There are no USEPA-designated sole source aquifers in Obion or Weakley Counties, based on available information (USEPA 2020b).

Transmission Upgrades

Groundwater resources underlying the Transmission ROW are the same as described above for the Solar Facility.

3.3.1.2 Surface Water

Surface waters are defined as water features that are on the Earth's surface typically consisting of streams, lakes, ponds, and wetlands. Surface water features are further segregated into perennial, intermittent, and ephemeral. Tennessee also designates certain surface water features as wet weather conveyances (WWC). Perennial waters are permanent surface water features that have water present throughout the year. They typically exist as streams, rivers, lakes, springs, and swamps. During periods of little or no rain, the water level is maintained by groundwater contributions. Intermittent classification is generally restricted to streams that have a well-defined channel but only contain water part of the year, typically during winter and spring seasons when the stream bed is below the water table. Intermittent streams often do not support biological and hydrological characteristics that perennial streams do. Ephemeral streams or WWCs are features that only flow in direct response to precipitation events. Ephemeral features typically exist as topographic swales and dry drainages with poor bed/bank development. Wet weather conveyances are, by definition, not a relatively permanent water, and they do not have a designated classified use. Wetlands are those areas inundated by surface water or groundwater such that vegetation adapted to saturated soil conditions is prevalent. Examples include swamps, marshes, bogs, and wet meadows. Wetland habitat provides valuable public benefits including flood/erosion control, water quality improvement, wildlife habitat, and recreation opportunities.

Surface waters that meet certain physical and hydrologic criteria (defined bed and bank, ordinary high water mark, or specific hydrologic, soil, and vegetation composition) as defined in the Clean Water Act (CWA) are considered Waters of the U.S. (WOTUS) (or jurisdictional waters) and are under the regulatory jurisdiction of USACE. The CWA is the primary federal law that regulates discharges of pollutants and/or fill materials into WOTUS as outlined in Sections 402, 404 and 401. A jurisdictional determination by the USACE typically governs the activities affecting WOTUS. TDEC uses the 401 Certification process in coordination with its own regulatory authority, ARAP, to regulate dredge and fill activities permitted by the USACE (Section 10/404). The USACE and TDEC share responsibility for compliance and enforcement. Additionally, Executive Order (EO) 11990 instructs federal agencies "to avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative" (42 FR 26961, 3 CFR, 1977).

Solar Facility

The Project Site is within the U.S. Environmental Protection Agency (USEPA) Mississippi Valley Loess Plains Ecoregion (Level 4) and is within the Obion River Hydrologic Unit Code (HUC) 08010202 (USEPA 2020c; USGS 2020c). The Project Site generally drains west into the North Fork Obion River and eventually flows several miles southwest into the Mississippi River.

Between March 2 through March 4, 2020 and April 13 through April 21, 2020, Burns & McDonnell wetland scientists conducted field surveys and identified two palustrine unconsolidated bottom (PUB) wetlands, one palustrine emergent (PEM) wetland, two palustrine forested (PFO) wetlands, four intermittent streams and three perennial streams within the Survey Area. Wetland delineations were conducted in accordance with the *Corps of Engineers Wetland Delineation Manual* (1987 Manual) and the 2010 Atlantic and Gulf Coast Plain Region – Version 2.0 (Regional Supplement). A value assessment of each wetland was also conducted utilizing the Tennessee Valley Authority Rapid Assessment Methodology (TVARAM). Wetlands identified within the Survey Area were categorized following the Cowardin classification system (Cowardin et al., 1979). Factors considered in determining jurisdictional waters of the U.S. included criteria as defined under the recent April 21, 2020 publication of The Navigable Waters Protection Rule: Definition of "Waters of the United States" (USACE and EPA, 2020). Surface water locations at the Project Site are shown in Figure 3-3. The Wetland and Waterbody Delineation Report, which covers the entire Survey Area, is provided in Appendix D. Surface water feature details are presented in the table below.

Additionally, wetlands were evaluated by their functions using a TVA-developed modification of the Ohio Rapid Assessment Method specific to the TVA power service area (TVA Rapid Assessment Method or "TVARAM"). This assessment is designed to determine the ecological quality and the level of function of a particular wetland and to define wetlands into three categories of wetland function and integrity: Category 1, Category 2, and Category 3. Wetlands were placed into functional categories based on a numeric score ranging from zero to 100 determined by a qualitative measure of ecosystem functions.

Category 1 (Scores 0-34.9) wetlands are low quality, degraded aquatic resources that may exhibit low species diversity, minimal hydrologic input and connectivity, recent or on-going disturbance regimes, and/or predominance of nonnative species. These wetlands provide low functionality and are considered of low value.

Category 2 (Scores 35-64.9) represents moderate quality wetlands that provide functions at a greater value due to a lesser degree of degradation and/or due to their habitat, landscape position, or hydrologic input. Moderate quality wetlands are considered healthy water resources of value. Disturbance to hydrology, substrate, and/or vegetation may be present to a degree at which valuable functional capacity is sustained, and there is reasonable potential for restoration.

Category 3 (Scores 65-100) wetlands are superior quality wetlands, which may exhibit little, if any, recent disturbance; provide essential and/or large scale stormwater storage, sediment retention, and toxin absorption; contain mature vegetation communities; and/or offer habitat to rare species. Superior quality wetlands include those wetlands offering high functions and values within a watershed or are of regional and/or statewide concern. Conditions found in superior quality wetlands often represent restoration goals for wetlands functioning at a lower capacity.

Streams and wet weather conveyances (WWC) features were classified utilizing the methodology and guidance provided in the TDEC Division of Water Pollution Control Guidance for Making Hydrologic Determinations, Version 1.5 (TDEC 2020a). The on-site water resources identified during the field survey were submitted to USACE and TDEC for confirmation of their jurisdictional status; verification has not yet been received (Appendix C). A total of five jurisdictional wetlands (2.33 acres), two jurisdictional perennial streams (1,337 linear feet), three jurisdictional intermittent streams (5,852 linear feet), and six WWCs (11,836 linear feet) were identified within the Solar Facility Site. Surface waters are listed in Table 3-5 and

Table 3-6; and, their locations are shown in Figure 3-3. In the submittals to TDEC and USACE, it was recommended that the WWCs do not meet jurisdictional wetland criteria or the definition for classification as a jurisdictional stream.

Table 3-5: Wetlands Delineated during Skyhawk Solar Field Surveys

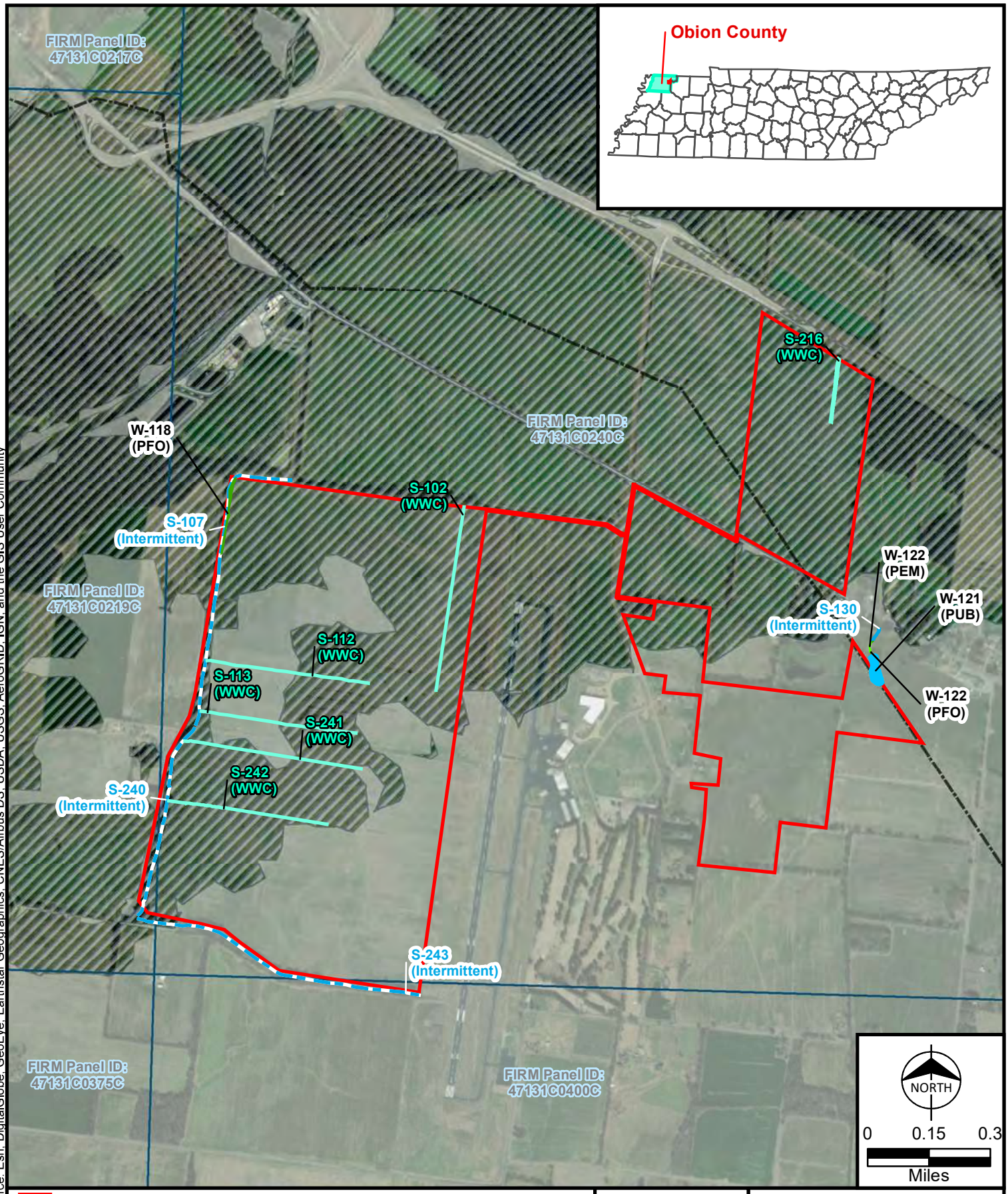
Wetland Number	Wetland Type[a]	TVA Ram Score	Area of Wetland (acre) in Project Site	Area of Wetland Impact by Solar Facility	Document Location Reference
W-109	PUB	41	0.001	--	Appendix D: Figure A-4; Pg. 1
W-118	PFO	36	0.831	--	Appendix D: Figure A-4; Pg. 11
W-121	PUB	38	1.382	--	Appendix D: Figure A-4; Pg. 4,5
W-122	PEM	32	0.081	--	Appendix D: Figure A-4; Pg. 4,5
W-122	PFO	32	0.035	--	Appendix D: Figure A-4; Pg. 4,5
		Total	2.33	0.0	

(a) wetland type: PEM = palustrine emergent, PUB = palustrine unconsolidated bottom, PFO = palustrine forested

Table 3-6: Waterbodies Delineated during Skyhawk Solar Field Surveys

Stream Number	Stream Type	Length of Stream (feet) in Survey Area	Document Location Reference
S-101	Perennial	769	Appendix D: Figure A-4; Pg. 10, 11
S-102	WWC	2,385	Appendix D: Figure A-4; Pg. 10, 13
S-107	Intermittent	3.192	Appendix D: Figure A-4; Pg. 10, 11
S-112	WWC	2,105	Appendix D: Figure A-4; Pg. 11, 12, 13
S-113	WWC	2,025	Appendix D: Figure A-4; Pg. 12, 13
S-130	Intermittent	213	Appendix D: Figure A-4; Pg. 4,5
S-132	Perennial	568	Appendix D: Figure A-4; Pg. 6
S-216	WWC	862	Appendix D: Figure A-4; Pg. 3
S-240	Intermittent	2,447	Appendix D: Figure A-4; Pg. 12, 15
S-241	WWC	2,349	Appendix D: Figure A-4; Pg. 13, 14, 15
S-242	WWC	2,110	Appendix D: Figure A-4; Pg. 13, 14, 15
S-243[a]	Intermittent	0	Appendix D: Figure A-4; Pg. 15

(a) Due to their location completely outside of the Project Site, photographs of S-122 and S-243 are not included in Appendix C of the Wetland Delineation Report (Appendix D of this EA).



Project Site
Existing Weakley to Union City 161 kV Transmission Line
FEMA FIRM Panel
100-Year Floodplain (Zones A and AE)
Area of Minimal Flood Hazard (Zone X)

Delineated Features
WWC (Non-Jurisdictional)
Intermittent Stream
Perennial Stream
PFO Wetland
PEM Wetland
PUB Wetland

BURNS McDONNELL

Figure 3-3
FEMA Flood Hazard Map
Skyhawk Solar Project
Obion County, TN

Path: C:\Users\olhaney\Desktop\Projects\121610_SkyhawkSolar\GIS\MXDs\EA\Floodplain_Map.mxd olhaney 10/13/2020
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Source: Esri, Federal Emergency Management Agency (FEMA) National Flood Hazard Layer, TN Solar 1, LLC, Burns & McDonnell

Issued: 10/13/2020

Dominant vegetation in the PEM wetlands included rough barnyard grass (*Echinochloa muricata*), Quaker bittercress (*Cardamine pensylvanica*), fowl bluegrass (*Poa palustris*), spreading bent (*Agrostis stolonifera*), kidney-leaf buttercup (*Ranunculus abortivus*), fall panic grass (*Panicum dichotomiflorum*), tufted meadow-foxtail (*Alopecurus carolinianus*), wand panic grass (*Panicum virgatum*), golden groundsel (*Packera aurea*), Eurasian buttercup (*Ficaria verna*), common chickweed, and bog chickweed (*Stellaria alsine*). Wetland hydrology was indicated in PEM wetlands by surface water, high water table, saturation, drift deposits, water-stained leaves, aquatic fauna, oxidized rhizospheres on living roots, a sparsely vegetated concave surface, drainage patterns, crayfish burrows, a concave geomorphic position, and a positive FAC neutral test. Hydric soil was indicated by the presence of a depleted matrix.

Common vegetation around the PUB wetlands included crow garlic (*Allium vineale*), eastern daisy fleabane (*Erigeron annuus*), Kentucky bluegrass, rough cocklebur (*Xanthium strumarium*), rough barnyard grass, and Japanese bristle grass (*Setaria faberi*).

Vegetation in the PFO wetlands was dominated by willow oak (*Quercus phellos*), green ash, red maple, rough barnyard grass, fall panic grass, common rush (*Juncus effusus*), horsebriar (*Smilax rotundifolia*), and muscadine (*Vitis rotundifolia*). Wetland hydrology was indicated in the PFO wetlands by surface water, high water table, saturation, water-stained leaves, oxidized rhizospheres on living roots, a concave geomorphic position, and a positive FAC-neutral test. Hydric soil was indicated by the presence of a depleted matrix.

WWC's were characterized by a defined bed and bank, but they had limited flow during the site visit, indicating that these streams largely carry water only during and after precipitation events (See Appendix D for site forms). Ephemeral streams ranged from approximately 0.5 to 6 feet in width at the ordinary high-water mark (OHWM) with bank heights ranging from 0.25 to 3 feet. At the time of the delineation, water was observed at a depth of 1 inch to 8 inches. The substrates of the ephemeral streams were comprised of silt with limited gravel. These streams were in upland fields and agricultural fields. Riparian vegetation included species such as Kentucky bluegrass, fowl bluegrass, purple deadnettle, henbit, creeping bent, crow garlic, common chickweed, and agricultural corn stubble.

WWCs were determined based on Tennessee's Hydrologic Determination Field Data Sheet (Appendix D). Site conditions were slightly elevated in terms of seasonal precipitation, and more than an inch and a half of rainfall had been recorded at the adjacent airport during the week leading up to surveys. The hydrologic determination for WWC was prepared by a Qualified Hydrologic Professional using the TDEC-DWR Hydrological Determination Guidance per Rule 0400-4-03. Five WWCs were identified within the Solar Facility (TDEC 2020a).

Hydrologic determinations evaluate waterbodies based on primary and secondary indicators observed in the field. Primary indicators are typically conclusive evidence allowing for an immediate determination without further evaluation of secondary indicators. Primary indicators include; "Hydrologic feature exists solely due to a process discharge", "Defined bed and bank absent, vegetation dominated by upland and FACU species", "Watercourse dry anytime during February through April 15th, under normal precipitation/groundwater conditions", "Daily flow and precipitation records showing feature only flows in direct response to rainfall", "Presence of multiple populations of obligate lotic organisms with greater than

or equal 2 months aquatic phase", "Presence of fish (except Gambusia)", "Presence of naturally occurring ground water table connections", "Flowing water in channel 7 days since last precipitation >0.1 inch in local watershed", and "Evidence watercourse has been used as a supply of drinking water".

Scoring reflects the persistence of water, with intermittent and perennial streams typically scoring higher scores. The evaluation scale is a four–tiered weighted scale scoring process in which each indicator mentioned above addresses the natural variability of stream channels. The scores, "absent", "weak", "moderate", and "strong" are applied to sets of geomorphic, hydrologic, and biological indicators. The score given to an indicator reflects the observations from the evaluator for the average degree of development of the indicator along the particular channel under evaluation. Sample reaches should include the channel accessible to the investigator that is applicable to the project goals or area of potential impact. Preferably, reaches of 200 feet long if possible, are most preferred for accurate scoring. It is the intention of the scoring categories to allow the evaluator to make a more precise description when assessing variable features or attributes than simple "presence/absence". Additionally, the small increments in scoring between gradations should help reduce the range in scores between different evaluators. The score ranges were developed to more accurately assess gradual and variable transitions of streams from ephemeral to intermittent.

Intermittent streams were characterized by the presence of a limited volume of flow at the time of the site visit. This is a likely indicator that the stream is partially influenced by groundwater, but it may not flow during dry periods. Intermittent streams were 1 to 7 feet in width at the OHWM with bank heights ranging from 0.75 to 7 feet. At the time of the delineation, water was observed at a depth of 2 inches to 1.5 feet. The substrates of intermittent streams were comprised of silt with limited gravel. These streams flowed through upland fields, agricultural fields, and wooded riparian areas. Common riparian vegetation included species such as Kentucky bluegrass, fowl bluegrass, henbit, purple deadnettle, golden groundsel, common chickweed, Quaker bittercress, Carolina cranesbill, and kidney-leaf buttercup.

Perennial streams were characterized by the presence of a substantial volume of flow at the time of the site visit as well as secondary characteristics such as observance of fish and rooted aquatic fauna, indicating that water flows year-round. Perennial streams were approximately 5 to 30 feet in width at the OHWM with bank heights ranging from 2 to 16 feet. At the time of the delineation, the depth of water observed was 0.5 to 10 feet. The substrates of the perennial streams were likely comprised of silt, gravel, and cobble, although this could not be confirmed at all streams due to turbidity. Perennial streams flowed through upland fields, agricultural fields, and wooded riparian areas. Common riparian vegetation included Kentucky bluegrass, fowl bluegrass, rough cocklebur, golden groundsel, Quaker bittercress, henbit, purple deadnettle, Japanese honeysuckle, green ash, willow oak, and American sycamore (*Platanus occidentalis*) (Burns and McDonnell 2020a).

Stormwater drainage surrounding the Project Site is provided through a system of open drainage ditches and culverts, some of which were classified in the field as intermittent or perennial. Most of the stream channels identified are secondary tributaries to North Fork Obion River, with a smaller portion contributing in the south to Cypress Creek. The largest of the streams originates at the Everett-Stewart Airport and flows along the entirety of the north and west borders of County PV 98 parcel, providing a tributary to North Fork

Obion River. The North Fork Obion River approaches the Project Site at its closest point 0.3 miles northwest of the County PV 98 parcel.

The tributaries are not assessed by TDEC for impairment; however, the North Fork and Cypress Creek are both listed as impaired (TDEC 2019). The segment of North Fork Obion River nearest the Project Site is impaired by *Escherichia coli*, habitat alteration, and siltation from channelization and crop production. Approximately 12 miles of Cypress Creek are impaired by E. coli, habitat alteration, and total nutrients. Total Maximum Daily Loads (TMDLs) for E. coli in the North Fork Obion River and Cypress Creek were revised in 2019 (TDEC, 2019).

The Project Site is currently used for agricultural purposes and is not subject to any individual NPDES permits. However, one industrial facility – Southern Machinery Repair, Inc. – located between the Dowdy PV 20 and Moore PV 75 parcels is exempted from a Tennessee Stormwater Multi-Sector General Permit (TMSP) by certifying No Exposure of stormwater to industrial materials and activities (Permit TNR058736). One additional meat byproducts and processing facility, Darling Ingredients, Inc., less than 0.5-mile north of the County PV 498 parcel, has an active minor NPDES individual permit (Permit TN0000931) for discharge to the North Fork.

Transmission Upgrades

The Transmission ROW is within HUCs 08010202 and 08010203 (USEPA 2020c; USGS 2020c). A wetland delineation was completed March 2 through March 4, 2020, April 13 through April 21, 2020, and June 22 and June 23, 2020, for the Transmission ROW portion of the Project. Burns & McDonnell wetland scientists identified 16 wetlands and 29 streams within the Transmission ROW. Factors considered to determine jurisdictional waters of the U.S. included criteria defined under the recent April 21, 2020 publication of The Navigable Waters Protection Rule: Definition of "Waters of the United States". Surface water locations along the existing Transmission ROW are depicted in Appendix B.

Dominant vegetation in the PEM wetlands generally included fox sedge (*Carex vulpinoidea*), blunt broom sedge (*Carex tribuloides*), upright sedge (*Carex stricta*), shallow sedge (*Carex lurida*), creeping jenny (*Lysimachia nummularia*), slender spikerush (*Eleocharis tenuis*), marsh seedbox (*Ludwigia palustris*), and common rush. Wetland hydrology was indicated in PEM wetlands by surface water, high water table, saturation, water marks, sediment deposits, drift deposits, an algal mat or crust, inundation visible on aerial imagery, a sparsely vegetated concave surface, aquatic fauna, surface soil cracks, drainage patterns, crayfish burrows, a hydrogen sulfide odor, oxidized rhizospheres on living roots, saturation visible on aerial imagery, a concave geomorphic position, and a positive FAC neutral test. Soils were primarily dark grayish brown (10YR 4/2), grayish brown (10YR 5/2), and gray (10YR 5/1 and 10YR 6/1) in color and typically silt loam or silty clay loam in texture, with redoximorphic concentrations. Hydric soil was indicated by Hydrogen Sulfide, Loamy Gleyed Matrix, Depleted Matrix, or Redox Dark Surface.

Common vegetation around the PUB wetlands included little barley (*Hordeum pusillum*), butterweed (*Packera glabella*), annual bluegrass (*Poa annua*), hairy buttercup, and Japanese honeysuckle. The substrate was typically silt, and algae was often present within the wetlands.

One 0.03-acre PFO wetland was delineated within the survey corridor. Dominant vegetation in the PFO wetland included black willow (*Salix nigra*), sugarberry (*Celtis laevigata*), slippery elm (*Ulmus rubra*), and boxelder (*Acer negundo*). Wetland hydrology was indicated in the PFO wetland by surface water, a high water table, saturation, water marks, an algal mat or crust, water-stained leaves, oxidized rhizospheres on living roots, a concave geomorphic position, and a positive FAC neutral test. Soils were grayish brown (10YR 5/2) in color and silt loam in texture, with redoximorphic concentrations. Hydric soil was indicated by a depleted matrix.

Ephemeral streams ranged from approximately 0.75 to 2 feet in width at the OHWM with bank heights ranging from 0.25 to 3 feet. At the time of delineation, water was observed at a depth of 1 to 8 inches. The substrates of the ephemeral streams were comprised typically of silt. These streams flowed through upland fields, along roadsides, and within areas manipulated for stormwater runoff. Riparian vegetation included species such as purple deadnettle (*Lamium purpureum*), henbit deadnettle (*Lamium amplexicaule*), curly dock (*Rumex crispus*), Japanese honeysuckle, Canada goldenrod, and beaked cornsalad.

Intermittent streams were characterized by the presence of a limited volume of flow at the time of the site visit. This is a likely indicator that the stream is partially influenced by groundwater, but it may not flow during dry periods. Intermittent streams ranged from approximately 0.5 to 5 feet in width at the OHWM with bank heights ranging from 1 to 20 feet. At the time of delineation, water was observed at a depth of 0.25 to 1 foot. The substrates of intermittent streams were comprised of silt and/or gravel. These streams flowed through upland fields, along roadsides, and within maintained utility line ROW. Common riparian vegetation included species such as purple deadnettle, henbit deadnettle, Japanese honeysuckle, butterweed, beaked cornsalad, Canada goldenrod, boxelder, multiflora rose (*Rosa multiflora*), stinging nettle (*Urtica dioica*), and pale dock (*Rumex altissimus*)

Perennial streams, including Grove Creek, Cane Creek, and North Fork Obion River were characterized by the presence of a substantial volume of flow at the time of the site visit as well as secondary characteristics such as observance of fish and other aquatic fauna, indicating that water flows year-round. Perennial streams were approximately 3.5 to 140 feet in width at the OHWM with bank heights ranging from 2 to 25 feet. At the time of delineation, water was observed at a depth of 0.5 to 2.5 feet. The depth of S-215 (North Fork Obion River) could not be estimated during field survey due to the size of the stream, flowrate, and turbidity of the water. The substrates of perennial streams were typically comprised of silt, gravel, and cobble, although this could not be confirmed at all streams due to turbidity. These streams typically flowed through clearings of wooded riparian areas. Common riparian vegetation included boxelder, purple deadnettle, henbit deadnettle, Japanese honeysuckle, butterweed, Canada goldenrod, beaked cornsalad, multiflora rose, pale dock, great ragweed (*Ambrosia trifida*), and Virginia wildrye (*Elymus virginicus*) (Burns and McDonnell 2020b).

3.3.1.3 Floodplains

Floodplains are geographic areas that FEMA has defined according to varying levels of flood risk and type of flooding. The area subject to a one-percent chance of flooding in any given year is normally called the 100-year floodplain. The area subject to a 0.2-percent chance of flooding in any given year is normally called the 500-year floodplain. It is necessary to evaluate development in floodplains to ensure that the Project is consistent with the requirements of Executive Order (EO) 11988, Floodplain Management. The

northern and western areas of the Project Site are located within the FEMA-designated 100-Year Floodplain (Zone A/AE). Further, in the northwestern corner, a FEMA Regulatory Floodway exists where permanent aboveground structures should be discouraged.

Maps developed by FEMA show the likelihood of flooding in particular areas and help determine eligibility for the National Flood Insurance Program (NFIP). The purpose of the NFIP is to reduce impacts from flooding to private and public structures by supporting community level regulations to mitigate the effects of flooding to structures. Obion County participates in the NFIP. EO 11988, Floodplain Management, requires federal agencies to "avoid to the extent practicable the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative…"

Solar Facility

The Project would be located between North Fork Obion River miles 8.0 to 11.6. One FEMA-designated floodplain associated with the North Fork Obion River Obion County, Tennessee, Flood Insurance Rate Map (FIRM) (Panels 47131C0219C, 47131C0240C, and 47131C0400C, all with an effective date of January 13, 2010) is located on the Project Site (FEMA 2020). The floodplain is designated as Zone A (areas with a one percent annual chance of a flood event and no base flood elevations or flood depths have been determined). Floodplain areas are located in the southwestern and northeastern portions of the Project Site, as shown in Figure 3-3. The total acreage of land within the Project Site that is designated as a FEMA floodplain is approximately 392 acres (56 percent).

Transmission ROW

Three FEMA designated floodplains associated with North Fork Obion River, Cypress Creek, and Cane Creek FIRM Panels 47131C0216C, 47131C0217C, 47131C0219C, 4783C0100D, 47131C0240C, 4783C0200D, 47131C0400C, 47183C018D, 4718C0182D, 47183C0185D, 47183C0184D, 47183C0203D, 47183C0215D, and 47183C0215D with an effective date of January 13, 2019, for Obion County, TN FIRM Panels, and November 5, 2008, for Weakley County, TN FIRM Panels are located on the Project Site. The floodplains are designated as Zone A and Zone AE (areas with a one percent annual chance of a flood event where base flood elevations or flood depths have been determined) and are located at a variety of points along the Transmission ROW, depicted in Appendix B. The total acreage of land within the Transmission ROW that is designated as a FEMA floodplain is approximately 16.4 acres (24 percent). Additionally, approximately 0.6 acres (one percent) is within a regulated floodway. However, only 25 small workspaces associated with pole replacements would actually occur within the floodplain.

3.3.2 Environmental Consequences

3.3.2.1 No Action Alternative

Under the No Action Alternative, the proposed Solar Facility would not be constructed; therefore, no project-related impacts on water resources would occur. Existing land use would remain as farmland, and surface waters would remain as they are at the present time. Increases in erosion and sediment runoff could occur over time if best-practices in agriculture were not maintained to prevent erosion and runoff. In addition, if broad applications of chemical fertilizers or pesticides are continually used, it could result in nutrient-rich runoff that degrades the quality of surface waters within the site and throughout the broader drainage basin.

3.3.2.2 Proposed Action

Under the Proposed Action, minor, short term, impacts from construction would be expected on streams, wetlands, and floodplains. Beneficial, indirect impacts to surface water and groundwater would result from a reduction in broad applications of pesticides, herbicides, and fertilizers used in support of the current agricultural land use activities. Additionally, water quality may be improved through filtering by native plant cover as opposed to crop cover which could reduce erosion and sedimentation from stormwater events.

Groundwater

Solar Facility

Direct adverse impacts to the supply and availability of groundwater are not anticipated with implementation of the Proposed Action. During construction, hazardous materials would be on-site that could potentially contaminate groundwater resources, including petroleum products for fuel and lubrication of construction equipment, hydraulic fluids, and a variety of other chemicals commonly used for general construction projects. Implementation of the Project SPCC Plan would minimize the potential for leaks or spills from construction equipment and outline procedures and protocols to quickly address potential spills that may occur. Pollution to groundwater from sedimentation could also occur during construction activities resulting from erosion prior to successful re-vegetation of the Project Site. Construction activities would be in accordance with BMPs outlined in TVA's *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities* (TVA, 2017b) to avoid contamination to groundwater. Broad application of fertilizers and herbicides are not proposed during construction or operation of the Project, which would be considered a direct long-term benefit to groundwater. However, if minor applications of fertilizer or herbicides are needed for initial re-vegetation or maintenance, applications would be in accordance with manufacturer's recommendations and would be short-term. Currently, most of the land proposed for use is actively cultivated cropland with frequent application of fertilizers, herbicides, and pesticides. Change in land use from agriculture to solar would therefore be a long-term beneficial impact to groundwater.

Water needed for construction would be provided from water delivery trucks. The construction contractor would use water for the purposes of fugitive dust mitigation (during dry conditions), concrete mixtures, and other temporary construction needs. Construction activities requiring water would primarily be used for dust control and compaction during grading activities for access road, pads, and foundations for structures.

Water usage within the Project Site would be in accordance with BMPs outlined in TVA's *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities.* Local rainfall is generally consistent enough to avoid the need for dust control on PV arrays. Therefore, regular panel washing is not anticipated. If there are water needs during the operation and maintenance phase of the Proposed Action, wells would be installed within the Solar Facility. The water volume would be small compared to irrigation quantities; therefore, impacts to groundwater resources would not be anticipated.

If the Solar Facility were to be decommissioned or closed, a Decommissioning and Closure Plan would be developed. The Decommissioning and Closure Plan would detail procedures to control erosion and

sedimentation and maintain compliance with NPDES requirements and permits. Water usage for potential decommissioning and closure is not likely to exceed that used for operation and maintenance. Therefore, impacts to groundwater resulting from a decommissioning and closure of the Solar Facility are not anticipated.

Overall, impacts to local aquifers and groundwater are not anticipated due to the limited volume of groundwater required for initial construction, operation and maintenance, or decommissioning and closure. Implementation of BMPs and a Decommissioning and Closure Plan would reduce the potential for hazardous materials to reach groundwater resources during any stage of the Project.

Additionally, minor, indirect beneficial impacts to groundwater could occur from the discontinued use of broad applications of herbicides, pesticides, and fertilizers, due to change in land use from agriculture to solar.

Transmission Upgrades

Construction activities associated with transmission upgrades could result in temporary impacts on groundwater quality during installation of new and replacement poles. Pole holes would be shallow, ranging from 10 – 15 feet deep, which could impact groundwater in certain areas. Impacts would be temporary with some sedimentation possible during augering and pole placement. Groundwater quality is anticipated to return to pre-construction conditions within 24 hours of installation.

Surface Water

Solar Facility

Construction and operation of the Skyhawk Solar Facility would not affect jurisdictional streams or wetlands. During all stages of the design process, efforts have been made to avoid impacts to jurisdictional wetlands and waterbodies to the greatest extent practicable. Although intermittent and perennial streams were identified along the perimeter of some of the agricultural fields within the Project Site, these streams would not be modified from their current condition, and riparian buffers would be maintained.

The layout of PV panels, access roads, inverters, AC collection lines, and other appurtenant project components have not been finalized. TN Solar would design the final layout so that panel placement would avoid impacts on jurisdictional streams or wetlands. With implementation of BMPs and permit requirements to control erosion and sediment runoff, temporary impacts to streams would also be minimized. The Proposed Action would result in no adverse temporary or permanent impacts to jurisdictional streams or wetlands. There is potential for short- and long-term beneficial impacts on streams within the Project Site due to the reduction in annual agricultural activities and applications of pesticides and fertilizers within the Project Site.

There would be numerous WWCs within the Solar Facility that could be impacted during construction and operation of the Project. These WWCs would be included and accounted for in the SWPPP submittal as part of the NPDES permit.

There were no sinkholes observed within the Project Site; therefore, the potential for direct surface to groundwater contamination from stormwater, or chemical and solid waste runoff is not anticipated. Broad

applications of herbicide and pesticide application are not expected to be used during construction or operation of the Project. However, if pesticide or herbicide would be required at any point during construction or maintenance activities, all herbicides would be applied under the supervision of a licensed applicator in accordance with applicable state and federal laws and regulations. Proper application of herbicides and pesticides, if needed, may result in minor impacts to surface water but would be significantly less than applications from current land use.

Transmission Upgrades

Due to location and easement constraints, complete avoidance of impacts to jurisdictional water features and WWCs was not practicable for the structural upgrades required along TVA's Transmission ROW. Of the 16 wetlands and 29 streams identified along the 100-foot-wide survey corridor, construction of the upgrades and use of access roads could temporarily affect up to 10 intermittent streams, up to 3 perennial streams, up to 8 WWCs, up to 9 PEM wetlands, and 1 PUB wetland (totaling approximately 1.5 acres of wetlands). During all stages of the design process, efforts have been made to avoid and minimize impacts to jurisdictional wetlands and waterbodies to the greatest extent practicable. TVA is subject to E.O. 11990, Protection of Wetlands. Under the Proposed Action, impacts to jurisdictional wetlands are anticipated to be minor and temporary. Therefore, the Proposed Action is consistent with the requirements of E.O. 11990. The table below provides a list of jurisdictional water resources located within the temporary workspace (TWS) of the Transmission ROW

Table 3-7: Wetlands Affected by Construction of Structural Improvements along the Existing TVA Transmission ROW

Resource ID	Type	Impact Description [a/]	Total Area of Impact (ft^2)	Access Road ID	Structure ID
W-121	PUB	Access Road Crossing	7,149	ARTVA_OB_115756	-
W-201	PEM	TWS & Access Road Crossing	10,703	ARTVA_OB_115714	156
W-208	PEM	TWS	529	-	132
W-209	PEM	TWS	1,408	-	131
W-210	PEM	TWS & Access Road Crossing	4,479	ARTVA_OB_115730	131
W-226	PEM	TWS & Access Road Crossing	3,982	ARTVA_WE_115743	75
W-229	PEM	Access Road Crossing	115	ARTVA_WE_115744	-
W-241	PEM	Access Road Crossing	224	ARTVA_WE_115761	-
W-242	PEM	TWS & Access Road Crossing	36,755	ARTVA_WE_115761	3S, 3R
Temporary Wetland Impacts			**65,343**		
a/ TWS = temporary workspace for structural improvements within the existing Transmission ROW					

Table 3-8: Streams Affected by Construction of Structural Improvements along the Existing TVA Transmission ROW

Resource ID	Type	Crossing width (feet)[a/]	Impact Description[b/]	Total Area of Impact (ft^2)	Access Road #	Structure ID
S-116	Perennial	6	TWS	475	-	114
S-203	Intermittent	12	TWS	394	-	151
S-204	Intermittent	15	TWS	199	-	149
S-205	Intermittent	5	Access Road Crossing	1	ARTVA_OB_115727	-
S-206	Intermittent	3.5	TWS	41	-	138
S-207	Intermittent	4	TWS	120	-	136
S-212	Perennial	14	TWS	574	-	131
S-214	Perennial	20	TWS	672	-	130
S-222	Intermittent	8	TWS	464	-	69
S-229	Intermittent	3	TWS & Access Road Crossing	510	ARTVA_WE_115761	3U
S-231	Intermittent	12	TWS	543	-	3M, 3L
S-235	Intermittent	3.5	Access Road Crossing	27	ARTVA_WE_115710	-
S-301	Intermittent	8	Access Road Crossing	120	ARTVA_WE_115731	-
Temporary Stream Impacts				**4,140**		

a/ Crossing width is reporting as the width of top of bank for stream crossings
b/ TWS = temporary workspace for structural improvements within the existing Transmission ROW

Floodplains

As a federal agency, TVA adheres to the requirements of EO 11988, Floodplain Management. The objective of EO 11988 is "… to avoid to the extent practicable the long- and short term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative…" The EO is not intended to prohibit floodplain development in all cases, but rather to create a consistent government policy against such development under most circumstances (United States 1978). The EO requires that agencies avoid the 100-year floodplain unless there is no practicable alternative.

Solar Facility

Approximately 392 acres of floodplain were identified within the Project Site. The Skyhawk Substation and Skyhawk Switching Station would be located outside of the 100-year floodplain. Project components, such as buried collection lines, about half the PV panels, security fencing, and portions of the overhead wire may occur within the 100-year floodplain, which is currently utilized for active agricultural operations. As part of a Drainage Report, TN Solar performed a hydrology study for the Project Site (Appendix F). Based on the results of the hydrology study, one parcel that was originally considered for the Solar Facility was removed from further considering due to the calculated base flood elevation (BFE). Although portions

of the currently proposed Solar Facility would fall within the floodplain, the BFE was significantly lower. Based on consultations with the Obion County Floodplain Administrator, TN Solar will provide site layout drawings and confirmation that the panels would be at least one foot above the BFE for all areas within the floodplain.

Consistent with EO 11988, the installation of underground electric lines and fencing are considered to be repetitive actions in the 100-year floodplain, which would result in minor impacts (TVA 1981). The Project would have no significant long-term impact on floodplains or their natural and beneficial values. Figure 3-3 depicts the Project Layout compared to floodplains within the Project Site. TN Solar, or its construction contractor, would monitor the weather forecasts during construction. If a heavy rain event were predicted, special precautions would be made within the floodplain to minimize impacts. Such precautions may include, but are not limited to, removing large construction equipment from the floodplain, temporary stabilization measures where soils are exposed, and maintaining any soil stockpiles outside the boundaries of the floodplain. Once in operation, the support structures would not impede floodplains or floodwaters. No adverse impacts are anticipated within the Project Site or upstream from the Project Site as a result of operation of the Solar Facility.

Transmission ROW

The support structures for the transmission line would not be expected to result in any increase in flood hazard, either as a result of increased flood elevations or changes in flow-carrying capacity of the streams being crossed. Construction in the floodplain would be consistent with EO 11988 provided the TVA subclass review criteria for transmission line location in floodplains are followed. The table below provides a list of structures and access roads associated with transmission upgrade construction that would occur within a floodplain. Floodplain mapping is provided in Appendix B. The table below provides a list of pole replacements that would occur within a floodplain.

Table 3-9: Workspaces associated with the Transmission Upgrades that would occur with the FEMA Floodplain

Structure ID	Floodplain	Impact Description [b/]	Total Area of Impact
24	Cane Creek	TWS	0.18 acre
25	Cane Creek	TWS	0.18 acre
34	Cane Creek	TWS	0.18 acre
36	Cane Creek	TWS	0.18 acre
36*	Cane Creek Regulated Floodway	TWS	0.18 acre
37	Cane Creek	TWS	0.18 acre
76	Cypress Creek	TWS	0.18 acre
77	Cypress Creek	TWS	0.18 acre
78	Cypress Creek	TWS	0.18 acre
79	Cypress Creek	TWS	0.18 acre
80	Cypress Creek	TWS	0.18 acre
106	North Fork Obion River	TWS	0.18 acre
112	North Fork Obion River	TWS	0.18 acre
114	North Fork Obion River	TWS	0.18 acre
116	North Fork Obion River	TWS	0.18 acre
125	North Fork Obion River	TWS	0.18 acre
127	North Fork Obion River	TWS	0.18 acre
129	North Fork Obion River	TWS	0.18 acre
130	North Fork Obion River	TWS	0.18 acre
131	North Fork Obion River	TWS	0.18 acre
136	North Fork Obion River	TWS	0.18 acre
151	North Fork Obion River	TWS	0.18 acre
154	North Fork Obion River	TWS	0.18 acre
155	North Fork Obion River	TWS	0.18 acre
156	North Fork Obion River	TWS	0.18 acre
Total Temporary Impacts within Floodplains			4.5 acres

Consistent with EO 11988, roads are considered to be repetitive actions in the 100-year floodplain that should result in minor impacts. To minimize adverse impacts, any road improvements would be done in such a manner that upstream flood elevations would not be increased by more than 1.0 foot.

Portions of access roads as well as entire access roads associated with the Transmission Upgrades would be located within the 100-year floodway of Cane Creek, Cypress Creek, and North Fork Obion River, as shown in Appendix B. The table below provides a list of access roads that would occur within floodplains.

Table 3-10: Access Roads associated with the Transmission Upgrades that would occur with the FEMA Floodplain

Temporary Access Road ID	Floodplain	Access Road Length w/in Floodplain (ft)	Total Area of Temporary Impact (ft^2)
ARTVA_OB_115728_	North Fork Obion River	180	2,700
ARTVA_OB_115756_	North Fork Obion River	822	12,300
ARTVA_OB_4851	North Fork Obion River	1,856	27,840
ARTVA_OB_4854	North Fork Obion River	4,498	67,470
ARTVA_OB_4857	North Fork Obion River	2,153	2,295
ARTVA_OB_115714	North Fork Obion River	131	1,965
ARTVA_OB_115715_	North Fork Obion River	1,826	27,390
ARTVA_OB_115719_	North Fork Obion River	1,516	22,740
ARTVA_OB_115720_	North Fork Obion River	210	3,150
ARTVA_OB_115730_	North Fork Obion River	337	5,055
ARTVA_OB_115736	North Fork Obion River	1,258	18,870
ARTVA_OB_115746_	North Fork Obion River	1,201	18,015
ARTVA_OB_115751_	North Fork Obion River	220	3,300
ARTVA_WE_115731_	Cypress Creek	3,295	49,425
ARTVA_WE_115743_	Cypress Creek	400	6,000
ARTVA_WE_115712_	Cane Creek	19	285
ARTVA_WE_115724	Cane Creek	230	3,450
ARTVA_WE_115739	Cane Creek	81	1,215
ARTVA_WE_115741	Cane Creek	245	3,675
ARTVA_WE_115744	Cane Creek	854	12,810
Temporary Impacts within Floodplains			**289,950 (6.7 acres)**

Obion and Weakley Counties participate in the National Flood Insurance Program, and any development must be consistent with its/their floodplain regulations. To prevent an obstruction in the floodway: (1) any fill, gravel or other modifications in the floodway that extend above the pre-construction road grade would be removed after completion of the project; (2) this excess material would be spoiled outside of the published floodway; and (3) the area would be returned to its pre-construction condition.

By implementing the following mitigation measures, the proposed TL and access roads would have no significant impact on floodplains and their natural and beneficial values:

1. Any fill, gravel or other modifications in the Cane Creek regulated floodway that extend above the pre-construction road grade will be removed after completion of the project.
2. This excess material would be spoiled outside of the published floodway.
3. The area will be returned to its pre-construction condition immediately following site restoration.
4. Standard BMPs would be used during construction activities.

5. Road construction other than within the Cane Creek floodway would be done in such a manner that upstream flood elevations would not be increased by more than 1.0 foot.
6. Construction would adhere to the TVA subclass review criteria for transmission line location in floodplains.

3.4 Biological Resources

3.4.1 Affected Environment

This section provides an overview of existing biological resources in the Project Site and Transmission ROW, and the potential impacts to biological resources resulting from implementation of the Proposed Action and the No Action Alternatives. Biological resources that are discussed in detail include vegetation, wildlife, and rare, threatened, and endangered species. Unless otherwise cited, information for this section has been summarized from the Skyhawk Solar Project Wetland Delineation Reports and the Skyhawk Solar Project Protected Species Report (Burns and McDonnell 2020a, Burns and McDonnell 2020b, Burns and McDonnell 2020c.)

3.4.1.1 Vegetation

Solar Facility

The Project Site is primarily composed of upland field, fallow agricultural field, typically planted with corn (*Zea mays*) and soybean (*Glycine max*) crops, and limited woodland. Typical vegetation in the upland portions of the Project Site included henbit, purple deadnettle (*Lamium purpureum*), Kentucky bluegrass, fowl bluegrass, spreading bent, common chickweed (*Stellaria media*), Japanese honeysuckle (*Lonicera japonica*), Carolina cranesbill (*Geranium carolinianum*), American pokeweed (*Phytolacca americana*), red maple (*Acer rubrum*), green ash (*Fraxinus pensylvanica*), and sweetgum (*Liquidambar styraciflua*).

Transmission Upgrades

The Transmission ROW is primarily composed of upland fallow field, wooded riparian areas, and maintained utility line ROW. Typical vegetation in the upland portions of the Survey Area included Japanese honeysuckle, annual bluegrass, Kentucky bluegrass, Canada goldenrod (*Solidago altissima*), narrowleaf plantain (*Plantago lanceolata*), hairy buttercup, and beaked cornsalad (*Valerianella radiata*).

Dominant vegetation in the PEM wetlands generally included fox sedge, blunt broom sedge, upright sedge, shallow sedge, creeping jenny (*Lysimachia nummularia*), slender spikerush (*Eleocharis tenuis*), marsh seedbox, and lamp rush. Common vegetation around the approximately 0.90-acre PUB wetlands included little barley, butterweed, annual bluegrass, hairy buttercup, and Japanese honeysuckle. Dominant vegetation in the PFO wetland included black willow, sugarberry, slippery elm, and boxelder.

3.4.1.2 Wildlife

Wildlife occurring within the Project Site and Transmission ROW includes mammals, reptiles, and birds commonly native to all areas in the state of Tennessee. Edge species and species associated with active agriculture and old field habitats include rodents and other small mammals, deer, turkey, songbirds, and raptors.

Mammals commonly found throughout Tennessee include coyotes (*Canis latrans*), white-tailed deer (*Odocoileus virginianus*), gray fox (*Urocyon cinereoargenteus*), otters (*Lontra canadensis*), beavers (*Castor canadensis*), skunks (*Mephitis mephitis*), opossums (*Didelphis virginiana*), racoons (*Procyon lotor*), squirrels (*Sciurus* spp.), bobcat (*Lynx rufus*), and armadillos (*Dasypus novemcinctus*) (USFWS 2014). During field surveys for protected species and habitat assessments, evidence of deer, raccoon, squirrel, opossum, and armadillo were physically observed and generally confined to the forested areas.

Reptiles and amphibians commonly found in the region include a variety of turtles, lizards, frogs, and snakes. Fence lizards (*Sceloperus* spp.), five-lined skinks (*Plesitiodon fasciatus*), and broad-headed skink (*Plestiodon laticeps*) are commonly observed lizards. Gray tree frog (*Hyla versicolor*), cricket frog (*Acris gryllus*), green tree frog (*Hyla cinerea*), bullfrog (*Lithobates catesbeianus*), American toad (*Anaxyrus americanus*), eastern spadefoot toad (*Scaphiopus holbrookii*), marbled salamander (*Ambystoma opacum*), and spotted salamander (*Ambystoma maculatum*) are often observed in the region. Non-venomous snakes include garter snake *(Thamnophis sirtalis*), black king snake and speckled kingsnake (*Lampropeltis spp*.), rat snake (*Pantherophis* spp.), and water snake (*Nerodia* spp.), while venomous species include cottonmouth (*Agkistrodon piscivorus*), copperhead (*Agkistrodon contortrix*), pygmy rattlesnake (*Sistrurus miliarius*), and timber rattlesnake (*Crotalus horridus*). A speckled kingsnake was observed during field surveys near the ROW.

Birds common to the region include mourning dove (*Zenaida macroura*), blue jay (*Cyanocitta cristata*), American crow (*Corvus brachyrhynchos*), barn swallow (*Hirundo rustica*), Carolina wren (*Thyrothorus ludovicianus*), eastern bluebird (*Sialia sialis*), American robin (*Turdus migratorius*), European starling (*Sturnus vulgaris*), northern cardinal (*Cardinalis cardinalis*), field sparrow (*Spizella pusilla*), indigo bunting (*Passerina cyanea*), red-tailed hawk (*Buteo jamaicensis*), black vulture (*Coragyps atratus*), and turkey vulture (*Cathartes aura*) (TWRA 2020). Observations of red-tailed hawk, indigo bunting, American crow, northern cardinal, mourning dove, and black vulture were made during field surveys at both Solar Facility and Transmission ROW portions of the Project.

Surveys for protected species and habitat assessments were conducted March 2-4 and April 16-20, 2020. The entire Project Site was surveyed simultaneously during the wetland delineation survey. In addition to the habitat assessment, detailed vegetative communities were described. Areas within the Project Site that are not currently used for agriculture would provide suitable habitat for wildlife common to the region both seasonally and year-round.

3.4.1.3 Threatened, Endangered, and Rare Species

Federally Listed Species

A review of the USFWS threatened and endangered species list identified one federally threatened and one federally endangered species that have the potential to occur within the Project Site (USFWS, 2020a, USFWS, 2020b). No protected species or suitable habitat were observed within the Project Site. Refer to the table below for the list of species protected under the Endangered Species Act, their protection classification, their listing status, a summary of their habitat requirements, their potential for occurrence within the Survey Area, and the effects determination for each species.

Table 3-11: Federally Listed Species Potentially Occurring in the Project Area, Obion and Weakley Counties, Tennessee

Common Name (Scientific Name)	Status[a]	County	Range and/or Habitat Requirements	Potential to Occur within Project Site	Effects Determination
Indiana Bat (*Myotis sodalis*)	E	Obion, Weakley	Hibernation/winter habitat includes cool, humid caves where temperatures are consistently between 50- and 32-degrees Fahrenheit. Roosting and foraging habitat includes wooded areas with dead trees or trees containing exfoliating bark. Forging habitat also includes wetlands and streams.	Unlikely to Occur	No effect
Northern Long-eared Bat (NLEB) (*Myotis septentrionalis*)	T	Obion, Weakley	Hibernation/winter habitat includes cool, humid caves. Roosting and foraging habitat includes wooded areas with dead trees or trees containing exfoliating bark. Rarely, NLEB can roost in man-made structures. Forging habitat also includes wetlands and streams.	Unlikely to Occur	No effect

Source: USFWS 2020a and USFWS 2020b.

(a) Status as designated by the Endangered Species Act: E – Endangered, T – Threatened

Indiana Bat and Northern Long-eared Bat

These species hibernate during winters in cool, humid caves where temperatures are consistently between 50- and 32-degrees Fahrenheit. After hibernation, Indiana bats and northern long-eared bats typically inhabit wooded areas and roost under exfoliating bark of dead or dying trees.

Indiana bat roosting habitat is defined as forest patches with trees of 5-inch (12.7 cm) diameter at breast height (dbh) or larger. However, early successional habitat with small diameter trees (3 – 5-inch dbh) may be used as foraging habitat by Indiana bats (USFWS 2019).

Suitable summer habitat for the Northern long-eared bat consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields, and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags ≥3 inches dbh that have exfoliating bark, cracks, crevices, and/or cavities), as well as linear features such as fencerows, riparian forests, and other wooded corridors (USFWS 2019). Rarely, northern long-eared bats roost in man-made structures such as barns or sheds. Forested edges provide foraging habitat for these species (USFWS 2020a; USFWS 2020b).

Solar Facility

Habitat assessments for the solar facility were conducted March 2-4, 2020 following Range-Wide Indiana Bat Survey Guidance (USFWS 2020). No areas suitable for summer roosting were observed during the

surveys. Additionally, no caves or other structures were observed during the surveys that would provide suitable winter hibernacula for bats. Thin tree lines bordering some parcel boundaries and stream riparian areas along wetland and waterbodies that could potentially provide marginal foraging habitat were observed during surveys. To the extent practicable, forested areas at the Project Site will remain as riparian and visual buffers. Some trees may be trimmed or removed if it is determined that they will interfere with operation of the Solar Facility (less than one acre). TN Solar would leave mature trees in place to the greatest extent practicable.

Transmission Upgrades

Habitat assessments for the transmission upgrades were conducted April 16-21, 2020 following Range-Wide Indiana Bat Survey Guidance (USFWS 2020). The areas where transmission upgrades are proposed are entirely within an existing maintained ROW. Proposed access roads for the upgrades are also within existing roads or agricultural fields. No areas suitable for summer roosting were observed during the surveys. Additionally, no caves or other structures were observed during the surveys that would provide suitable winter hibernacula for bats. The early successional and herbaceous habitat within the ROW may provide foraging habitat for bats. Forested areas adjacent to the ROW that could potentially provide summer roosting habitat and foraging habitat were observed during surveys. Surveys were not conducted outside of the ROW to specifically identify the presence of potentially suitable trees. No tree removal or trimming would be required for construction or access roads of transmission upgrades associated with the Project.

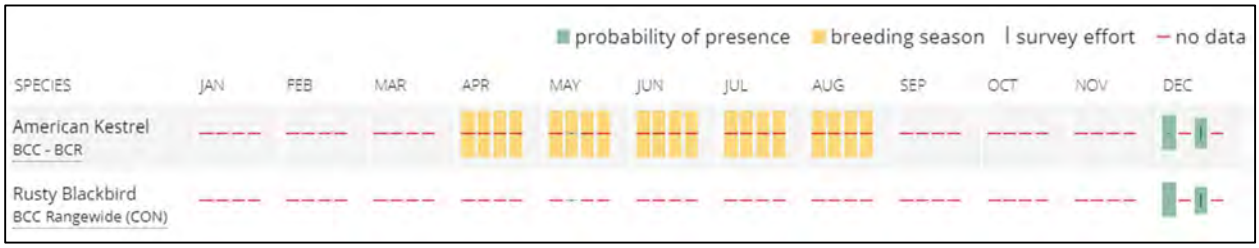
Critical Habitat. No designated critical habitat for federally listed threatened and endangered species was identified within the Project Site (USFWS 2020a, USFWS 2020b).

Bald Eagles and Migratory Birds

In Tennessee, the bald eagle is protected under the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Protection Act (MBTA). No bald eagles or nests were observed during the environmental field surveys within the Survey Areas for the solar facility, transmission upgrades, or along public roadways near the Project. Structures within and adjacent to the existing TVA ROW were surveyed for bald eagle nests. Additionally, no large bodies of water that would supply a sufficient food source for bald eagles was present in or adjacent to the solar facility or TVA ROW.

In the USFWS IPaC Report for the Project Site (USFWS 2020a,2020b), two Birds of Conservation Concern (BCC) were identified as having the potential to occur in the project action area [American Kestrel (*Falco sparverius*) and rusty blackbird (*Euphagus carolinus*)]. American kestrels prefer habitat that provides open areas with short vegetation such as meadows, deserts, grasslands, parks, and farm fields (Cornell University 2019a). Foraging habitat for American kestrel is present throughout the Project Site at both the Solar Facility and TVA ROW. Rusty blackbirds breed in wet forests with areas such as swamps, bogs, fens, and beaver ponds (Cornell University 2019b). No suitable habitat is present for rusty blackbird at the Solar Facility site or TVA ROW. Table 3-12 provides additional details regarding these BCCs (USFWS 2020a, USFWS 2020b).

Table 3-12: Birds of Conservation Concern Potentially Occurring in the Project Area



State Listed Species

A review of TDEC's Department of Natural Areas (DNA) threatened and endangered species list identified six threatened, three endangered, and eight species of special concern that have the potential to occur in Obion and Weakley Counties (TDEC, 2020b). Refer to the table below for the list of species, their protection classification, their listing status, a summary of their habitat requirements, their potential for occurrence within the Project Area.

Additionally, a review was conducted of TVA's Regional Natural Heritage Database (RHND) of federally and state listed species potentially occurring in the county and/or within resources-defined radii of the Project Site or generally listed for the county. Two species "deemed in need of management" within 10-miles, one state endangered plant within 5-miles, and five reports for bald eagle nests within the county. Species deemed *in need of management* were both historical records of a northern madtom collected in 1973 within 10-miles, and meadow jumping mouse collected in 1979 within 3-miles of the Project Site. The database also indicated a historical record of the state endangered Harbison's Hawthorn within 5-miles of the Project Site collected in 1943. Of the five reports of bald eagle nests in Obion County, three were historical and two were extent, but have not been verified for viability since mid-1990's.

Table 3-13: State Listed Species Potentially Occurring in the Project Area in Obion and Weakley Counties, Tennessee

Common Name (Scientific Name)	Status (a)(b)	County	Range and/or Habitat Requirements	Potential to Occur within Project Site
Lake Cress (*Neobeckia aquatica*)	S	Obion	Gum of cypress swamps	Does Not Occur
Harbison's Hawthorn (*Crataegus harbisonii*)	E	Obion, Weakley	Dry rocky calcareous woods	Does Not Occur
Copper Iris (*Iris fulva*)	T	Obion	Bottomlands	Does Not Occur
Featherfoil (*Hottonia inflata*)	S	Obion	Wet sloughs and ditches	Unlikely to Occur
Ovate-leaved Arrowhead (*Sagittaria platyphylla*)	S	Obion	Swamps, emergent	Unlikely to Occur
Water-purslane (*Didiplis diandra*)	T	Obion	Swamps	Unlikely to Occur
Choke Cherry (*Prunus virginiana*)	S	Obion	Moist coves and slopes	Unlikely to Occur
Sweetscent Ladies'-tresses (*Spiranthes odorata*)	E	Obion	Swamp or pond margins	Unlikely to Occur
Nuttall's Waterweed (*Elodea nuttallii*)	S	Obion	Aquatic; streams and ponds	Unlikely to Occur
Yellow Water-crowfoot (*Ranunculus flabellaris*)	T	Obion	Ponds and Marshes	Unlikely to Occur
Bristly Sedge (Carex comosa)	T	Obion	Swamps	Unlikely to Occur
American Ginseng (*Panax quinquefolius*)	S-CE	Obion	Rich woods	Does Not Occur
Spinulose Shield Fern (*Dryopteris carthusiana*)	T	Weakley	Bogs	Does Not Occur
Naked-stem Sunflower (*Helianthus occidentalis*)	S	Weakley	Limestone glades and barrens	Does Not Occur
Red Turtlehead (Chelone obliqua)	S	Weakley	Alluvial swamps and wet woods	Does Not Occur
Hatchie Burrowing Crayfish (*Creaserinus hortoni*)	E	Weakley	Saturated or seasonally saturated soils associated with perennial bodies of water such as Mississippi River tributaries.	Unlikely to Occur
Bachman's Sparrow (*Peucaea aestivalis*)	E	Obion	Dry open pine or oak woods	Unlikely to Occur
Eastern Woodrat (*Neotoma floridana illinoensis*)	T	Obion	Wooded areas, ravines, flooplain forest, swamps and marshes	Unlikely to Occur

Source: Tennessee Department of Environment and Conservation, 2020
(a) State Agency or State Act that provides species protection: TDEC. (b)State Status Key: E – Endangered, T-Threatened, S – Special Concern,

3.4.2 Environmental Consequences

3.4.2.1 No Action Alternative

Under the No Action Alternative, the proposed Solar Facility would not be constructed and no project-related impacts to biological resources would occur. It is assumed that existing agriculture operations would continue, and undeveloped land would remain as is. There would be no change in vegetation, wildlife use, or impacts on protected species.

3.4.2.2 Proposed Action

Vegetation

Solar Facility

Under the Proposed Action, the Project would be constructed and put into service which would lead to the conversion of actively cultivated agricultural vegetation to native or noninvasive vegetation. Although shallow strips of mature trees exist along the perimeter of certain agricultural fields in the Project Site, no forested areas would need to be removed during construction of the Solar Facility. There are no forested areas, riparian buffers, or biologically sensitive areas within the Project Site that would provide suitable habitat to protected species.

During construction, grading and clearing activities would remove invasive species with mechanized clearing or selective herbicides as needed. Upon completion of construction, only native, non-invasive vegetation would be introduced to the Project as part of the revegetation strategy and would be in accordance with EO 13112. Seed selection for re-vegetation strategy would be developed to plant low-growing species in an effort to reduce the amount of maintenance required below the PV arrays. If the construction of the Project increases growth of invasive species, these effects would be reduced once the re-vegetation process is initiated and native and non-invasive species are established. Implementation of the Proposed Action would not significantly contribute to the introduction or spread of invasive species.

Riparian areas would remain intact at and around jurisdictional streams during construction to the greatest extent practicable. Tree removal is not anticipated for the development of the Solar Facility. The Proposed Action would result in the clearing of existing agricultural crops and old field vegetation. There are limited areas of native vegetation within the Project Site, and impacts would be temporary and minor during construction. Upon completion of construction, TN Solar would establish low-growing native species. The conversion of agricultural crops to native or noninvasive species would result in a long-term benefit to the vegetation community within the Project Site.

Transmission Upgrades

During upgrades to the existing TVA Transmission ROW, small, intermittent areas of herbaceous vegetation and crops may be cleared during construction activities and for access road improvements. The entire Transmission ROW is considered previously disturbed. Proposed access roads for transmission line upgrades are all existing TVA access roads or through active cropland. Proposed structural upgrade workspaces are all within the existing maintained easement, predominately comprised of actively cultivated cropland and open fields. Appendix B provides aerial mapping for the 16-mile Transmission ROW.

Direct impacts to herbaceous vegetation for structural upgrades would be temporary and negligible since all areas for this portion of the Project are either on existing access roads or TVA's existing maintained ROW. Once construction is complete, the area will be returned to its pre-construction conditions.

Wildlife

Solar Facility

TN Solar will install security fencing around the perimeter of the Solar Facility. Fencing should deter deer and other large migrating animals while allowing for movement of small animals such as reptiles, amphibians, and small mammals. Although deer have been known to forage in agricultural areas, they are not necessarily dependent upon them. Increased stress to surrounding areas from foraging is not anticipated. Although installation of multiple rows of PV panels on metal racks would be installed at the site, transition from row crops to native species and the resulting change in land management will provide a long-term benefit to small animals such as song birds, reptiles, amphibians, and small mammals. Post-construction land management strategies would no longer involve active broad pesticide and herbicide application management nor frequent and ongoing land disturbance activities associated with agricultural land use.

Transmission Upgrades

All areas associated with the transmission upgrades are periodically disturbed from easement maintenance and/or active agriculture uses. Due to early successional and herbaceous composition of habitat within the Transmission ROW, in addition to similar landscape and land use in surrounding areas, it is expected that wildlife utilizing the Transmission ROW would be able to relocate successfully to nearby areas of similar habitat and food resources during construction. Therefore, during upgrades to the existing TVA Transmission ROW, temporary, negligible indirect impacts to wildlife would be anticipated. Once construction is complete, wildlife would return to the Project Site as equipment and workers demobilize.

Threatened, Endangered, and Rare Species

Federally Listed Species

Solar Facility

No suitable hibernacula or summer roosting habitat, and only marginal foraging habitat exist at the solar facility project site for Indiana bat and northern long-eared bat. Additionally, the nearest designated critical habitat for Indiana bat is more than 125 miles to the northeast of the Project Site. USFWS determined that designating critical habitat for northern long-eared bat not prudent. No caves or other hibernacula were observed during field reviews of the Project Site. Due to lack of suitable hibernacula and suitable summer roosting habitat, significant effects to Indiana bat or northern long-eared bat are not anticipated.

Transmission Upgrades

No areas suitable for summer roosting were observed within the TVA ROW. Additionally, no caves or other structures were observed during the surveys that would provide suitable winter hibernacula for bats. The early successional and herbaceous habitat within the ROW may provide foraging habitat for bats, and forested areas adjacent to the ROW may provide more suitable habitat. However, proposed actions would only occur within the existing maintained ROW, existing access roads, or active agricultural fields. No tree removal or trimming would be required for construction or access for transmission upgrades associated

with the Project. Due to lack of suitable hibernacula and suitable summer roosting habitat significant effects to Indiana bat or northern long-eared bat are not anticipated.

During biological surveys conducted on March 2 through March 4, 2020, and April 13 through April 21, 2020, no observations of federally listed species or suitable habitats, other than marginal foraging habitat, were observed. Effects to federally listed species are not anticipated (Burns and McDonnell 2020c). The Protected Species Habitat Assessment Report for the entire survey area is available in Appendix E.

Bald Eagles and Migratory Birds

Solar Facility

Sparse habitat along the forest edges and vegetated stream corridors may provide habitat for migratory birds within the proposed solar facility Project Site. Wetlands, streams, and forested areas would be avoided to the greatest extent practicable under the Proposed Action. To the extent practicable, forested areas at the Project Site would remain as riparian and visual buffers. Although not anticipated, a small number of trees may be trimmed or removed if it is determined that they will interfere with operation of the Solar Facility. TN Solar would avoid removal of mature trees to the greatest extent practicable. Implementation of the Proposed Action may temporarily reduce negligible quantities of low-quality nesting habitat, reduce minor foraging habitat for species such as the American kestrel and other birds of prey that use farm fields as foraging habitat, and may displace birds to surrounding areas of similar habitat and land use during construction. However, it is assumed any birds using the farms fields within the Project Site for foraging would use adjacent lands if there is a significant reduction in prey items. Similar habitat is available adjacent to the Project Site and would likely be able to absorb any displaced individuals.

Due to limited foraging habitat for migratory birds of conservation concern that may be temporarily affected by the transmission upgrades, in conjunction with seasonal vegetation trimming, no significant direct or indirect impacts on migratory birds are expected.

During environmental field surveys, no bald eagles or bald eagle nests were observed in or adjacent to the solar facility Project Site. There are no known bald eagle nests within one mile of proposed actions. Due to lack of known nests or suitable foraging habitat in the action area, no impacts to bald eagle are anticipated. Actions are in compliance with the National Bald Eagle Management Guidelines. After construction, the native or noninvasive vegetation and lack of herbicides or pesticides may increase foraging areas for songbirds and potential nesting sites for ground nesters. AR coating applied to the solar panels also would reduce the likelihood for adverse impacts on migratory birds.

Transmission Upgrades

Early successional and herbaceous habitat within the maintained TVA ROW would provide foraging habitat for migratory birds. Wetlands, streams, and forested areas would be avoided to the greatest extent practicable under the Proposed Action. No permanent changes or habitat conversion is anticipated with implementation of the transmission upgrades. Implementation of the Proposed Action may reduce negligible quantities of low-quality nesting habitat, reduce minor foraging habitat for species such as the American kestrel and other birds of prey that use farm fields as foraging habitat, and may displace birds to surrounding areas of similar habitat and land use during construction. However, it is assumed any birds using the farms fields within the Project Site for foraging would use adjacent lands if there is a significant

reduction in prey items. Similar habitat is available adjacent to the Project Site and would likely be able to absorb any displaces individuals.

Due to limited nesting habitat for migratory birds of conservation concern that may be affected by the Proposed Action, in conjunction with no proposed tree clearing, no significant direct or indirect impacts on migratory birds are expected.

No bald eagles or bald eagle nests were observed in or adjacent to the TVA ROW. Due to lack of known nests or suitable foraging habitat in the action area, no impacts to bald eagle are anticipated. Proposed actions for transmission line upgrades are in compliance with the National Bald Eagle Management Guidelines.

State Listed Species

Solar Facility

Due to the lack of quality wetlands within the Project Site, proposed avoidance of wetland during construction and the Project Site being primarily within actively cultivated agricultural fields, the lack of vegetation diversity would not provide suitable habitat for aquatic or wetland species such as: lake cress, featherfoil, ovate-leaved arrowhead, sweetscent ladies'-tresses, nuttall's waterweed, yellow water-crowfoot, bristly sedge, plains minnow, golden topminnow, piebald madtom, hatchie burrowing crayfish Swainson's warbler, or eastern woodrat. Therefore, adverse effects to state-listed species requiring aquatic or wetland habitats are not anticipated with implementation of the solar facility.

Harbison's hawthorn, copper iris, American ginseng, cerulean warbler, and Bachman's sparrow are typically found in dry wooded habitat areas. There are narrow strips of wooded areas along fencelines and some parcel boundaries within the Project Site. Wooded tree lines would be avoided to the greatest extent practicable and tree removal or trimming along these areas would only occur if it is determined that they will interfere with operation of the Solar Facility. There are no large tracts of forest within the Solar Facility. The Project is entirely within active agricultural lands. Therefore, none of these species with dry woodland habitat requirements are expected to occur, and adverse effects are not anticipated.

During biological surveys conducted on March 2 through March 4, 2020, and April 13 through April 21, 2020, no observations of protected state listed species or suitable habitats were observed within the solar facility Project Site. Adverse effects to state listed species are not anticipated (Burns and McDonnell 2020c).

Transmission ROW

Although wetland species including lake cress, featherfoil, ovate-leaved arrowhead, sweetscent ladies'-tresses, nuttall's waterweed, yellow water-crowfoot, bristly sedge, and Swainson's warblers were not observed during pedestrian surveys of the TVA ROW, temporary impacts to wetlands would occur during transmission line upgrades. Wetlands within the TVA ROW are mostly low-quality PEM wetlands that are regularly maintained mowed over and lack hydrologic characteristics such as water depth, duration of water, or swamp-like and wooded conditions to support these aquatic species. Therefore, none of these species are expected to occur, and adverse impacts are not anticipated. Harbison's hawthorn, copper Iris, American ginseng, cerulean warbler, and Bachman's sparrow are typically found in dry wooded habitat

areas. There are wooded tree lines adjacent to the ROW; however, they are not within the Project Site. No tree removal or trimming along these areas would occur. The Project is entirely within active agricultural lands or existing maintained ROW. Therefore, none of these species with dry woodland habitat requirements are expected to occur, and adverse effects are not anticipated.

During biological surveys conducted April 13 – April 21, 2020 on the TVA ROW, no observations of protected state listed species or suitable habitats were observed. Adverse effects to state listed species are not anticipated (Burns and McDonnell 2020c).

3.5 Visual Resources

Visual resources are the visible features of an area and can include both natural viewsheds and viewsheds comprised of manmade attributes. Visual resources can influence how an observer experiences a certain location and how they may distinguish the location from other locations. Visual resources are important to the people living in and traveling through an area. Additionally, visual resources can make up a significant component of historically and/or culturally significant settings. The following sections describe the aesthetic and visual characteristics of the Project Site and surrounding areas.

3.5.1 Affected Environment

3.5.1.1 Solar Facility

The Solar Facility Project Site consists of approximately 690 acres of land currently used for agriculture and is spread across four individual parcels, located along Tennessee State Route 431. Everett-Stewart Regional Airport adjoins the western parcel of the Project Site to the east and rural residential development adjoins to the west. Rural residential development also adjoins the eastern parcels of the Project Site to south and west. Just to the northwest of the Project Site where Highway 431 crosses the Obion River, Griffin Industries operates a meat rendering plant. Forested areas line several of the Project parcel boundaries. Remaining surrounding areas are agricultural land. Apart from the airport, the rendering plant, and nearby residential properties, properties in the area are generally consistent with the agricultural and farmland zoning land use designation.

With the exception of roadways that parallel the AC collection lines, the Project Site is comprised of active agricultural land. The active agriculture area is used to produce a rotational mix of corn and soybeans. The Everett-Stewart Regional Airport is located just east of the largest parcel. The small, county-operated public airport is predominantly used by airplanes that perform the aerial application of agricultural fertilizers, pesticides, and other crop protection products. Just to the northwest of the Project Site is Griffin Industries, which is an approximately 65-acre meat rendering plant.

The photos below provide representative views of the Project Site. Generally, the Project Site is rural and agricultural with isolated single-family homes adjacent to the Project Site. The topography is characterized by generally flat terrain. The scenic attractiveness of the Project Site is rated as typical or common of a rural-agricultural and sparsely residential area. The scenic integrity is assessed as moderate due to the adjacent meat rendering plant, airport with large white hangers, and golf course adjacent to the Project Site.

There are six single-family homes located along Airport Road and Richards Road east of the airport; these homes would be between 65 – 250 feet from the proposed Project Site property line.

Figure 3-4: View of agricultural field in Project Site looking east, toward the airport (11/5/19)

Figure 3-5: View of recently harvested field in Project Site, taken along Airport Road, looking east (11/5/19)

Figure 3-6: Everett-Stewart Regional Airport taken from tarmac facing east (11/5/19)

Figure 3-7: View down TVA ROW taken from Hwy 431, looking northwest (11/5/19)

Figure 3-8: Meat Rendering Plant on Hwy 431, looking south (Google Streetview)

3.5.1.2 Transmission Upgrades

TVA's existing TL includes approximately 16 miles of a 100-foot-wide right-of-way. The corridor begins at the Weakly Substation, about 3.5 miles south of the town of Martin. It heads in a north-northwesterly direction across mostly open fields and agricultural land until reaching the Union City Substation on the southeast side of Union City. The majority of the existing TL right-of-way is comprised of agricultural land. Appendix B provides aerial mapping along the TL. Additionally, the photos below are representative of the general conditions along TVA's right-of-way. In Weakley County, there is one densely populated area just southeast of Martin, Tennessee, along Mt. Pelia Road where the existing TL travels through residential neighborhoods for approximately 4,600 feet. There is also one location on the eastern edge of Union City where the existing right-of-way is located approximately 100 feet south of several multi-family housing units (i.e. apartments or duplexes).

Figure 3-9: Representative Photo of Weakly to Union City 161-kV Transmission Line (Weakly County)

Figure 3-10: Representative Photo of Weakly to Union City 161-kV Transmission Line (Obion County)

3.5.2 Environmental Consequences

This section describes the potential impacts on visual resources should the No Action or the Proposed Action Alternatives be implemented. For this analysis, the construction and operation phases are treated separately as construction would be temporary and have different visual impacts from the longer-term operation phase.

3.5.2.1 No Action Alternative

Under the No Action Alternative, the proposed Solar Facility and associated structures would not be constructed; therefore, no Project-related impacts to visual resources would result. Existing views would be expected to remain unchanged from the present mix of agricultural land, light industry, and Transmission ROW.

3.5.2.2 Proposed Action

Solar Facility

The Project would convert cropland into industrial/electrical infrastructure consisting mostly of low-profile PV arrays. Figure 2-2 provides the proposed layout for PV arrays, the Skyhawk Substation, gen-tie, and the Skyhawk Switching Station.

During site visits in April and May 2020, Burns & McDonnell assessed the potential for visual impacts on sensitive areas such as residences, churches, schools, and from roadways. There are four public roadways that abut portions of the proposed Solar Facility:

1. SR 22 is a four-lane, controlled access highway that would parallel the northernmost parcel of the Solar Facility for approximately 1,700 feet. The arrays would be visible to drivers headed both east and west for a short time period as they pass the Solar Facility. During construction, passersby would notice construction equipment and exposed soils. Improvements to structures along the Transmission ROW would likely go unnoticed from this vantage point.
2. State Route 431 (aka Martin Hwy) is a two-lane paved road that would allow drivers to view portions of the Solar Facility during construction and operation. There would be an approximate 2-mile stretch of the road where drivers could likely view Project components either to the north or south of the roadway. The Transmission ROW also crosses this roadway. During construction of structural upgrades, drivers along State Route 431 may be able to see construction activities at certain workspace areas along the Transmission ROW; however, once complete, no obvious changes in the ROW are anticipated.
3. Drivers traveling along Airport Road would be able to look east or west and see both construction activities and the arrays on each side of the road. From the beginning of Airport Road (at its intersection with Highway 431) to the point where it reaches Richards Road, there is little natural screening available. However, south of Richards Road there are natural vegetative screening buffers on both sides of Airport Road.
4. Richards Road is a 350-foot-long road that provides access to three single-family residences. The Solar Facility, including the Skyhawk Substation and Switching Station, would likely be visible from Richards Road.

From the above listed vantage points, the manufactured and structural appearance of the Solar Facility would be most obvious in the morning, when the dark-colored solar panels would be upright, averaging approximately eight feet from the ground, at full tilt, facing east. At midday, the panels would be less obvious as they would be laying nearly flat. At midday, when the panels would be flat, they would average about five feet off the ground. In the evening, when the panels would be full tilt and facing west, they would be most obvious along Airport Road and Richards Road.

Figure 3-11: Representative Photo of Single-Axis Tracking PV System in the Morning, Facing East

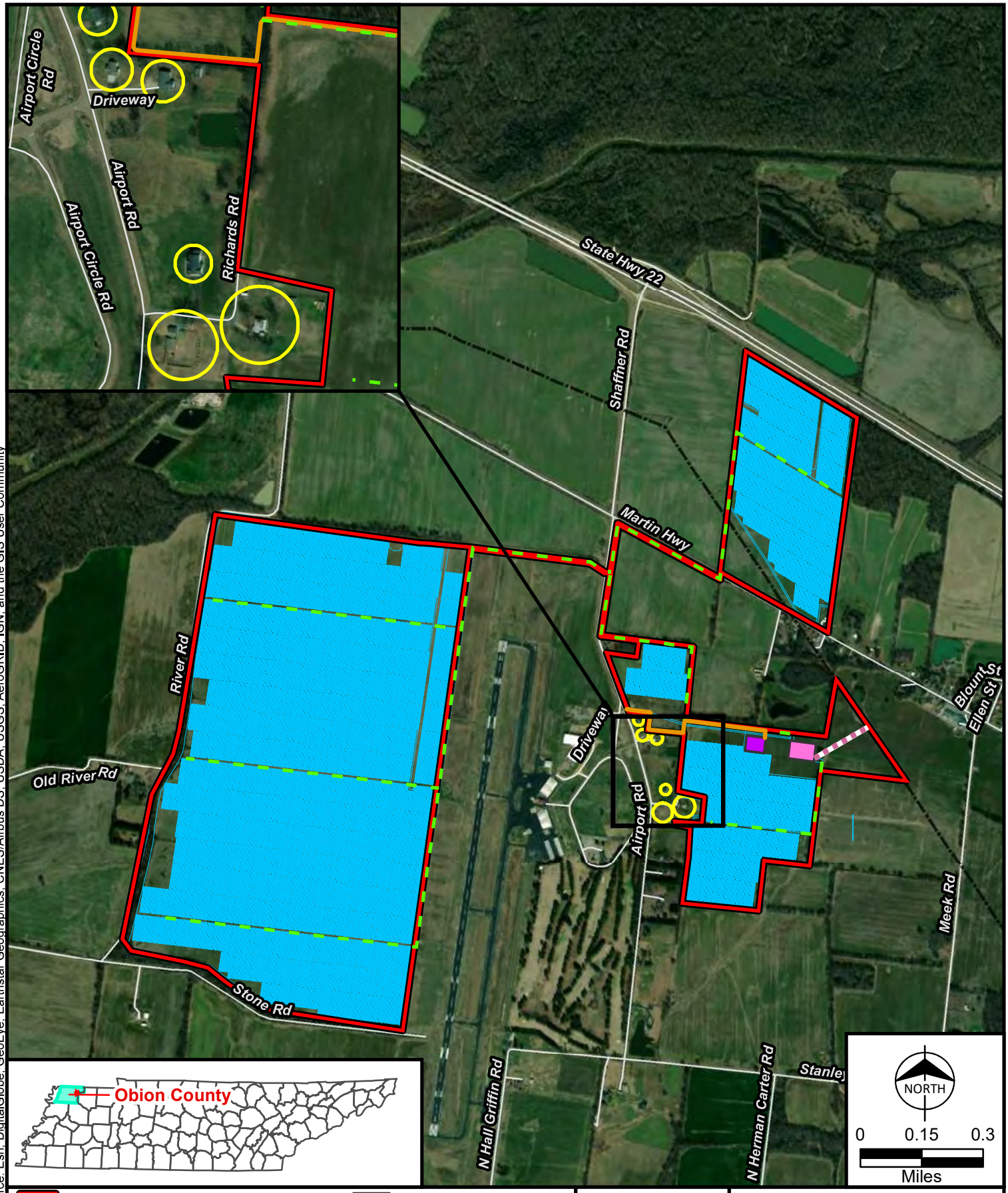
Figure 3-12: Representative Photo of Single-Axis Tracking PV System at Midday, Laying Flat

Although portions of the Project would be visible across open fields or otherwise clear areas, residential and commercial properties and roadways in the vicinity of the Project Site generally have mature trees along or near property boundaries and fence lines that would partially or almost fully obscure views of the Solar Facility from many vantage points. The relatively stable elevations and the maintenance of existing vegetation along the perimeter of the Project Site would largely shield views from most vantage points to the Solar Facility. There are three residences along Airport Road, almost directly across the street from the airport, as well as three residences on Richards Road that would all have partial to unobstructed views of the Solar Facility (Figure 3-13).

As shown on Figure 3-13, the six residences along Airport Road and Richards Road range in distance to the boundaries of the proposed Project Site. The closest residences are approximately 65 - 85 feet from the property line of the Project Site. These three residences are located on Airport Road, just east of the airport. There are three additional residences located on Richards Road that are about 100 – 250 feet from the boundary of the proposed Project Site.

These six residences would likely have a view of active Project construction areas for the approximately 12-month construction window. Two of the three homes on Airport Road that are directly across the street from the airport have an existing natural vegetation buffer that would provide some visual screening. The existing vegetation along the Project boundaries would be left in place where practicable. Currently, TN Solar is not proposing tree clearing; however, tall trees that cast shadows over the solar panels would likely be trimmed or, in unavoidable settings, removed. TN Solar would minimize the removal of mature vegetation to the greatest extent practicable, especially in areas where such vegetation provides natural screening or buffers to residential land uses near the Project Site. For the remaining four residences that do not appear to have natural vegetation buffers between their homes and the proposed Project Site, TN Solar would coordinate with the homeowners, construction contractors, and the array layout designers to determine the most suitable type of buffer to be used in each location. The Skyhawk Substation would be over 1,000 feet east-northeast from all six residences; any screens installed for the purpose of obscuring the view of the Project Site would also minimize visual effects from the presence of this substation. TN Solar would communicate plans with TVA before clearing mature trees to identify any additional consultations that may be necessary.

Planting thick shrubs and/or installing screening, such as a privacy fence, as screening buffers between the Project Site and these homes could minimize the visual impact of the project during both construction and operation of the Solar Facility.



Path: C:\Users\olhaney\Desktop\Projects\121610_SkyhawkSolar\GIS\MXDs\EA\GenVicinityMap_Aerial_withresidence.mxd olhaney 10/7/2020
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

BURNS McDONNELL

Figure 3-13
General Vicinity Map
Skyhawk Solar Project
Obion County, TN

Source: Esri, TIGER, TN Solar 1, LLC, Burns & McDonnell

Issued: 10/7/2020

Construction of the proposed Project would temporarily alter the visual character of the Project Site. During construction, heavy machinery would be present, changing the visual characteristics from vantage points surrounding the Project Site. Within the Project Site, trees and other tall vegetation at the perimeter of the parcels would be preserved to the extent practicable, which would provide natural buffers from public roadways. In areas where grading would be necessary, minor changes to the contour, color, and texture of the ground surface would be visible. The Project Site would appear as a mixture of neutral colors such as dark browns and grays due to earthmoving, road construction, and concrete activities. Silt fences and other erosion control devices would likely be visible from many vantage points during construction. Dust levels would be controlled during dry periods by spraying Project work areas with water. Visual impacts from construction would be minimal at night since most construction is anticipated to occur during the day. Erosion control silt fences and sediment traps would be removed once construction is complete, and bare areas would be promptly vegetated.

Over the approximately 12-month-long construction phase, indirect impacts to visual resources in the area may occur due to increased traffic and movement of heavy machinery to the Project Site along local roads. Overall, there would be minor temporary direct and indirect impacts to visual resources during the construction phase of the Proposed Action.

Visual impacts during the operation phase of the Project would be mitigated in the immediate vicinity by natural tree buffers around property boundaries and the Project Site's proximity to existing industrial and commercial features. Visual impacts would be minimal to negligible due to the current variation of the visual attributes of the surrounding area.

Results of the Glint/Glare Analysis

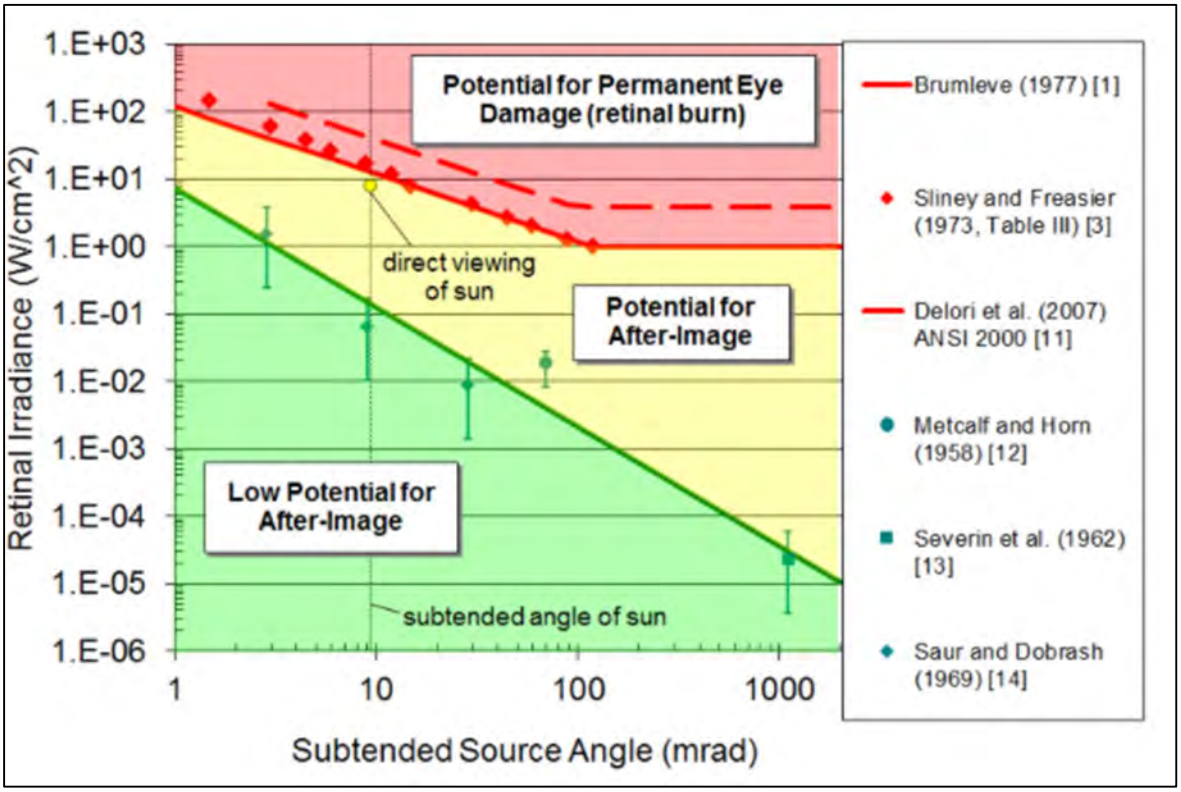
Glint is typically defined as a momentary flash of bright light, often caused by a reflection off a moving source. A typical example of glint is a momentary solar reflection from a moving car. Glare is defined as a continuous source of bright light. Glare is generally associated with stationary objects, which, due to the slow relative movement of the sun, reflect sunlight for a longer duration. The difference between glint and glare is duration. Industry-standard glare analysis tools evaluate the occurrence of glare on a minute-by-minute basis; accordingly, they generally refer to solar hazards as 'glare' (ForgeSolar, 2020).

Due to the proposed Project's proximity to the Everett-Stewart Regional (UCY) Airport, a glare analysis was performed in accordance with the FAA's 2018 Airport Solar Guide standards (FAA, 2018). In order to understand and model glare in accordance with FAA's standards, Sandia National Laboratories developed the Solar Glare Hazard Analysis Tool (SGHAT). ForgeSolar utilized its SGHAT license to perform the glare analysis for this study, (ForgeSolar, 2020). The SGHAT allows the user to specify a site location, draw an outline of the proposed photovoltaic array, and specify observer locations. Once these points are given the properties of the arrays, such as the tracking type, tilt, module surface type, and orientation can be specified for each array. Latitude, longitude, and elevation for each observation point and array vertex are tracked and used for sun position and vector calculations to determine glare for that observation point. Additional information regarding reflectance, environment, and ocular factors can be altered.

The ocular impact of glare is visualized with the Solar Glare Ocular Hazard Plot (SGOHP). This chart displays the ocular impact as a function of glare subtended source angle and retinal irradiance. Each minute

of glare is displayed on the chart as a small circle in its respective hazard zone. For convenience, a reference point is provided which illustrates the hazard from viewing the sun without filtering, i.e., staring at the sun. Each plot includes predicted glare for one PV array and one receptor (ForgeSolar, 2020).

Figure 3-14: Solar Glare Ocular Hazard Plot



Source: ForgeSolar 2020

If glare is found, the SGHAT calculates the retinal irradiance and size/distance of the glare source, defines how many minutes of "green glare," "yellow glare," and "red glare" exist at each observation point, and produces the SGOHP. Other results from the SFHAT are a plot that specifies when glare would occur throughout the year and at what times with color codes indicating the potential ocular hazard.

The FAA established an interim policy in 2013 relating to glare from solar projects. The FAA determined that for pilots, no yellow or red glare is allowable on approach, green glare is acceptable on approach, and there are no restrictions for when regularly flying the plane (i.e., pilot is not on approach). See below for exact wording on page 2 of Federal Register / Vol. 78, No. 205 / Wednesday, October 23, 2013 / Notices:

> "No potential for glare or 'low potential for afterimage' along the final approach path for any existing landing threshold or future landing thresholds (including any planned interim phases of the landing thresholds) as shown on the current FAA-approved Airport Layout Plan (ALP). The final approach path is defined as two (2) miles from fifty (50) feet above the landing threshold using a standard three (3) degree glidepath" (FAA, 2013).

Burns & McDonnell performed a Solar Glare Ocular Impact Analysis for the proposed Project to determine whether any glare created from the Project would adversely impact surrounding properties, vehicles traveling on roadways near the Project Site, or pilots approaching the Everett-Stewart Airport. As part of the analysis, observation points were identified, SGHAT Analysis was performed, Line-of-Sight Analysis was performed, View Angle Analysis was performed, and a landscape review was performed.

The intent of the analysis was not to illustrate that all potential glare has been removed, but to identify the glare that could exist and determine if the glare would adversely impact surrounding properties, vehicles traveling along nearby roadways, or pilots approaching the Everett-Stewart Airport. It was found that the Project would not produce any glare that could cause permanent eye damage due to retinal burn. Potential glare at all observation points was categorized as having low potential for afterimage (designated as green glare) or having low potential for afterimage (designated as yellow glare). Based on the SGHAT results, onsite visual observations, a view angle analysis, and reviews of the landscaping, it was found that no observation points would have potential glare to adversely impact properties surrounding the Project Site.

Transmission Upgrades

Visual impacts associated with the proposed transmission upgrades along TVA's existing Weakley to Union City 161-kV right-of-way would be temporary, occurring during construction only. The replacement poles and new pole structures would be consistent with the pre-construction landuse and visual environment. The temporary construction activities associated with the transmission upgrades would be most visually noticeable in the residential area near Mt. Pelia Road. In this area, the workspaces or construction access roads would come within 100 feet of approximately 35 homes within this neighborhood. Residences would experience a temporary increase in visual impacts from the presence of construction equipment, workers, and materials. Once upgrade activities are complete and all equipment and workers have demobilized, the visual environment would return to its pre-construction condition. Visual impacts would be temporary and negligible.

3.6 Noise

The magnitude and frequency of environmental noise may vary considerably over the course of the day, throughout the week, and across seasons, in part due to changing weather conditions and the effects of seasonal vegetation cover. Two measures that relate the time-varying quality of environmental noise to its known effect to people are the 24-hour equivalent sound level (L_{eq}) and day-night sound level (L_{dn}). The L_{eq} is the level of steady sound with the same total (equivalent) energy as the time-varying sound of interest, averaged over a 24-hour period. The L_{dn} is the L_{eq} plus 10 dBA added to account for people's greater sensitivity to nighttime sound levels (typically considered between the hours of 10:00 p.m. and 7:00 a.m.). The A-weighted scale is used to assess noise impacts because human hearing is less sensitive to low and high frequencies than mid-range frequencies. The human ear's threshold of perception for noise change is considered 3 A-weighted decibels (dBA); 6 dBA is clearly noticeable to the human ear, and 10 dBA is perceived as a doubling of noise (or halving, if the noise is decreasing).

In 1974, the EPA published *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin on Safety*, which evaluated the effects of environmental noise on public health and welfare (USEPA 1974). In this document, the EPA indicated that an L_{dn} of 55 dBA is

the noise threshold that would prevent outdoor activity interference or annoyance from continuous noise. We have adopted this criterion and use it to evaluate potential noise impacts from TVA projects at noise sensitive areas (NSAs) such as residences, schools, or hospitals. An L_{dn} of 55 dBA is equivalent to a continuous sound level of 48.6 dBA for facilities that generate constant sound levels. A list of typical sound levels for common sound sources is presented in the table below.

Table 3-14: Typical Sound Pressure Levels Associated with Common Sound Sources

Sound Pressure Level (dBA)	Subjective Evaluation	Environment	
		Outdoor	Indoor
140	Deafening	Jet aircraft at 75 feet	--
130	Threshold of pain	Jet aircraft during takeoff at a distance of 300 feet	--
120	Threshold of feeling	Elevated train	Hard rock band
110	--	Jet flyover at 1,000 feet	Inside propeller plane
100	Very loud	Power mower, motorcycle at 25 feet, auto horn at 10 feet, crowd sound at football game	--
90	--	Propeller plane flyover at 1,000 feet, noisy urban street	Full symphony or band, food blender, noisy factory
80	Moderately loud	Diesel truck (40 miles per hour) at 50 feet	Inside auto at high speed, garbage disposal, dishwasher
70	Loud	B-757 cabin during flight	Close conversation, vacuum cleaner
60	Moderate	Air-conditioner condenser at 15 feet, near highway traffic	General office
50	Quiet	--	Private office
40	--	Farm field with light breeze, birdcalls	Soft stereo music in residence
30	Very quiet	Quiet residential neighborhood	Inside average residence (without TV and stereo)
20	--	Rustling leaves	Quiet theater, whisper
10	Just audible	--	Human breathing
0	Threshold of hearing	--	--
Sources: Egan, 1988; Ramsey and Sleeper, 1994			

3.6.1 Affected Environment

3.6.1.1 Solar Facility

The proposed Solar Facility is in a rural area adjacent to several local roadways, State Hwy 22 to the north, and it abuts a small county-operated airport. The major noise sources in this area are traffic on the roadways, small propeller planes, farm equipment, wind, and farm animals.

As discussed in section 3.5 and shown on Figure 3-13, there is a small cluster of six residences along Airport Road and Richards Road that range in distance to the proposed Project Site from 65 to 250 feet. All six residences are over 1,000 feet from the proposed Skyhawk Substation.

There is one residence approximately 800 feet south of the proposed Solar Facility. A row of mature trees exists along the southern boundary of the Project Site, which would provide buffering of temporary construction noise for this residence (located along Stone Road in Obion County).

There are approximately 15 residences located just over 1,000 feet northeast of the proposed Skyhawk Substation and Switching Station. These same residences range from 350 feet to over 1,000 feet from the northern most parcel where solar arrays would be installed. Residences in these homes may experiences temporary increases in noise during construction. There are natural sound buffers in place due to the presence of mature trees.

No NSAs are located within 1,000 feet of the proposed Skyhawk Substation or Switching Station.

Noise regulations were reviewed for federal, State of Tennessee, and Obion County. During the review, no numerical limits were identified for the Project.

3.6.1.2 Transmission Upgrades

TVA's existing TL includes approximately 16 miles of a 100-foot-wide right-of-way. The corridor begins at the Weakly Substation, about 3.5 miles south of the town of Martin. It heads in a north-northwesterly direction across mostly open fields and agricultural land until reaching the Union City Substation on the southeast side of Union City. The majority of the existing TL right-of-way is comprised of agricultural land and has very few associated NSAs along the route. Appendix B provides aerial mapping along the TL. In Weakley County, there is one densely populated area just southeast of Martin, Tennessee, along Mt. Pelia Road where the existing TL travels through residential neighborhoods for approximately 4,600 feet. There is also on location on the eastern edge of Union City where the existing right-of-way is located approximately 100 feet south of several multi-family housing units (i.e., apartments or duplexes). Both of these locations would qualify as NSAs.

3.6.2 Environmental Consequences

3.6.2.1 No Action Alternative

Under the No Action Alternative, the proposed Solar Facility and associated structures would not be constructed; therefore, no project-related noise impacts would result. Current noise impacts related to vehicle traffic and agricultural land use, which is likely very minimal, would persist.

3.6.2.2 Proposed Action

Solar Facility

Under the Proposed Action Alternative, noise levels would be temporarily elevated in the areas immediately surrounding the Project when construction is occurring. Construction activities such as vegetation removal, tree branch trimming, site grading, and installation of the PV panel support posts would generate noise on a temporary basis. Maximum noise levels produced by the construction equipment are in the range of 80 to 85 dBA at a distance of 50 feet.

The three Airport Road homes and the three Richards Road homes would experience elevated noise levels caused by the operation of construction equipment during daytime hours (typically 8am – 7pm) as well as an increase in traffic during peak morning and evening commutes. However, the elevated noise levels would be short in duration and would not occur at night. Further, the elevated noise levels at the closest residence are not expected to exceed the 65 dBA for prolonged periods of time. As described in Section 3.5 and displayed in Figure 3-13, the closest residences are approximately 65 - 85 feet from the limits of the Project Site. These three residences are located on Airport Road, just east of the airport. The closest construction activity would be vehicles and larger equipment utilizing a construction access road. Noise impacts, if noticeable, would be short-term and negligible during temporary construction activities.

There are three additional residences located on Richards Road (approximately 600 feet south of the three homes on Airport Road) that are about 100 – 250 feet from the boundary of the proposed Project Site. Noise abatement measures for these three residences are not anticipated to be necessary. The Skyhawk Substation would be greater than 1,000 feet east of all six residences.

For residences that are within 500 feet of an inverter, a pre-construction sound study including an ambient survey would be conducted to quantify the existing ambient environment. After the project reaches commercial operation, TN Solar would measure the sound levels at residential property lines and identify any equipment that generates a L_{dn} sound level that exceeds 55 dBA at the property line. If there are locations where noise levels exceed that threshold, TN Solar would install sound buffers (walls, fences with screening, or vegetation) in order to minimize the noise levels from operating equipment.

Transmission Upgrades

Noise impacts associated with the proposed transmission upgrades along TVA's existing Weakley to Union City 161-kV right-of-way would be temporary, occurring during construction only. The temporary noise increases from construction activities associated with the transmission upgrades would be most noticeable in the residential area near Mt. Pelia Road. In this area, the workspaces or construction access roads would come within 100 feet of approximately 35 homes within this neighborhood. Residences would experience a temporary increase in noise levels from the operation of construction equipment, workers, and materials. Once upgrade activities are complete and all equipment and workers have demobilized, the noise levels would return to pre-construction levels. Elevated noise levels would be temporary and would occur during daytime hours. There would be no change is noise levels as a result of the structural upgrades on the Transmission ROW.

3.7 Air Quality and Greenhouse Gas Emissions

This section describes existing air quality and GHG emissions in the Project region (including the Transmission ROW) and the potential impacts on air quality and GHG emissions that would be associated with the No Action and Proposed Action Alternatives.

3.7.1 Affected Environment

Ambient air quality is determined by the type and concentration of pollutants emitted into the atmosphere, the size and topography of the air shed in question, and the prevailing meteorological conditions in that air shed. With the issuance of the Clean Air Act of 1970 and its amendments, Congress mandated the protection and enhancement of our nation's air quality. USEPA established the National Ambient Air Quality

Standards (NAAQS) for the following criteria pollutants to protect public health and welfare: sulfur dioxide (SO_2), ozone, nitrogen dioxide (NO_2), particulate matter whose particles are less than or equal to 10 micrometers (PM_{10}), particulate matter whose particles are less than or equal to 2.5 micrometers ($PM_{2.5}$), carbon monoxide (CO), and lead (USEPA 2020d).

Primary NAAQS were developed to protect public health and safety, and secondary NAAQS were developed to protect public welfare (e.g., visibility, crops, forests, soils, and materials) from known or potential negative effects of air pollutants. Areas in compliance with the NAAQS are designated "attainment" areas. Areas not in compliance with the NAAQS are designated as "nonattainment" areas. New sources proposed in or near nonattainment areas may be subject to more stringent air permitting requirements. Nonattainment areas are usually defined by county. National standards may not be exceeded more than once per year (except where noted). Areas that cannot be classified based on available information for a specific pollutant are designated as "unclassifiable" and are treated as attainment areas unless proven otherwise. If an area that was formerly designated as nonattainment for a particular pollutant later qualifies as attainment, it is then categorized as "maintenance" for that pollutant for the next 20 years as long as the area continues to meet the NAAQS for that pollutant. If an area remains in attainment for the 20-year maintenance period, it will qualify to be formally designated back to normal attainment.

Regional Air Quality

The Project is located in rural Obion County, which has little development in the vicinity apart from that related to rural-residential and agricultural uses. Denser development is approximately 1.5 miles northwest on the outskirts of Union City and about 5.5 miles southeast in Weakly County where the town of Martin, Tennessee is located.

Obion County and Union City are in attainment for applicable NAAQS and meet federal and state air quality standards. The table below presents the most recent USEPA emission inventory data (USEPA 2020d) for the most prevalent NAAQS pollutants for Obion County. These data represent anthropogenic emissions from all stationary source and mobile source activities. The most recent available measurements of ambient air concentrations closest to the Project Site shown in the table below are consistent with the above designation. Therefore, the Project is located in an area with good air quality.

Table 3-15: Average Emissions of NAAQS Pollutants in Obion County

Pollutant	Emissions for Obion County (tons per year)
Carbon Monoxide	6,735
Nitrogen Oxides (NO_x)	1,578
PM_{10}	1,774
$PM_{2.5}$	549
Sulfur Dioxide (SO_2)	100
Volatile Organic Compounds (VOCs)	1,458

Source: EPA 2020d

Regional Climate

Weather conditions determine the potential for the atmosphere to disperse emissions of air pollutants. West Tennessee's climate is characterized by warm, humid summers with average high temperatures up to 89 degrees Fahrenheit (°F) and cool winters with average low temperatures around 45 °F (Weatherspark 2020). Precipitation averages 52 inches per year (US Climate Data 2020).

Greenhouse Gas Emissions

Greenhouse Gases typically consist of natural and man-made compounds that are released into the earth's atmosphere. GHGs also absorb a portion of Earth's infrared radiation and can re-emit some of the radiation back to the earth's surface. When radiation is emitted back to the earth's surface, temperatures are typically warmer than they would naturally be. With that process, GHGs act as insulation and contribute to the maintenance of global temperatures. Increasing levels of GHGs in the atmosphere result is an increase in temperature on earth, commonly known as global warming. Changes in climate associated with global warming produce negative economic and social consequences globally through changes in weather (e.g., more intense natural disasters, greater risk for forest fires, flooding) (USGCRP 2018).

The primary GHG emitted by human activities in the U.S. is carbon dioxide (other than water vapor), representing approximately 82 percent of total GHG emissions in the US (USEPA 2020e). Dominant sources of carbon dioxide and of overall GHG emissions result from fossil fuel combustion. Emissions of the GHG methane, which have declined in the U.S. from 1990 levels, result primarily from digestion of domestic livestock, decomposition materials in landfills, coal mining, and natural gas leaks. Approximately 74 percent of the GHG nitrous oxide emissions from human activities in the U.S. are a result of agricultural soil management (USEPA 2020e).

3.7.2 Environmental Consequences

3.7.2.1 No Action Alternative

Under the No Action Alternative, the proposed Solar Facility would not be constructed. Therefore, no air emissions or GHGs would be generated by equipment or vehicles from construction or operation of the Solar Facility. Existing land use would be expected to remain as agricultural land, and the only ongoing emissions would be due to vehicles or equipment used to operate the farms or maintain the agricultural clearings.

3.7.2.2 Proposed Action

Under the Proposed Action, minor direct impacts on air quality would be anticipated as a result of construction and operation of the Project. Temporary impacts to GHG emissions expected during construction would be negligible.

Regional Air Quality

The majority of potential air quality impacts associated with the Proposed Action would occur during construction. Construction activities would result in emissions from the operation of construction equipment, contracted employees' personal vehicles, and fugitive dust suspension from clearing, grading, and other activities across exposed dry soil. Although unlikely, if any tree debris from clearing were generated, it would be removed by either burning or chipping and grinding. As burning may occur, this could generate temporary localized air quality impacts due to smoke particles and gases. Any such burning

of vegetative debris would be done in accordance with local ordinances or burn permits and is not expected to have any health consequences for this rural area.

The use of construction equipment would cause a minor temporary increase in tailpipe emissions from mobile diesel- and gas-fueled equipment. Combustion of gasoline and diesel fuels by internal combustion engines (haul trucks and off-road vehicles) would generate local emissions of PM, NO_x, CO, VOCs, SO_2, and GHGs. The total amount of these emissions would be small and would result in negligible air quality impacts overall. The construction contractors are expected to utilize equipment that have undergone regularly scheduled maintenance as recommended by its manufacturers. By performing routine maintenance, utilizing standard emissions control technology, and by establishing "no idling" zones near residential areas, emissions generated during construction would be even further reduced.

Approximately 95 percent (by weight) of fugitive emissions from vehicular traffic over paved and unpaved roads would be composed mainly of particles that would be deposited near the roadway routes taken to reach the Project Site. As necessary, fugitive dust emissions from construction areas and paved and unpaved roads would be mitigated using wet suppression. Wet suppression can reduce fugitive dust emissions from roadways and unpaved areas by as much as 95 percent. Therefore, direct impacts to air quality associated with construction activities would be temporary and minor.

Regional Climate

No noticeable direct or indirect impacts to the regional climate would occur as a result of the proposed Project. Local or regional climate effects can occur, for example, with major changes in land use that affect the hydrological cycle, or that create large impervious surfaces, thus changing the radiative heat balance over a large area. The Project would change the surface characteristics somewhat, but it would have little effect on soil permeability and hydrologic characteristics of the developed area. Vegetation would still grow under and around the solar panels, tending to maintain a landscape with significant evapotranspiration of precipitation, as opposed to creating significant runoff of precipitation which happens with urban development. Therefore, average temperatures of the developed area are not expected to change significantly due to the proposed development.

Greenhouse Gases

The use of construction equipment would cause a minor temporary increase in GHG emissions during construction activities. Combustion of gasoline and diesel fuels by internal combustion engines (trucks and off-road vehicles) at the site would generate emissions of CO_2 and very small amounts of other GHGs such as methane and NOx. Additional GHG emissions would occur due to transporting materials and workers to the Project Site, and GHGs would be emitted in the U.S. or globally for production and transportation of the materials used for construction. The production of construction materials is expected to represent the largest portion of the Project-related GHG emissions. The total GHG emissions resulting from construction would be entirely offset by Project operation over the long term. This is because the electricity generated by the Project would offset some fossil-fuel-based electricity generation and the GHG emissions associated with the combustion of fossil fuels.

Because the Project would occur on agricultural land and existing Transmission ROW, tree and other tall vegetation removal during construction of the Project would be minimal. If trees or tall vegetation required

removal, it would represent a minor loss of sequestered carbon, as well as potential future carbon sequestration. Trees and other tall vegetation currently remove CO_2 from the air and sequester it as biomass. The loss of this carbon sink would constitute a minor adverse direct and indirect impact as sequestration would have continued for the life of the vegetation and long into the future, assuming that other future changes on the Project Site would not result in deforestation. The loss of the carbon sink from tree removal would be at least partially offset by the increased sequestration of CO_2 by the permanent grass-dominated vegetation that would be maintained on the Project Site.

The operation of the Project is not anticipated to have any long-term negative impacts to air quality or GHG emissions. Operation of the Solar Facility or electrical lines would not produce emissions. Minor emissions would occur during maintenance activities, including facility inspections and periodic mowing. Conversely, overall emissions of air pollutants from the TVA power system would decrease during operation as the nearly emissions-free power generated by the Project would offset power that would otherwise be generated, at least in part, by the combustion of fossil fuels. The reduction in GHG emissions resulting from the operation of the Project would have little noticeable effect at regional or larger scales. It would, however, be a component of the larger planned system-wide reduction in GHG emissions by the TVA power system. The adverse impacts of GHG emissions and the beneficial impacts of TVA's efforts to reduce GHG emissions are described in more detail in the TVA IRP (2019).

3.8 Cultural Resources

Cultural resources include, but are not limited to, prehistoric and historic archaeological sites, historic structures, and historic sites at which important events occurred. Cultural resources are finite, non-renewable, and often fragile. They are frequently threatened by industrial, commercial, and residential development, as well as construction of roads and other infrastructure.

The NHPA provides for a national program to support both public and private efforts to identify, evaluate, and protect the nation's important cultural resources. Once identified, these resources are evaluated for inclusion in the NRHP maintained by the National Park Service. Tangible cultural resources may qualify for inclusion in the NRHP if they are 50 years of age or older and (other than in exceptional cases) if found to possess one or more of four different criteria, in accordance with 36 CFR § 60.4:

1. *Criterion A:* association with events that have made a significant contribution to the broad patterns of our history. Such events may include a specific occurrence or pattern of occurrences, cultural traditions, or historic trends important at a local, regional, or national level. To be considered in association with a cultural resource, events must be important within the particular context being assessed.

2. *Criterion B:* association with the lives of persons significant in our past. People considered may be important locally, regionally, or nationally, and the cultural resources considered are limited to properties illustrating a person's achievements rather than commemorating them.

3. *Criterion C*: embodiment of the distinctive characteristics of a type, period, or method of construction; representative of the work of a master; possessing high artistic values; or representative of a significant and distinguishable entity whose components may lack individual distinction. Cultural resources

considered generally include architectural resources such as buildings, objects, districts, and designed landscapes.

4. *Criterion D*: cultural resources that have yielded, or may be likely to yield, information important in prehistory or history. Considered cultural resources typically include archaeological sites but may also include buildings, structures, and objects if they are the principal source of important information not contained elsewhere.

Under Section 106 of the NHPA, federal agencies must consider public views and concerns about historic preservation issues when making final project decisions (GSA, 2020). The NHPA addresses the preservation of "historic properties," which are defined under the Act as any prehistoric or historic district, site, building, structure, or object included in or eligible for inclusion in the NRHP. Under Section 106 of NHPA, the Project is required to consider ways to avoid or minimize effects from its undertakings on significant cultural resources.

3.8.1 Affected Environment

Burns & McDonnell staff conducted Phase I archaeological and historic architecture surveys of the Area of Potential Effect (APE) for the Solar Facility and the entire 16-mile-long existing Transmission ROW (Phase I Survey). Field surveys were conducted from March 8 through 14, March 16 through 18, April 6 through 11, and April 27 through May 15, 2020. The purpose of the Phase I survey was to identify and document both previously recorded and newly documented archaeological and historic-age non-archaeological resources, to assess their eligibility for listing in the NRHP, and to assess potential Project impacts to historic (NRHP-listed or eligible) properties as required under Section 106. Prior to the cultural resources survey field effort, a desktop review was conducted, including an area comprising the Physical APE and a 0.5-mile buffer (Study Area). The review involved the evaluation of previously recorded archaeological sites and cultural resources survey data maintained at the State of Tennessee's Department of Environmental and Conservation-Division of Archaeology offices located in Nashville, Tennessee.

The field methods used during the investigation were designed to identify cultural resources and to obtain data needed to identify the age, function, and other characteristics of each cultural resource discovered. Pedestrian survey was conducted at transects spaced at 10 meters where there were areas of slope greater than 15 percent and in areas with 50 percent or greater ground surface visibility. Shovel testing was employed for all areas of the Physical APE that had less than 50 percent ground surface visibility and less than 15-percent slope. Typically, these areas included pastureland and fallow agricultural fields. Seventy-five percent of the Physical APE during the survey was in active agricultural fields, and 11 percent was developed areas. All of these locations allowed for pedestrian survey.

The historic-age, non-archaeological resource reconnaissance survey was conducted in two mobilizations during March and June of 2020. During the field efforts, surveyors sought to document all buildings, structures, objects, districts, etc. constructed prior to 1975 (45 years of age or older) within the Visual APE. The survey was conducted solely from the public right-of-way (ROW) and roads accessible at the time of the survey. All accessible resources within the Visual APE were photo-documented and their locations recorded for further assessment.

3.8.1.1 Historic Architectural Resources

Historic properties include pre-contact or historic sites, districts, buildings, structures, and objects that are at least 50 years old. Historic architecture can also include properties of traditional religious or cultural importance listed in or eligible for listing in the NRHP.

The pre-field background review of previously recorded archaeological sites and surveys in the Study Area included examination of archaeological site records and survey reports maintained at the Tennessee Division of Archaeology (TDOA) and review of the Tennessee Historical Commission State Inventory. The review of the NRHP-listed properties for Obion County revealed no NRHP-listed properties located within the Physical APE or Study Area.

The Study Area is located within the Tennessee Civil War National Heritage Area, which was designated by Congress in 1996 and is a partnership unit of the National Park Service. The Center for Historic Preservation at Middle Tennessee State University administers the Heritage Area with the goal of telling the story of the Civil War and its aftermath in Tennessee from 1860 through 1875. No associated markers or Civil War battle sites were identified within the Physical APE or Study Area.

3.8.1.2 Archaeological Resources

Archaeological Resources can include earthworks, weapons and projectiles, human remains, rock carvings, cultural material scatters, and remains of subsurface structures, such as old fire rings or fire pits. A review of the TDOA records in January 2020 revealed two previously recorded archaeological sites within the Project Site Study Area (40OB207 and 40OB208) as well as one isolated find.

One site, 40OB207, identified historically as the Embry-Riddle Airfield and now known as the Everett-Stewart Airport, is located within the Physical APE. Site 40OB207 was recorded as a part of the statewide inventory of World War II sites in Tennessee. The site's NRHP-eligibility is unknown.

Previously recorded site 40OB208, also known as the Stanley House, was constructed in 1850 by William Stanley, an early Euro-American settler in Obion County. The site is approximately ½ mile south of the Project Site. The Stanley House site, 40OB208, was documented in 2007 during the *Archaeological Assessment of an Approximate 8.5 Acre Area Surrounding the Stanley House for Proposed Safety Development Activities at the Everett-Stewart Airport in Union City, Obion County, Tennessee. S*ite 40OB208 is recommended not eligible for listing in the NRHP.

The isolated find, and an additional historic site (40OB226) located adjacent to the Study Area, were recorded during the *Phase I Archaeological Survey, Weakley-Union City NERC Alert Project, Obion and Weakley Counties, Tennessee* in 2017. Neither the isolated find, nor 40OB226, were recommended eligible for listing in the NRHP. No additional historic resources or NRHP-listed properties were identified within the Study Area during the records review.

Portions of twelve archaeological sites were encountered within the Physical APE during field investigations and are described in the *Phase I Cultural Resources Survey for the Skyhawk Solar Project, Obion County, Tennessee* (Shaver and Harris 2020). These included eleven historic-era sites and one multicomponent site (with both prehistoric and historic-era components). None of the archaeological sites

are recommended as eligible for inclusion in the NRHP. The sites all have limited integrity and/or limited research potential, and therefore, none of them are recommended for avoidance by the Project.

A total of 82 historic-age non-archaeological resources on 66 properties were recorded within the Project's Visual APE. None of the properties, either individually or collectively, appear to meet the criteria for NRHP inclusion due to a lack of significance and/or architectural integrity, and none of the resources would be impacted directly by Project implementation.

The background research for the Transmission ROW Study Area indicated that one previously recorded archaeological site, 40OB226, and one isolated find are located within the Transmission ROW proposed APE. Both site 40OB226 and the isolated find were recorded during the *Phase I Archaeological Survey, Weakley-Union City NERC Alert Project, Obion and Weakley Counties, Tennessee* in 2017. Neither previously recorded site, 40OB226 nor the isolated find, were recommended as eligible for listing in the NRHP. At the recommendation of TVA, previously surveyed areas within the APE were not resurveyed.

During fieldwork for the Phase I archaeological resources survey of the proposed Transmission ROW APE, Burns & McDonnell recorded portions of four newly identified archaeological sites: 40WK120, 40OB231, 40OB237, and 40OB238. All four sites extend beyond the surveyed APE and the portions of the archaeological sites within the APE were recommended noncontributing to the site's NRHP eligibility. The sites all have limited integrity and/or limited research potential, and therefore, none of them are recommended for avoidance by the Project

3.8.2 Environmental Consequences

This section describes the potential impacts to cultural resources should the Proposed Action or No Action Alternatives be implemented.

3.8.2.1 No Action

Under the No Action Alternative, no Project related impacts to cultural resources would occur. The landscape in the Project Site would remain relatively unchanged from the present mix of agricultural fields and undeveloped land.

3.8.2.2 Proposed Action

As no historic properties (NRHP-eligible or listed archaeological or architectural resources) would be physically or otherwise adversely affected by the proposed Project, no direct or indirect impacts to archaeological or historic resources are anticipated.

TVA initiated consultation with the SHPO and federally recognized Native American tribes with an interest in the area with respect to these findings of both the archaeological and architectural surveys in a letter dated 29 September 2020. The consultation documentation is included in Appendix C.

Should previously undiscovered cultural resources be identified during Site construction or operations, construction in the affected area will be immediately stopped and the discovery location secured against further disturbance, pending completion of the consultation. TVA and the SHPO will be consulted before any further action is taken.

3.9 Utilities

This section describes an overview of existing utilities within the Project Site and the potential impacts on these utilities that would be associated with the No Action and Proposed Action Alternatives. Specific utility components analyzed below include telecommunications, electricity, natural gas, water, and sewer.

3.9.1 Affected Environment

The Project Site is located on agricultural land in a rural area of Obion County, Tennessee, in between the towns of Union City and Martin. Available power sources to the county residents within the Project Area are electricity and natural gas. No significant renewable energy sources are currently located in the Project Area.

3.9.1.1 Telecommunications

Telecommunication services in the Project Area are provided primarily by AT&T and Spectrum, as well as mobile providers.

3.9.1.2 Electricity

The local electricity provider for most of unincorporated Obion County is Gibson EMC (GEMC), a not-for-profit electric cooperative that purchases power generated by TVA. The existing Weakly-to-Union City transmission line, which would undergo structural upgrades as a result of the Project, crosses the Project Site on the eastern side.

3.9.1.3 Natural Gas

Natural gas service in the vicinity is provided by Atmos Energy. There are no known natural gas transmission pipelines in the Project Site.

3.9.1.4 Water and Sewer

Water and sewer service in the Project Area are provided through the Union City water department or through private wells and septic systems. No known public service water lines or line markers servicing individual customers were observed on the Project Site.

3.9.2 Environmental Consequences

3.9.2.1 No Action Alternative

Under the No Action Alternative, the proposed Solar Facility would not be constructed; therefore, there would be no Project-related impacts to utilities. Existing land use would be expected to remain as agricultural land, and existing utilities would likely remain unchanged with the exception of potential upgrades and maintenance.

3.9.2.2 Proposed Action

Under the Proposed Action, installation of a new gen-tie line by TVA would occur. Electrical service to the Skyhawk Solar Facility would be provided by GEMC. If electrical outages were necessary, GEMC would be responsible for communicating such outages to its consumers. No long-term adverse impacts are anticipated as a result of the Project.

Minimal temporary impacts to local electricity service could be expected when bringing the Solar Facility on-line or during routine maintenance of the facility. Once the Project enters the operation phase, GEMC

would provide the required back-up power for controls. Given the low level of retail electric demand needed for the facility, no changes to the GEMC distribution system would be expected, and there would be no impacts to the local utility or its customers. Implementation of the Proposed Action would result in additional renewable energy resources in the region, which would augment total electricity supply and constitute an improvement to the environmental impacts associated with regional electricity generation.

Water would be needed for soil compaction and dust control during construction, and to a lesser extent for domestic use during operations (i.e., cleaning solar panels). Portable toilet facilities would be available on-site for the duration of the construction period; there would be no need for a septic system or connection to the closest sanitary sewer. Water in sufficient quantity and quality would be made available through use of on-site groundwater wells, or delivery via water trucks during construction. TN Solar's construction contractor would determine daily water requirements based on the preliminary grading plan and size the new on-site wells accordingly. TN Solar's construction contractor would perform groundwater drilling and testing work prior to full construction to generate data on aquifer characteristics and develop a plan for the production well design. If existing groundwater wells are available and needed, they would be utilized for the Project, the exact location of which would be identified in the final design. The wells would be spaced around the Project Site to provide easy access for construction water and to reduce the potential for any significant water level drawdown. Any new wells would be drilled by a licensed Tennessee driller and appropriate notifications and fees would be made to TDEC. During operation, a new domestic, private-use water well may be needed for the operations and maintenance building. Additionally, a new septic system would likely be required for sanitation at the operations and maintenance building.

Natural gas service would not be required for the Project.

No communication resources are anticipated to be acquired through the local providers. TN Solar would have a dedicated communications system to remotely monitor the Project facility and operations.

No long-term adverse impacts to utilities would be anticipated as a result of implementation of the Proposed Action. No indirect impacts to utilities would occur under the Proposed Action. The Proposed Action would result in a new source of renewable energy for the region; thus, the Project would ultimately contribute to a long-term beneficial impact to electrical services across the region.

3.10 Waste Management

This section describes an overview of existing waste management within the Project Area and the potential impacts to waste management that would be associated with the No Action or Proposed Action Alternatives. Components of waste management that are analyzed include solid and hazardous waste and materials.

3.10.1 Affected Environment

"Hazardous materials" and "hazardous waste" are substances which, because of their quantity, concentration, or characteristics (physical, chemical, or infectious), may present a significant danger to public health and/or the environment if released. These substances are defined by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA; 42 U.S.C. §§ 9601 *et seq.*) and the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act ([RCRA]; 42 U.S.C. §§ 6901 *et seq.*). Regulated hazardous wastes under RCRA include any solid, liquid, contained

gaseous, or semisolid waste or combination of wastes that exhibit one or more of the hazardous characteristics of ignitability, corrosivity, toxicity, or reactivity, or is listed as a hazardous waste under 40 CFR part 261. Storage and use of hazardous materials and wastes are regulated by local, state, and federal guidance including the Emergency Planning and Community Right-to-Know Act (42 U.S.C. §§ 116 *et seq.*) and RCRA.

Because the current land use of the Project Site is entirely agricultural or undeveloped, no known hazardous waste exists on the site and none is anticipated aside from potential small volumes of petroleum, residential-grade pesticides, herbicides, or fertilizers that can be removed as part of the construction process.

Collection and disposal of solid waste in Obion County is offered primarily by two main service providers: Red River Waste Solutions and Republic Services. Nonhazardous wastes, including construction wastes, can be hauled to an operating Class I facility.

3.10.2 Environmental Consequences

3.10.2.1 No Action Alternative

Under the No Action Alternative, the proposed Solar Facility would not be constructed; therefore, no Project related impacts to waste management resources would occur. Existing land use would be expected to remain agricultural, and existing waste management conditions would be expected to remain as they are at present.

3.10.2.2 Proposed Action

Construction of the Proposed Action would result in the generation of hazardous and nonhazardous solid waste in the form of construction debris, grading spoils, packaging materials, and general construction waste. Under the Proposed Action, every effort would be made to minimize the amount of waste generated during and after construction of the Project.

Materials suitable for soil compaction activities such as gravel and soils would be brought to the Project Site as needed and off-loaded at the designated road or building location for immediate dispersion. Materials unsuitable for compaction, such as mowed debris, would be removed and loaded immediately for subsequent disposal at an acceptable off-site location. Contaminated grading and mowing materials are not anticipated; however, if any such materials are encountered during excavation, they would be disposed of at the nearest appropriate facility in accordance with applicable laws, ordinances, regulations, and standards. It is estimated that not more than 20 cubic yards of construction debris and material waste would be generated each week (during heavier periods of construction), which would be accumulated in a construction debris container and hauled off monthly. There is only one landfill within a reasonable driving distance of the Project Site, as identified in the table below.

Table 3-16: Waste Facilities Near the Project Site

Landfill	Address	Materials
Northwest Tennessee Disposal Landfill (Republic Services)	518 Beech Chapel Rd, Union City, TN 38261	Municipal wastes, construction and demolition materials, yard trimmings, and scrap metals.

Hazardous Waste

Small quantities of hazardous wastes would be generated during construction, operation and maintenance, and decommissioning of the Project. Hazardous wastes generated during the construction phase would include substances such as paint and primer, thinners, and solvents. Hazardous solid and liquid waste streams that would be generated during operation of the Project include substances such as used hydraulic fluids, used oils, greases, filters, etc., as well as fluorescent light bulbs, spent cleaning solutions, and spent batteries. Hazardous wastes generated during decommissioning would include substances such as carbon dioxide, diesel fuel, hydraulic fuel, and lubricating oil. To the extent possible, hazardous wastes would be recycled. Waste collection and disposal would be conducted in accordance with applicable regulatory requirements to minimize health and safety effects.

TN Solar (or its contractor) would report any spills to TDEC's Division of Solid Waste Management. A sampling and cleanup report would be prepared and sent to the agency to document each spill and clean up. Each spill, regardless of amount, would be cleaned up within 48 hours and a spill report completed. Copies of spill and cleanup reports would be kept on-site.

Minimal amounts of petroleum fuel would be kept on-site during construction. BMPs would be implemented in order to minimize the potential of a spill and to instruct on-site workers on how to contain and clean up any potential spills. The Project Site would be surrounded by security fencing during both construction and operational phases, and access gates would normally remain locked. General public health and safety would not be at risk in the event of an accidental spill on-site.

During construction, hazardous materials would be stored on-site in storage tanks, vessels, or other appropriate containers specifically designed for the characteristics of the materials to be stored. The storage facilities would include secondary containment in case of tank or vessel failure. Construction- and decommissioning-related hazardous materials used for development of the Project could include gasoline, diesel fuel, oil, lubricants, and small quantities of solvents and paints. Material Safety Data Sheets for applicable materials present on-site would be made readily available to on-site personnel.

Fueling of some construction vehicles and other mobile equipment would occur primarily in the construction laydown area. Special procedures would be identified to minimize the potential for fuel spills, and spill control kits would be carried on refueling vehicles for activities such as refueling, vehicle or equipment maintenance procedures, waste removal, and tank clean-out. Fuel for construction equipment could be provided by a fuel truck or could be stored in aboveground double-walled storage tanks with built-in containment. The volume of each individual tank would not exceed 1,320 gallons, the threshold above which a Spill Prevention, Countermeasure and Control (SPCC) Plan would be required (40 CFR 112). However, because there will be fuel in reserve for diesel generators, in addition to the volume of oil contained in the main electrical transformers, the total volume of regulated materials may exceed the threshold. In that case, an SPCC Plan would be prepared.

The SPCC Plan would include procedures, methods, and equipment supplied during construction to prevent discharges from reaching navigable waters. The facility would fall under USEPA's SPCC applicability as a Tier I Qualified Facility. Because oil storage would consist of only "oil-filled operational equipment," double-walled protection would not be required [40 CFR 112.7(k)(2)] and the SPCC plan would not have

to be certified by a Professional Engineer [40 CFR 112.3(g)]. The SPCC plan would be prepared prior to construction to prevent oil discharges during facility operation. The administering agency is the USEPA.

At the end of its useful life, the majority of Project facilities would be decommissioned and dismantled, restoring the site to its previous condition. During decommissioning, above ground equipment and below ground electrical connections would be removed from the Project Site. In addition, concrete pads and foundations would be broken and removed, underground utilities would be abandoned, compacted areas would be scarified, and soils would be stabilized. The majority of decommissioned materials and equipment would be recycled. TN Solar would seek a processor to recycle the solar panels to the highest degree practicable. Materials that cannot be recycled would be disposed of at approved facilities. Alternatively, the Project facilities may be repurposed for new solar technologies available at the end of the plant lifecycle, where equipment, cabling, and foundations would be re-used where practicable. Hazardous materials that could be present during construction and decommissioning of the Proposed Action are included in Table 3-17.

Table 3-17: Summary of Special Handling Precautions for Large Quantity Hazardous Materials

Hazardous Material	Use	Relative Toxicity[1] and Hazard Class[2]	Permissible Exposure Limit	Storage Description; Capacity	Storage Practices and Special Handling Precautions
Diesel Fuel	Equipment Generator refueling and emergency diesel fire pump	Low toxicity; Hazard class – combustible liquid	PEL; none established TLV: 100 mg/m^3	Carbon steel tank (3,600 gallons)	Secondary containment, overfill protection, vapor recovery, spill kit.
Hydraulic fluid (if applicable)	Tracker drive units	Low to moderate toxicity; Hazard class – Class IIIB combustible liquid	TWA (oil mist); 5 mg/m^3 STEL: 10 mg/m^3	Hydraulic drive tank, approx. 20 gallon per tracker drive unit (if applicable) throughout solar field. Carbon steel tank, maintenance inventory in 55-gallon steel drums.	Found only in equipment with a small maintenance inventory. Maintenance inventory stored within secondary containment, alternative measures to secondary containment for equipment would be implemented at the project.
Lube Oil	Lubricate rotating equipment (*e.g.*, tracker drive units)	Low toxicity Hazard class – N/A	None established	Carbon steel tank, maintenance inventory in 55-gallon steel drums.	Secondary containment for tank and for maintenance inventory.

PEL = permissible exposure limit
TLV = threshold limit value
TWA = time weighted average
STEL = short-term exposure limit

[1]Low toxicity is used to describe materials with an NFPA Health rating of 0 or 1. Moderate toxicity is used to describe materials with an NFPA rating of 2. High toxicity is used to describe materials with an NFPA rating of 3. Extreme toxicity is used to describe materials with an NFPA rating of 4.

[2]N/A denotes materials that do not meet the criteria for any hazard class defined in the 1997 Uniform Fire Code.

In addition to the chemicals listed above, small quantities (less than 55 gallons, 500 pounds or 200 cubic feet) of janitorial supplies, office supplies, laboratory supplies, paint, degreasers, herbicides, residential-grade pesticides, air conditioning fluids (chlorofluorocarbons), gasoline, hydraulic fluid, propane, and welding rods typical of those purchased from retail outlets may also be stored and used at the facility. Flammable materials (e.g., paints, solvents) would be stored in flammable material storage cabinet(s) with built-in containment sumps. Due to the small quantities involved and the controlled environment, a spill could be cleaned up without significant environmental consequences.

TN Solar would develop and implement a variety of plans and programs to ensure safe handling, storage, and use of hazardous materials (e.g., Hazardous Material Business Plan). Facility personnel would be supplied with appropriate personal protective equipment (PPE) and would be properly trained in the use of PPE as well as the handling, use, and cleanup of hazardous materials used at the facility and the procedures to be followed in the event of a leak or spill. Adequate supplies of appropriate cleanup materials would be stored on site. If necessary, TN Solar or its contractor would obtain a hazardous waste generator identification number from the State of Tennessee prior to generating any hazardous waste.

Non-hazardous Waste Management

Construction, operation and maintenance, and decommissioning of the Project would generate non-hazardous solid wastes. Facility-related wastes generated during all phases of the Proposed Action would include soiled rags, worn or broken metal and machine parts, defective or broken electrical materials, other scrap metal and plastic, insulation material, empty containers, cardboard, glass, wood/pallets, and other miscellaneous solid wastes including the typical refuse generated by workers. These materials would be disposed of by means of contracted refuse collection and recycling services. Waste collection and disposal would be in accordance with applicable regulatory requirements to minimize health and safety effects, and no waste would be treated on site during construction or operations. Designated contractor and subcontractor personnel would be responsible for daily inspection, cleanup, and proper labeling, storage, and disposal of all refuse and debris produced. Disposal containers such as dumpsters or roll-off containers would be obtained from a proper waste disposal contractor. Records of the amounts generated would be provided to TN Solar. Information on universal wastes anticipated to be generated during Project construction is provided in Table 3-18.

Table 3-18: Summary of Construction Waste Streams and Management Methods

Waste Stream	Origin and Composition	Estimated Frequency of Generation	On-site Treatment	Waste Management Method / Offsite Treatment
Construction waste	Empty material containers	Intermittent	None	Return to vendor
Construction Waste	Used oil, hydraulic fluid, oily rags	Intermittent	None	Recycle wherever practicable, remove to off-site disposal location
Construction Waste	Steel, glass, plastic, wood/pallets, cardboard, paper	Intermittent	None	Recycle wherever practicable, otherwise dispose of at a class I landfill
Sanitary waste	Portable chemical toilets – sanitary waste	Periodically pumped to tanker truck by licensed contractors	None	Ship to sanitary wastewater treatment facility.

The anticipated quantities of waste produced during Project operation are summarized in Table 3-19. Universal wastes and unusable materials produced as a result of implementation of the Proposed Action would be handled, stored, and managed in accordance with Tennessee Universal Waste requirements.

Table 3-19: Summary of Operational Waste Streams and Management Methods

Waste Stream	Origin and Composition	Estimated Volume	Estimated Frequency of Generation	Waste Management Method	
				Onsite	Offsite
Used hydraulic fluid, oils, and grease-petroleum-related wastes	Tracker drives, hydraulic equipment	1,000 gallons/year	Intermittent	Accumulate for <90 days	Recycle
Oily rags, oil absorbent, and oil filters – petroleum-related wastes	Various	One 55-gallon drum/month	Intermittent	Accumulate for <90 days	Send offsite for recovery or disposed at Class I landfill
Spent batteries	Lead acid/lithium ion	1,000	Every 10 years	Accumulate for <90 days	Recycle

Waste collection and disposal would be conducted in accordance with the Solid and Hazardous Waste Rules and Regulation of the State of Tennessee (TDEC DSWM Rule 0400 Chapters 11 and 12, respectively). To the extent practicable, waste would be recycled. Materials that could not be recycled would be disposed of at an approved facility to be determined by the designated contractor(s). No waste oil would be disposed of on the Project Site.

Any spills related to the Project would be reported to TDEC's Division of Solid Waste Management. A sampling and cleanup report would be prepared for the Project Site and sent to TDEC to document each spill and clean up. Each spill, regardless of amount, would be cleaned up within 48 hours and a spill report would be completed. Copies of any spill and cleanup reports would be kept on site.

Designated contractor and subcontractor personnel would be responsible for daily inspection, cleanup, and proper labeling, storage, and disposal of all refuse and debris produced. Disposal containers such as dumpsters or roll-off containers would be obtained from a proper waste disposal contractor. Records of the amounts generated would be provided to the designated Solar Facility environmental specialist.

3.11 Public and Occupational Health and Safety

This section describes an overview of existing public health and safety at the Project Site and the potential impacts to public health and safety associated with the No Action and Proposed Action Alternatives. Analyzed issues include emergency response and preparedness and occupational or worker safety in compliance with the Occupational Safety and Health Administration (OSHA) standards.

3.11.1 Affected Environment

The Project Site is currently private property, with a predominant land use activity of agricultural. Public emergency services in the area include fire protection services, law enforcement services, urgent care clinics, and hospitals. Fire protection services are provided by the Union City Fire Department, approximately 3.5 miles from the Project Site. Law enforcement services in the Town of Union City are

provided by the Union City Police Department. Obion County law enforcement services are provided by the Obion County Sheriff's Department in Union City. There is a Fast Pace Health Urgent Care clinic in both Union City and Martin. The Union City clinic, located on Reelfoot Ave, is approximately 9 minutes from the Project Site. The Martin clinic, located on Courtright Road, is approximately 8 minutes from the Project Site. The Baptist Memorial Hospital is the closest hospital, located in Union City approximately 4 miles (6 minutes) northwest of the Project Site. The Tennessee Emergency Management Agency (TEMA) has the responsibility and authority to coordinate with state and local agencies in the event of a release of hazardous materials.

3.11.2 Environmental Consequences

3.11.2.1 No Action Alternative

Under the No Action Alternative, the proposed Solar Facility would not be constructed; therefore, no Project related impacts on public health and safety would result. Existing land use would be expected to remain as agriculture, and existing public health and safety issues would be expected to remain as they are at present.

3.11.2.2 Proposed Action

Based on typical hazards associated with construction, workers on the Project Site would have an increased safety risk during construction. Due to increased safety risks associated with construction, standards such as those developed by OSHA would be implemented to maintain health and safety on all construction sites. Health and safety plans in compliance with OSHA standards outline and implement BMPs for site safety management in efforts to minimize potential health and safety risks to workers. BMPs include initial site safety orientations for all personnel on-site; development of work procedures and programs for site specific activities; use of equipment safety measures, emergency stop-work procedures, lockout and tag out procedures, general site housekeeping, personal protective equipment; safety inspections; and plans and procedures to identify and resolve potential safety hazards.

Fuel for construction vehicles may be stored on-site during construction. An SPCC plan would be developed and implemented to minimize the potential of a spill and to provide detailed instructions for on-site personnel on how to contain and clean up any potential spills. Any hazardous materials stored within the Project Site during construction would be secure and not accessible to the general public. General public health and safety would not be at risk in the event of an accidental spill on site. Emergency response for any potential incidents at the Project Site would be provided by the local, regional, and state law enforcement, fire, and emergency responders, as described in the prior section.

A minor increase in potential public health and safety hazards could result from increased traffic on local roadways during construction of the Project. The few residential sites along roadways used by construction traffic to access the Project Site would experience increased commercial and industrial traffic during construction. Established traffic procedures and awareness of these residences would be implemented in the health and safety plans to minimize potential safety concerns associated with the temporary increase in traffic.

No public health or safety hazards would be anticipated from operation of the Solar Facility. Impacts to public health and safety associated with implementation of the Proposed Action would be temporary and minor.

3.12 Transportation

This section describes roadways and other transportation infrastructure serving the Project Site and surrounding area and the potential impacts on transportation resources that would be associated with the No Action and Proposed Action Alternatives. Components of transportation resources that are analyzed include roads, traffic, railroads, and airports.

3.12.1 Affected Environment

3.12.1.1 Solar Facility

The area considered for transportation is located within the northeast portion of Obion County, Tennessee, with the cities of Union City to the northwest and Martin to the southeast in Weakley County. All roads are paved, two-lane roads unless otherwise noted.

Regional access is provided by State Route 22 (SR 22), a four-lane divided highway, and State Route 431 (SR 431/Martin Highway) (Figure 1-1). Both highways run roughly east to west between Union City and Martin in the north of the Project Site.

Beginning in the north, SR 22 runs east-west along the northern edge of the Project Site. The northernmost parcel associated with the Solar Facility is accessible by driveways on its southern property line along SR 431. Just 1500 feet west of Thompson parcel, a major interchange with SR-22 occurs at Shaffner Road. Shaffner Road becomes Airport Road south of the intersection with SR 431. Airport Road and SR 431 provide access to the other Solar Facility parcels.

Existing traffic volumes on roads surrounding the Project Site were determined using the 2018 and 2020 Average Annual Daily Traffic (AADT) counts measured at existing Tennessee Department of Transportation (TDOT) stations (TDOT 2018, 2020a, and 2020b). The AADT is the average number of vehicles traveling along a roadway each day. Based on information reported by TDOT, for three of the four traffic stations located near the proposed Solar Facility, average daily traffic has actually decreased between 2018 and 2020, as shown in Table 3-20.

Table 3-20: Existing Average Annual Daily Traffic & One-Way Peak Hour on Roads Near the Project Site

Roadway	Average Annual Daily Traffic (2018)	Average Annual Traffic (2020)	Number of Lanes
SR 431 / Martin HWY - near Weakley County line (Station 101)	1,815	1,660	2
SR 431 / Martin Hwy – SE of Union City, west of North Fork Obion River (Station 100)	2,833	2,669	2
SR 22 - Connector Rd to SR 431 (Station 191)	6,451	6,125	4
SR 22 – near Weakley County line (Station 161)	9,501	9,631	4

Source: TDOT 2020a and 2020b

The Everett-Stewart Regional Airport (UCY) is surrounded by the Project Site. It is accessible from SR 431 via Airport Road. The airport's north-south runway measures approximately 6,500 feet and is adjacent to County PV 498 parcel's eastern property line. The Airport has a single runway and averages approximately 78 operations per day (AirNav, 2020).

The nearest rail line runs northeast between Rives and Union City. Approximately one-mile northwest of parcel County PV 498, the railroad is a Class I freight carrier operated by Canadian National (CN) (CN, 2020).

3.12.1.2 Transmission Upgrades

The 161kV Union City to Weakley aerial transmission line associated with the Project crosses five roads overhead in both Obion and Weakley counties.

3.12.2 Environmental Consequences

3.12.2.1 No Action Alternative

Under the No Action Alternative, the proposed solar project would not be constructed. Therefore, no project-related impacts to transportation resources would result. Existing land use would be expected to remain as agricultural land, and the existing transportation network and traffic conditions would be expected to remain as they are at present.

3.12.2.2 Proposed Action

Solar Facility

The construction and operation of the Project would have no effect on operation of the airports in the region. The operation of the Project would not affect commercial air passenger traffic or freight traffic in the region and would not adversely affect any aerial crop dusters operating in the vicinity of the Project Site.

During construction of the proposed Solar Facility, a crew of approximately 150 to 300 people would be present at the Project Site between sunrise and sunset, seven days a week. A majority of these workers would likely come from the local area or region. Other workers would come from outside the region, and many would likely stay at hotels in Union City and Martin. It is anticipated that workers would drive personal vehicles to the Project Site. Some of the individual workers and work teams would likely visit local restaurants and other businesses during the construction phase of the Project. Additional traffic due to deliveries and waste removal would consist of approximately five vehicles per day during construction, as discussed in more detail below.

Traffic flow around the Project Site would be heaviest at the beginning of the workday, at lunch, and at the end of the workday. Deliveries and most workers would likely access the Project Site from the east and west along SR 431/Martin Hwy. Should substantial traffic congestion occur, TN Solar, or its contractor, would implement staggered work shifts to assist traffic flow near Project Site access locations. Implementation of such mitigation measures would minimize potential adverse impacts to traffic and transportation to negligible levels.

Construction equipment and material delivery and waste removal would require approximately 20 flatbed semi-trailer trucks or other large vehicles visiting the Project Site each day during the 12-month

construction period. The Project Site can be accessed via routes that do not have load restrictions. These vehicles should be easily accommodated by existing roadways; therefore, only minor impacts to transportation resources in the area surrounding the Project would be anticipated as a result of construction vehicle activity.

At least one permanent on-site access roads would be maintained within the Project Site (see Figure 2-1). Access points during construction include multiple existing access points along Airport Road and at least two access points along SR 431/Martin Hwy. Permanent access to the Skyhawk Substation and Skyhawk Switching Station would be off of Airport Road.

The Solar Facility would be staffed by up to four full-time workers who would live in the area. The addition of vehicles for full-time staff on local roadways would be accommodated by existing infrastructure; therefore, the operation of the Project would not have a noticeable impact on the local roadways.

Transmission Upgrades

As previously noted, the majority of the 16-mile existing TL where upgrade activities would occur is located in open fields and agricultural land. Workers would access the right-of-way via existing access roads that occur along nearly the entire length of the corridor. In Weakley County, the TL crosses four public thoroughfares: US Hwy 45, State Hwy 43, Baker Road (State Hwy 216), and Mt. Pelia Road. In Obion County, the TL crosses three public thoroughfares: Martin Highway (State Hwy 431), the State Hwy 431/22 Interchange, and E. Reelfoot Avenue (State Hwy 431). While upgrades are occurring along the TL, minor increases in traffic could occur from worker commutes and material deliveries. Any increase in traffic would be very short term and temporary. Actual construction activities are not anticipated to occur within the above listed roadways. Once construction is complete, traffic would return to its preconstruction levels almost immediately.

The overall direct impacts on transportation resources associated with implementation of the Proposed Action would be moderate during construction due to the influx of workers traveling to the job site. These impacts would be temporary and minimized through appropriate mitigation. The Proposed Action would not result in any indirect impacts on transportation.

3.13 Socioeconomics

3.13.1 Affected Environment

The Project Site is located approximately 3.5 miles east-southeast of Union City in Obion County, Tennessee. Obion County is identified as the area of impact regarding socioeconomics.

3.13.1.1 Socioeconomic Environment

Total population for Obion County, as reported by the U.S. Census Bureau (USCB), was 31,807 in 2010 and an estimated 30,267 in 2018 (USCB 2020a). Top employers in Obion County are primarily in the food and beverage sector and include Tyson Foods and Williams Sausage Company (Obion 2020a). Top employment industries for Obion County are education, healthcare, social services, manufacturing, and retail trade (USCB 2020b). Obion County offers cultural and recreational activities as well as economic

opportunities for residents. The county hosts a variety of events such as markets and annual festivals and provides public access to waterways, parks, and attractions (Obion 2020b).

Union City is the county seat to Obion County and is one of nine major towns (Obion, 2020c). In 2018, Obion County had a labor force of approximately 13,610 with 12,747 employed and 863 unemployed civilians. The unemployment rate for 2018 was an estimated 6.3%. By comparison, the unemployment rate for the state of Tennessee in 2018 was an estimated 5.9%. The median household income in Obion was $39,866 and 17.8% of households in the county made between $50,000 to $74,999 in income and benefits. By comparison, the median household income in Tennessee was $50,972 and 18.4% of households made between $50,000 to $74,999 in income and benefits (USCB 2020b).

3.13.2 Environmental Consequences

This section describes the potential impacts to socioeconomic resources should the Proposed Action or No Action Alternative be implemented. Social and economic issues considered for evaluation within the impact area include change in expenditures for goods and services and short- and long-term effects on employment and income.

3.13.2.1 No Action Alternative

Under the No Action Alternative, the proposed Solar Facility would not be constructed. Therefore, there would be no project-related socioeconomic impacts within Obion or Weakly Counties, including the beneficial impacts to local population, employment, and land value associated with the proposed Project.

3.13.2.2 Proposed Action

Under the Proposed Action, a new Solar Facility would be built at the Project Site. Construction activities at the Project Site would take approximately 12 months to complete with a crew of approximately 150 to 300 workers at the site, depending on construction activities. Workers would include general laborers and electrical technicians. Work would generally occur seven days a week during daylight hours; although in certain circumstances, construction activities may be required on Sundays or during evening hours. Short-term beneficial economic impacts would result from construction activities associated with the Project, including the purchase of materials, equipment, and services and a temporary increase in employment and income. This increase would be local or regional, depending on where the goods, services, and workers were obtained. It is likely some construction materials and services would be purchased locally in Obion and Weakly Counties and/or in adjacent counties. Most of the other components of the solar and transmission facilities would be acquired from outside the local area. Also, most of the construction workforce would be sought locally or within the region, while a small portion of the construction workforce might come from out of the region. The direct impact on the economy associated with construction of the Project would be short-term and beneficial.

The majority of the indirect employment and income impacts would be from expenditure of the wages earned by the workforce involved in construction activities, as well as the local workforce used to provide materials and services. Construction of the Project could have minor beneficial indirect impacts to population and short-term employment and income levels in the surrounding region.

Minor adverse indirect impacts could occur on the agricultural economy of the region due to the loss of 690 acres of annual soybean and corn production. TN Solar would be leasing the parcels for the Solar Facility which results in a higher lease payment to the landowner than agricultural production does. However, the loss of agricultural land would adversely impact the farmers working the land as well as other services that support agricultural production. These impacts would be minimal, and the economic benefit of the Project would outweigh the adverse impacts.

During operation of the Solar Facility, a full-time workforce of up to four people would be on site seven days a week from 7 A.M. to 5 P.M. This workforce would manage and maintain the Solar Facility and conduct regular inspections. Grounds maintenance and some other operation and maintenance activities may be conducted by local contractors. Therefore, operation of the Solar Facility would have a small positive impact on employment and population in Obion and/or Weakly County.

Overall, socioeconomic impacts for the operation of the proposed Solar Facility would be positive and long-term, but negligible relative to the total economy of the region. The local tax base would increase from construction of the Solar Facility and would be most beneficial to Obion County and the vicinity. Additionally, the local governments would not have to provide any of the traditional government services typically associated with a large capital investment, such as water, sewer, or schools.

3.14 Environmental Justice

This section provides an overview of environmental justice considerations within the Project Area and the potential impacts to environmental justice populations that would be associated with the No Action and Proposed Action Alternatives. Components of environmental justice that are presented include the proportions of the local population that are minority and low-income and the potential for disproportionate effects on these populations.

3.14.1 Affected Environment

EO 12898 – Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations was issued in 1994 with the purpose of focusing federal attention on the environmental and human health effects of federal actions on minority and low-income populations. The E.O.'s goal is to achieve environmental protection for all communities. Per the E.O., federal agencies are directed to identify and address minority and low-income populations that are disproportionately affected by adverse human health and environmental effects to the greatest extent practicable and permitted by law (USEPA, 2020f). While not subject to this E.O., TVA routinely considers environmental justice in its NEPA review process.

A low-income population is considered a community or group of individuals that live in geographic proximity to one another, or a set of individuals such as American Indians or migrant workers who meet the standards for low income and experience common conditions of environmental exposure or effect. Low-income populations located in an affected area are identified using the annual statistical poverty thresholds provided by the USCB's annual current population reports (Series P-60) on poverty and income. Poverty is defined as the number of individuals or families with income below a defined threshold level (Spies et al., 2018). Obion County's estimated poverty rate for 2018 was 17.7%. By comparison, the state of Tennessee had a poverty rate of approximately 15.3%. (USCB, 2020a). Based on the USEPA's

Environmental Justice Screening and Mapping Tool (EJSCREEN), 40 percent of the population block (ID# 471319658001) that the Project is located in, is considered low income (EJSCREEN 2020g).

Minority individuals are those who are members of the following demographics: American Indian or Alaskan Native, Asian or Pacific Islander, Black (not of Hispanic origin), or Hispanic. CEQ defines a "minority population" as a readily identifiable group of people residing in geographic proximity with a population comprised of 50 percent minority or greater or an identifiable group that has a meaningfully greater minority population than the adjacent geographic areas, or may also be a geographically dispersed set of individuals such as Native Americans or migrant workers (Spies, Stine, Gravenmier, Long, & Reilly, 2018). The minority population in Tennessee in 2018 was approximately 25% and in Obion County was approximately 16% (USCB, 2020a). Based on the USEPA's EJSCREEN tool, 10 percent of the population block (ID# 471319658001) that the Project is located in, is considered minority population (EJSCREEN 2020h).

3.14.2 Environmental Consequences

This section describes the potential impacts on environmental justice populations should the Proposed Action or No Action Alternative be implemented. According to the CEQ, adverse health effects to be evaluated within the context of environmental justice impacts may include bodily impairment, infirmity, illness, or death. Environmental effects may include ecological, cultural, human health, economic, or social impacts. Disproportionately high and adverse human health or environmental effects occur when the risk or rate of exposure to an environmental hazard or an impact or risk of an impact on the natural or physical environment for a minority or low-income population is high and appreciably exceeds the impact level for the general population or for another appropriate comparison group (CEQ 1997).

3.14.2.1 No Action Alternative

Under the No Action Alternative, there would be no changes attributable to the proposed solar project within Obion County that would create disproportionately high and adverse direct or indirect impacts on minority or low-income populations.

3.14.2.2 Proposed Action

No minority populations have been identified in the potentially affected area. For an area to be considered an Environmental Justice "low income population" or "minority population" over 50% of the population within that group needs to be low income or minority. Based on the analysis of impacts for all resource areas presented in this EA, it was determined that there would be no significant adverse health impacts on members of the public or significant adverse environmental impacts on the physical environment (water, air, aquatic, and terrestrial resources) and socioeconomic conditions. As there are no identified environmental justice communities in the block group within which the proposed Project is located, there would be no disproportionately high or any adverse direct or indirect impacts on minority or low-income populations due to human health or environmental effects resulting from the Proposed Action.

4 ANTICIPATED ENVIRONMENTAL AND CUMULATIVE IMPACTS

This chapter summarizes the anticipated adverse environmental impacts of the Project and considers the relationship between short-term uses and long-term productivity and whether the Project makes irreversible and irretrievable commitments of resources. This chapter also considers the cumulative impacts in relation to other ongoing or reasonably foreseeable proposed activities within the Project Site and the surrounding area.

4.1 Unavoidable Adverse Environmental Impacts

As described in Section 2, Table 2-1, the Proposed Action could result in some unavoidable adverse environmental effects. Specifically, construction activities would temporarily increase noise, traffic, and health and safety risks and temporarily affect air quality, GHG emissions, and visual aesthetics of the Project Site vicinity. Construction activities would primarily be limited to daytime hours, which would minimize noise impacts. The table below provides a summary of potential unavoidable impacts and the proposed mitigation measures designed to address each impact.

Table 4-1: Unavoidable Impacts and Proposed Mitigation for the Skyhawk Solar Project

Impact Type	Location	Description	Mitigation Measure
Floodplain	Solar Facility	Temporary construction activities within floodplain. Permanent placement of solar arrays and buried collection lines within floodplain.	When rain events greater than ½ inch are predicted, remove large construction equipment from the floodplain during overnight parking, temporary stabilization measures where exposed soils are located, and maintaining any soil stockpiles outside the boundaries of the floodplain. Once in operation, the support structures would not impede floodplains or floodwaters. Panels would be greater than 1 foot above BFE.
Floodplain	Transmission Upgrades	Pole replacements and access roads within floodplain.	Any fill, gravel or other modifications in the Cane Creek regulated floodway that extend above the pre-construction road grade will be removed after completion of the project.
			Any excess material would be spoiled outside of the floodplain boundaries.
			The area will be returned to its pre-construction condition immediately following site restoration
			Road construction other than within the Cane Creek floodway would be done in such a manner that upstream flood elevations would not be increased by more than 1.0 foot
			Construction would adhere to the TVA subclass review criteria for transmission line location in floodplains

Impact Type	Location	Description	Mitigation Measure
Regulated Floodway	Transmission Upgrades	Pole replacement within the regulated floodway	Any fill, gravel or other modifications in the floodway that extend above the pre-construction road grade would be removed after completion of the project
			Excess material would be spoiled outside of the published floodway
			The area would be returned to its pre-construction condition
Soils	Solar Facility	Permanent loss of prime farmland soils.	If fill or soil removal were needed, the topsoil would first be stripped and segregated. Once fill or other intense earthwork was complete, the topsoil would be reapplied to the surface.
Vegetation	Solar Facility	Removal of agricultural vegetation resulting in a large area of exposed soil.	Seeding Solar Facility with native and non-invasive low-growing grasses and flowers that would attract pollinators.
Visual	Solar Facility	Four residences that lack natural screening buffers between their homes and the Project Facility.	TN Solar would coordinate with the homeowners, construction contractors, and the array layout designers to determine the most suitable type of buffer to be used in each location where the visual environment for residents has undergone a long-term change due to the Project.
Noise	Solar Facility	Potential for increased noise levels to residents within 500 feet of inverters.	For residences that are within 500 feet of an inverter, a pre-construction sound study including an ambient survey would be conducted to quantify the existing ambient environment. After the project reaches commercial operation, TN Solar would measure the sound levels at residential property lines and identify any equipment that generates a Ldn sound level that exceeds 55 dBA at the property line. If there are locations where noise levels exceed that threshold, TN Solar would install sound buffers (walls, fences with screening, or vegetation) in order to minimize the noise levels from operating equipment.
Transportation	Solar Facility	Delivery trucks and most workers would likely access the Project Site from the east and west along SR 431/Martin Hwy which could result in traffic congestion along SR 431 and Airport Road.	Should substantial traffic congestion occur, TN Solar, or its contractor, would implement staggered work shifts to assist traffic flow near Project Site access locations. Implementation of such mitigation measures would minimize potential adverse impacts to traffic and transportation to negligible levels.

For residents within 500 feet of inverters, pre-construction ambient noise levels would be compared to fully-operational levels. If a L_{dn} sound level from the inverters exceeds 55 dBA at the property line, TN Solar would install sound buffers (walls, fences with screening, or vegetation) in order to minimize the

noise levels from operating equipment. Additionally, if the existing vegetation is not sufficient to provide a natural screening buffer for the six residences along Airport Road and Richards Road, TN Solar or its construction contractor would either plant thick shrubs or install a privacy fence along the perimeter of the Solar Facility in this particular area. TN Solar would work with these landowners to identify the most suitable screening buffer at each of the six homes.

Temporary increases in traffic would be minimized or mitigated by staggering work shifts and/or posting a flag person during the heavy commute periods if needed. Temporary increases in health and safety risks would be minimized by implementation of the Project health and safety plan. Construction and operations would have minor, localized effects on soil erosion and sedimentation that would be minimized by placement of construction BMPs, early soil stabilization, and vegetation management measures. Selective maintenance of tree buffers and/or fence screening (existing vegetated fence rows) along the perimeter of the Solar Facility would minimize effects to visual resources, during both construction and operation. The Project would change land uses on the Project Site from primarily agricultural to solar energy uses, where these practices are not presently occurring.

With the installation and routine maintenance of appropriate BMPs, no unavoidable adverse effects to groundwater are expected. Long-term habitat loss would occur due to alteration of land use on the Project Site. Revegetation of the Project Site with native and/or noninvasive grasses and herbaceous vegetation would help minimize effects to open, grassy habitats. The Project would not adversely affect any federal or state-listed species, or any NRHP eligible historic resources.

4.2 Relationship of Short-term Uses and Long-term Productivity

Short-term uses are generally those that occur on a year-to-year basis, such as wildlife foraging, agricultural activities, recreation, and uses of water resources. Long-term productivity is the capability of the land to provide resources, both to market and nonmarket, for future generations. For this EA, long-term impacts to site productivity would be those that last beyond the life of the Project. The Proposed Action would affect short-term uses of the Project Site by converting it from agricultural land to solar power generation. However, the effects on long-term productivity would be minimal because the existing land uses could be readily restored on the Project Site following the decommissioning and removal of the Solar Facility.

4.3 Irreversible and Irretrievable Commitments of Resources

An irreversible or irretrievable commitment of resources would occur if resources would be consumed, committed, or lost as a result of the Project. The commitment of a resource would be considered irretrievable if the Project would directly eliminate the resource, its productivity, or its utility for the life of the Project and possibly beyond. Construction and operation activities would result in an irretrievable and irreversible commitment of natural and physical resources. The implementation of the Proposed Action would involve irreversible commitment of fuel and resource labor required for the construction, maintenance, and operation of the solar energy system. Because removal of the solar arrays and associated on-site infrastructure could be accomplished rather easily, and the facility would not irreversibly alter the site, the Project Site could be returned to its original condition or used for other productive purposes once the Solar Facility is decommissioned. Most of the Solar Facility components could also be recycled after the facility is decommissioned.

4.4 Cumulative Impacts

A cumulative impact, as defined by the Council on Environmental Quality (CEQ), is described as an impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but aggregately significant actions taking place over a period of time (40 CFR 1508.7). A cumulative impacts analysis acknowledges the effects of the proposed alternatives on the various environmental resources. The analysis also recognizes the effects of other past, present, and reasonably foreseeable future actions, and describes the cumulative or additive effects that may result. While some cumulative effects, however minimal, can be established for virtually any resource or condition, the effects described in this EA are considered to be the most applicable and representative of those associated with the Proposed Action. Cumulative impacts associated with the Proposed Action are described below in the following resource sections.

Chapter 3 of this EA presents information about past and present environmental conditions, as well as future trends, where appropriate. This chapter addresses the cumulative impacts of the Project when combined with any reasonably foreseeable future action in the vicinity.

Desktop research of potential past, present, and future actions in the Obion and Weakly Counties, Tennessee area was conducted. Resources examined included:

- Local and regional news sources.
- Town of Union City and Town of Martin website records, including planning commission meetings, city meeting minutes, and public notices; and
- Tennessee DOT website.

The proposed Project would result in minor direct impacts to land use, geological resources and farmlands, visual resources, noise, air quality, public health and safety, and transportation.

4.4.1 Federal Projects

Obion and Weakly Counties are within Region 4 of TDOT. There are currently 18 projects listed in Region 4 that are pending or are in progress. None of the 18 Projects are within the Project Site or located along the roadways that would be crossed by the transmission upgrade work (TDOT 2020c).

4.4.2 State and Local Projects

Based on a review of local and regional news sources and economic development websites for both Union City and the town of Martin, there are no known state or local developments currently underway or planned in the foreseeable future that would contribute to a cumulative impact on the same land use, geological resources and farmlands, visual resources, noise, air quality, public health and safety, and transportation resources that would also be affected by the Proposed Action.

5 LIST OF PREPARERS

Name/Education	Experience	Project Role
TVA		
Ashley Pilakowski B.S. Environmental Management	9 years in environmental planning and policy and NEPA compliance.	NEPA Compliance and Project Management
Adam Dattilo M.S. Forestry B.S. Natural Resource Conservation	16 years in ecological restoration and plant ecology, 9 years in botany	Vegetation
Elizabeth B. Hamrick M.S. Wildlife and Fisheries ScienceB.A. Biology	18 years conducting field biology, 13 years technical writing, 9 years NEPA and ESA compliance	Terrestrial Ecology, Threatened and Endangered Species
A. Chevales Williams B.S., Environmental Engineering	14 years of experience in water quality monitoring and compliance; 13 years of NEPA planning and environmental services	Surface Water
Craig Phillips B.S. and M.S. Wildland and Fisheries Science	12 years sampling and hydrologic determination for streams and wet weather conveyances, 11 years in environmental reviews	Aquatics
Carrie Williamson, P.E., CFM M.S., Civil Engineering; B.S., Civil Engineering	6 years Floodplains, 3 years River Forecasting, 2 years NEPA Specialist, 7 years compliance monitoring.	Floodplains
Michaelyn Harle Ph.D., Anthropology; M.A. Anthropology; B.A. Anthropology	19 years in cultural resource management	Cultural and Historic Resources, Section 106 Compliance
Burns & McDonnell		
Jesse Brown B.A. Biology M.S. Biology	10 years in NEPA documentation, environmental permitting, protected species evaluations, and wetland delineations.	Document Preparation, Field Survey Coordination, Field Survey Biologist, Habitat Assessment, Deputy PM
John Fulmer B.A. Anthropology M.A. Anthropology	More than 20 years of experience surveying, documenting, and report writing for cultural and archeological resources	Senior Technical Reviewer
Olivia Haney B.S. Chemistry Certificate: Natural Resources and Environmental Studies	2 years of environmental permitting, wetland and waterbody surveys, and GIS support	Mapping and impact calculations
Ellen Pennington B.S. Ecological Restoration B.S. Renewable Natural Res.	3 years of environmental permitting and NEPA documentation.	Document Preparation

Name/Education	Experience	Project Role
Claire Randall M.S. Biology	3 years of environmental permitting and NEPA documentation.	Document Preparation
Doug Shaver M.S. Environmental & Urban Geosciences Registered Professional Archeologist	12 years' experience in cultural, archeological, and Native American Studies. Graduate Certification in Native American Studies. Graduate Certification in Historic Preservation	Principal Investigator and lead author for cultural resources.
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