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HORUS KENTUCKY 1 SOLAR PROJECT
FINAL ENVIRONMENTAL ASSESSMENT
Simpson County, Kentucky and Sumner County, Tennessee

Prepared for:
Tennessee Valley Authority
Chattanooga, Tennessee

Submitted by:
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c/o Horus Renewables Corporation

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Table of Contents

List of Appendices

List of Tables

List of Figures

Symbols, Acronyms, and Abbreviations

AADT	Average Annual Daily Traffic
AC	Alternating Current
ACHP	Advisory Council on Historic Preservation
AJD	Approved Jurisdictional Determination
APE	Area of Potential Effects
ASL	Above Sea Level
ATV	All-Terrain Vehicle
BMP	Best Management Practices
CAA	Clean Air Act
CBMPP	Construction Best Management Practices Plan
CE	Categorical Exclusion
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CUP	Conditional Use Permit
CWA	Clean Water Act
dB	Decibel
dBA	A-Weighted Decibels
dbh	Diameter at breast height
DC	Direct Current
DEA	Draft Environmental Assessment
DNL	Day-Night Average Sound Level
EDR	Environmental Data Resources
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right to Know Act
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FPPA	Farmland Protection Policy Act
GHG	Greenhouse Gas
GPR	Ground Penetrating Radar
GPS	Global Positioning Systems
HUC	Hydrologic Unit Map
IF	Isolated Find
IPaC	Information for Planning and Consultation
IRP	Integrated Resource Plan
IT	Information Technology
KPDES	Kentucky Pollutant Discharge Elimination System
KPSC	Kentucky Public Service Commission
KYSB	Kentucky State Board on Electric Generation and Transmission Siting
KYTC	Kentucky Transportation Cabinet
kV	Kilovolt
lf	Linear feet

MW	Megawatt
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NLEB	Northern Long-Eared Bat
NO_x	Nitrogen Oxide
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NPS	National Park Service
NWI	National Wetlands Inventory
O_3	Ozone
O&M	Operation & Maintenance
OHSA	Occupational Safety and Health Act
PAH	Polynuclear Aromatic Hydrocarbon
$PM_{2.5}$	Particulate matter equal to or less than 2.5 micrometers in aerodynamic diameter
PM_{10}	Particulate matter equal to or less than 10 micrometers in aerodynamic diameter
PV	Photovoltaic
PPA	Power Purchase Agreement
RCRA	Resource Conservation and Recovery Act
RFP	Request for Proposal
REC	Recognized Environmental Condition
SFHA	Special Flood Hazard Areas
SHPO	State Historic Preservation Office
SO_2	Sulfur Dioxide
SOI	Secretary of the Interior
SPCC	Spill Prevention Control and Countermeasure
SWPPP	Storm Water Pollution Prevention Plan
ROW	Right-of-Way
TDEC	Tennessee Department of Environment and Conservation
THC	Tennessee Historical Commission
TNW	Traditional Navigable Waters
TVA	Tennessee Valley Authority
TWRA	Tennessee Wildlife Resource Agency
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geologic Survey
VOC	Volatile Organic Compound
WOTUS	Waters of the U.S.

CHAPTER 1 – PURPOSE AND NEED FOR ACTION

1.1 Introduction

The Tennessee Valley Authority (TVA) proposes to enter into a Power Purchase Agreement (PPA) with Horus Kentucky 1, LLC (referred to herein as Horus Kentucky Solar), the facility-specific entity affiliated with Horus Renewables Corporation (Horus Renewables), to purchase the proposed power generated by the Proposed Horus Kentucky 1 Solar Project (Project). Under the terms of the conditional PPA between TVA and Horus Kentucky Solar, dated December 27, 2019, TVA would purchase the electric output generated by the proposed solar facility for an initial term of 15 years, subject to satisfactory completion of all applicable environmental reviews. The Project would include up to 69.3-megawatts (MW) alternating current (AC) in generating capacity and would be constructed and operated by Horus Renewables.

Following a detailed evaluation of various alternatives (please refer to Section 2), the Project would occupy approximately 550 acres of rural agricultural land, roughly five miles to the southeast of Franklin in Simpson County, Kentucky (see Figure 1.1 – Proposed Project Site Layout). The 550-acre tract is known herein as the "Project Site." The Project would also include a transmission upgrade component (herein referred to as the Project Transmission Line Upgrades) that would occur along approximately 20.96 miles of existing TVA Transmission Lines L5402 and L5775 (see Figure 2.5 – Proposed Upgrades to Transmission Line L5402 & L5775), as well as proposed access road improvements (see Figure 2.5 – Proposed Access Road Improvements Along L5402 & Figure 2.6 – Proposed Access Road Improvements Along L5775). The Project Site would be occupied with multiple parallel rows of solar photovoltaic (PV) panels on single-axis tracking structures, associated racking, direct current (DC) to AC inverters, and project substation transformer which would connect to TVA's existing L5402, 161-kilovolt (kV) transmission line, which would transmit power to the TVA network. TVA's L5402 traverses the Project Site at its central-southeast corner.

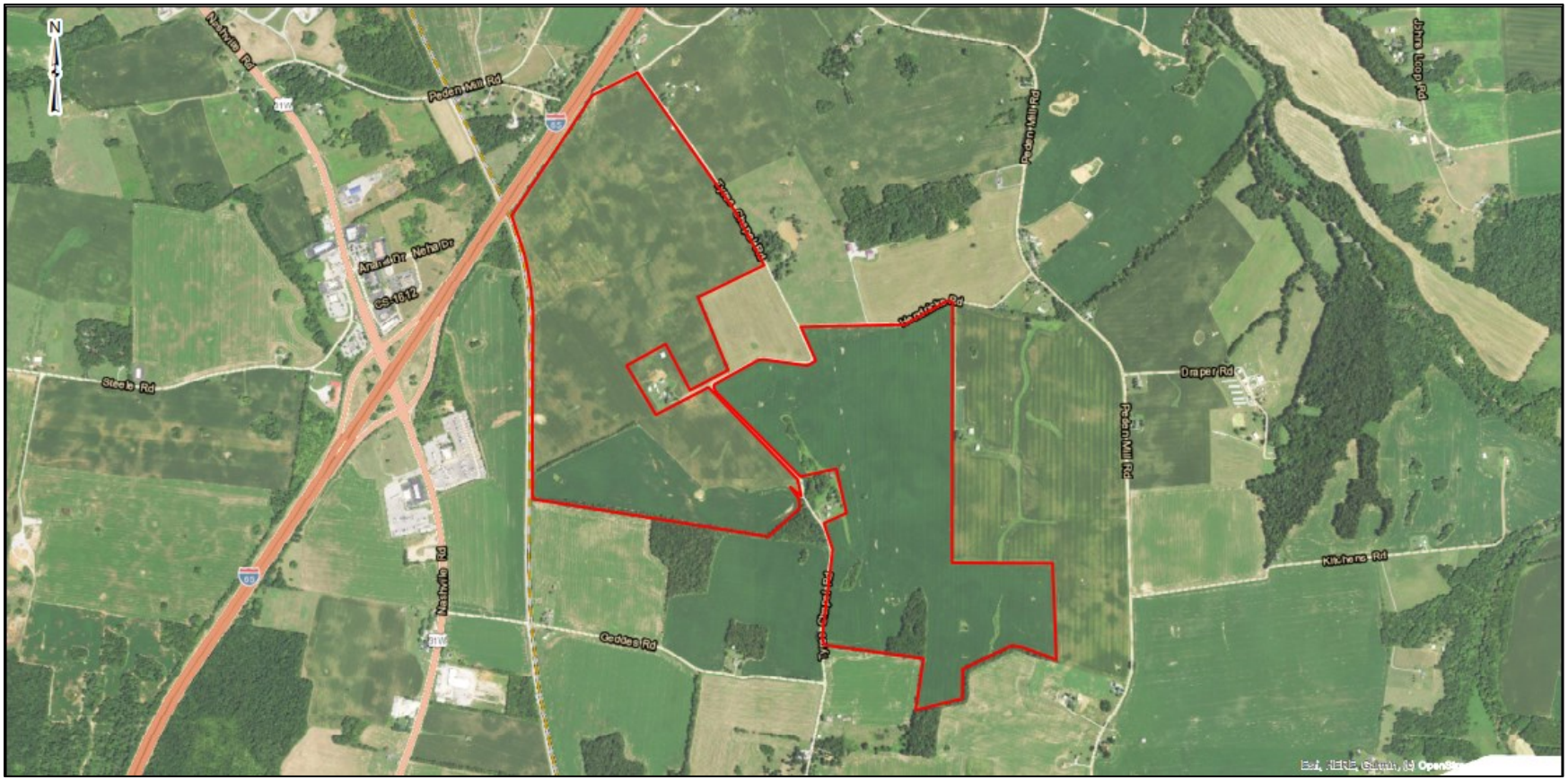

Figure 1.1 Proposed Project Site Layout

1.2 Purpose and Need for Action

TVA is a corporate agency of the United States and the largest public power provider in the country. Through our partnership with 153 local power companies, TVA supplies energy across 80,000 square miles for 10 million people, 750,000 businesses, and 56 large industrial customers, including military installations and the U.S. Department of Energy facilities at Oak Ridge, Tennessee. Our service area includes parts of seven southeastern states called the Tennessee Valley. Since 1933, TVA's mission has been to serve the people of the region to make life better. TVA continues to execute on that mission today as we serve the Tennessee Valley through our commitment to leadership and innovation in energy, the environment, and economic development. TVA has one of the largest, most diverse, and cleanest energy-generating systems in the nation characterized by low carbon, low rates, and high reliability – maintaining 99.999% reliability to our customers since 2000.

TVA produces or obtains electricity from a diverse portfolio of energy sources, including solar, hydroelectric, wind, biomass, fossil fuel, and nuclear. The 2011 TVA Integrated Resource Plan (IRP) (TVA 2011) established the goal of increasing its renewable energy generating capacity by 1,500 to 2,500 MW by 2020. 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 and to reduce environmental impacts. TVA's 2015 IRP (TVA 2015a) reinforced the continued expansion of renewable energy generating capacity, including the addition of between 175 and 800 MW (AC) of solar capacity by 2023. In June 2019, TVA released the final 2019 IRP and the associated Environmental Impact Statement (EIS)(TVA 2019a). This updated IRP provides further direction on how TVA will deliver clean, reliable and affordable energy in the Tennessee Valley over the next 20 years, and the associated EIS describes the natural, cultural and socioeconomic impacts associated with the IRP. The 2019 IRP recommends solar expansion and anticipates growth in all scenarios analyzed, with most scenarios anticipating 5,000-8,000 MW and one anticipating up to 14,000 MW by 2038 (TVA 2019a).

In 2019, customer demand prompted TVA to release a Request for Proposal (RFP) for renewable energy resources (2019 Renewable RFP). The PPAs that resulted from this RFP (including the Horus Kentucky Solar PPA) will help TVA meet immediate needs for additional renewable generating capacity in response to customer demands and fulfill the renewable energy goals established in the 2019 IRP. Therefore, the Proposed Action would provide cost-effective renewable energy consistent with the IRP and TVA goals.

The Proposed Action would directly help TVA meet this need for additional solar capacity under its IRP. In addition, the construction and operation of the Project Site has the potential to minimize the cost of electricity within the area and reduce air emissions due to the lack of fossil fuels used to generate electricity.

1.3 Scope of the Environmental Assessment

Pursuant to the National Environmental Policy Act of 1969 (NEPA), and its implementing regulations promulgated by the Council of Environmental Quality (CEQ) under Title 40, Code of Federal Regulations (CFR), §§ 1500-1508, Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (CEQ Regulations), Federal agencies are required to evaluate the potential environmental impacts of their proposed actions. Therefore, this Environmental Assessment (EA) was prepared in accordance with NEPA and TVA's Procedures for Implementing NEPA (18 CFR Part 1318; Updated March 27, 2020) to

assess TVA's Proposed Action and the associated impacts of the construction, operation, and interconnection.

This EA describes the existing environment within the Project Area, analyzes potential environmental impacts associated with the Proposed Action and the No Action Alternatives, and identifies and characterizes cumulative impacts that could result from the Proposed Action in relation to other on-going or reasonably foreseeable proposed activities within the surrounding area of the Project Site. As stated in the PPA, TVA's obligation to purchase renewable power is contingent upon the satisfactory conclusion on the environmental review and TVA's determination that the Proposed Action is deemed to be "environmentally acceptable and consistent with environmental analyses completed for and contained within TVA's environmental review and prepared in accordance with Applicable Law". To further determine the acceptability of the Proposed Action, TVA shall take into account Applicable Law, including laws protecting cultural, historic, archaeological, biological, and other environmental resources, and shall mean that the location, operation, and maintenance of the Project Site and any associated facilities shall not result in unacceptable impacts inconsistent with the purposes, provisions, and requirements of Applicable Law as well as other federal, state, and local environmental laws and regulations.

Based on TVA scoping, identification of applicable laws, regulations and policies, and executive orders, the EA identifies and analyzes the following resources areas: Land Use, Natural Areas, Parks, and Recreation; Geology, Soils, and Prime Farmland; Water Resources (Groundwater, Surface Water, Floodplains, Wetlands); Biological Resources (Vegetation, Wildlife, Threatened & Endangered and Other Rare Species); Cultural Resources; Visual Resources; Noise; Transportation; Air Quality and Climate Change; Public Health and Safety; Solid Waste and Hazardous Waste; Socioeconomics and Environmental Justice; and Cumulative Impacts.

Given the nature of the project, the following resources are not found in the study area or would not be impacted by any of the project alternatives: architectural survey along the Proposed Transmission Line Upgrades. It should be noted that architectural and visual resource surveys were not required along the Proposed Transmission Line Upgrades within Kentucky and Tennessee as any height change of the transmission lines are proposed to be no greater than 7-10 feet in height from the existing infrastructure.

The EA consists of the following six chapters discussing the alternatives considered, resource areas that would be potentially affected, and analysis of potential impacts. Additionally, the EA includes an Appendix, which contains applicable correspondence regarding the Project. The structure of the EA is outlined below:

- **Chapter 1**: Introduces the purpose and need for the Project, the decision to be implemented, related environmental reviews and consultation requirements, necessary permits or licenses, and the EA document overview.
- **Chapter 2**: Describes the Proposed Action and No Active Alternatives, provides a comparison of the Alternatives considered, and discussed the Preferred Alternative.
- **Chapter 3**: Discusses the affected environmental and potential impacts (direct and indirect) on the identified resource areas, as well as appropriate mitigation measures. In addition, it discusses cumulative impacts in relation to the other on-going and reasonably foreseeable proposed activities within the surrounding area of the Project site.
- **Chapter 4**: Contains the list of recipients of the EA document.

- **Chapter 5**: Contains the list of preparers of the EA document.
- **Chapter 6**: Contains the list of references cited in preparation of this EA document.
- **Appendix**: Consultation correspondence and comments received on Draft EA, Geotechnical Investigations and Karst Study Reports, Natural Resources Reports, Cultural Resources Reports, Phase I Environmental Site Assessment Report, Glare Memo, Noise Sound Level Assessment Report, and Transportation Effect and Route Evaluation Study.

1.4 Public Agency and Involvement

The Draft EA was issued for public review and comment for a 30-day period from June 15 through July 15, 2021. The Draft EA was posted on the TVA website, and notices of its availability and requests for comments was sent to government agencies, organizations, and individuals who have indicated an interest in the Project. TVA also typically announces its availability and requests for comments in a press release and in the local media outlets.

1.5 Other Environmental Reviews and Documentation

TVA conducted three separate Categorical Exclusions (CEs) on June 30, 2020, November 9, 2020, and December 16, 2020, to allow for geotechnical investigations to be conducted as part of the due diligence efforts to determine the feasibility of construction and potential need for acquisition of additional property in support of the Project. The geotechnical investigation scope of work included the use of diesel-powered all-terrain vehicle (ATV) or track-mounted drill rig for drilling to determine the general subsurface conditions and soil properties. The boreholes were subsequently backfilled with the soil cuttings to the existing ground surface. In addition, the remaining spoils were scatted on the surface around the bore location. The scope of work did not include any tree removal or construction of an access road to accommodate the drill rig(s).

1.6 Permits, Licenses, and Approvals

Based on the scope of the proposed construction activities, as described in Chapter 2, the Project would likely require a Kentucky Pollutant Discharge Elimination System (KPDES) construction general permit issued by the Kentucky Energy and Environment Cabinet. A general KPDES permit would require the development of a Stormwater Pollution Prevention Plan (SWPPP) and implementation of approved pollution prevention measures. The SWPPP would address the design, inspection, and maintenance of Best Management Practices (BMPs) utilized during construction activities. In addition, Conditional Use Permits (CUPs) have been issued by the Franklin-Simpson County Zoning Board of Kentucky, which was a requirement for the Project. Lastly, a Certificate to Construct a Merchant Electric Generating Facility issued by the Kentucky State Board on Electric Generation and Transmission Siting (KYSB), which is a division within the Kentucky Public Service Commission (KPSC) would be required for the Project. Currently, a KYSB Case No. 2020-00417 has been assigned for the Project.

CHAPTER 2 - ALTERNATIVES

Chapter 2 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 Description of Alternatives

2.1.1 The No Action Alternative

This alternative provides a baseline of conditions against which the impacts of the Proposed Action Alternative can be measured. Under the No Action Alternative, TVA would not purchase the power generated by the Project under the 15-year PPA with Horus Renewables. Therefore, this Project would not be constructed, operated, or maintained by Horus Renewables. The existing conditions (such as land use, water resources, biological resources, visual resources, cultural resources, and socioeconomics) within the Project Site would remain unchanged, the property would remain as agricultural land, and associated agricultural activities would likely continue on-site. Furthermore, TVA would continue to rely on other sources of power generation as described in its 2019 IRP, to ensure an adequate energy supply while still meetings its goals for increased renewable energy generating capacity. Environmental conditions in the Project Area would remain unchanged in the immediate future.

2.1.2 The Proposed Action Alternative

Under the Proposed Action Alternative, TVA would purchase the power generated by the Proposed Horus Kentucky Solar Project under the 15-year PPA with Horus Renewables. This EA assesses the impact of TVA's action to enter into the PPA and the associated impact of the construction and operation of the Project by Horus Renewables and the electrical interconnection.

Solar Facility

Horus Renewables would construct, operate, and maintain an up to 69.3-MW PV solar power generation facility. The Project would be constructed on approximately 550 acres of privately-owned rural agricultural land which is comprised of four (4) currently farmed tracts of land located less than five miles southeast of Franklin, Simpson County, within the Commonwealth of Kentucky. Based on a review of information obtained from the Simpson County, Kentucky Property Valuation Administrator (PVA) record, the northwest portion of the Project Site is split into three (3) parcels: northeast parcel (Parcel ID No. 043-00-00-025.00; currently owned by Summers Rosdeutscher Farm LLC); northwest parcel (Parcel ID No. 043-00-00-026.00 currently owned by Summers Hodges Farm LLC); and southwest parcel (Parcel ID No. 044-00-00-011.00; currently owned by Summers Hodges Farm LLC). The southeastern and southwestern portions of the Project Site are split by Tyree Chapel Road; however, both portions are included in one (1) parcel (Parcel ID No. 044-00-00-012.00; currently owned by Roger D. Hoffman). The Project Site is currently bound to the north by Interstate-65 (I-65) and Old County Farm Road; to the east by Tyree Chapel Road and Hendricks Road; to the south by Tyree Chapel Road; and to the west by railroad tracks (see Figure 1.1 – Proposed Project Site Layout). The Project Site would occupy predominantly cultivated agricultural fields (see Figure 2.1 – Representative Photograph of Horus Kentucky Solar Project Area).

Figure 2.1 Representative Photograph of Horus Kentucky Solar Project Area

The Project Site is approximately 750 feet above sea level (ASL). The southeast portion of the Project Site is relatively flat, with a slight gradient towards the northeast. Southwest and northwest portions of the Project Site have varied topographic gradient due to rolling topography (see Figure 2.2 – Proposed Horus Kentucky Solar Project Site – Topographic Map).

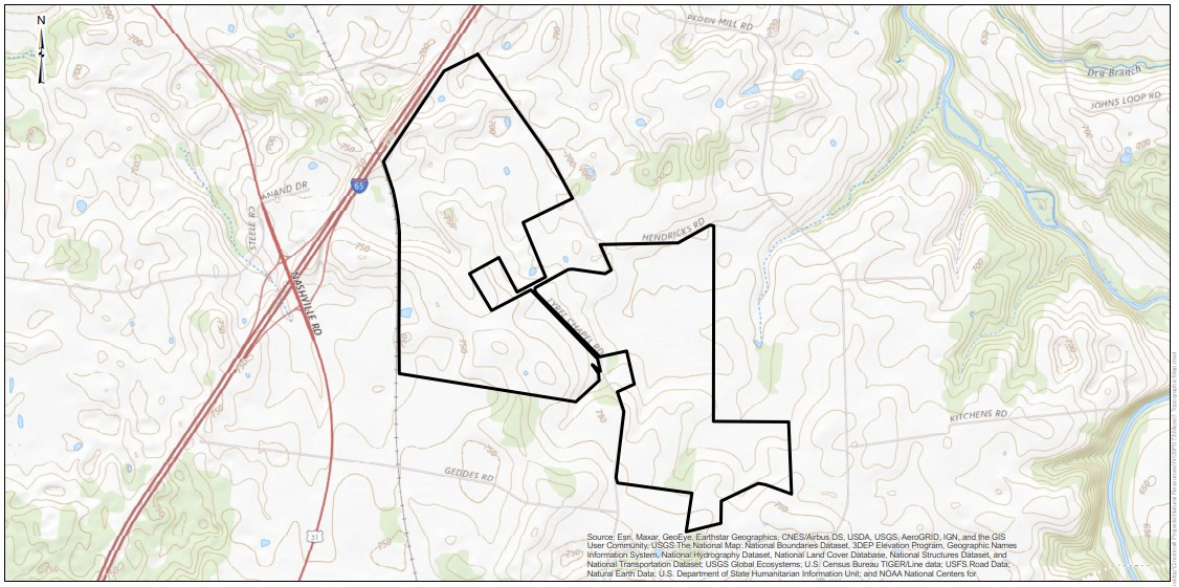

Figure 2.2 Proposed Horus Kentucky Solar Project Site – Topographic Map

The Project Site would be occupied with multiple parallel rows of solar PV panels (total of 163,632 PV panels) on single-axis tracking structures, associated racking, 22 DC to AC inverters, and a project substation transformer. The Project would connect to the existing TVA transmission network by providing a new 161-kV tap point on the existing Franklin-Portland (L5402) 161-kV line that traverses the Project Site at its central-southeast corner, which would transmit power to the TVA network.

Approximately 500 acres of the 550 acres would be occupied by PV panels, and the remaining approximate 50 acres would be occupied by ancillary equipment and infrastructure to support the Project or would remain undeveloped. The PV panels would be mounted on motor-operated axis tracker structures, which are commonly referred to as single-axis trackers. These single-axis trackers are designed to pivot the panels along their north-south axes to follow the path of the sun across the sky from the east to west direction. The tracker assemblies would be constructed in parallel north-south rows using steel piles installed at an average height of 7.5 feet off ground to the top of the panel at a 55-degree full-tilt, with a resting angle to be set to 0 degrees. The perimeter of the Project Site would be enclosed with security fencing (see Figure 2.3 – Proposed Horus Kentucky Solar Project Site Layout).

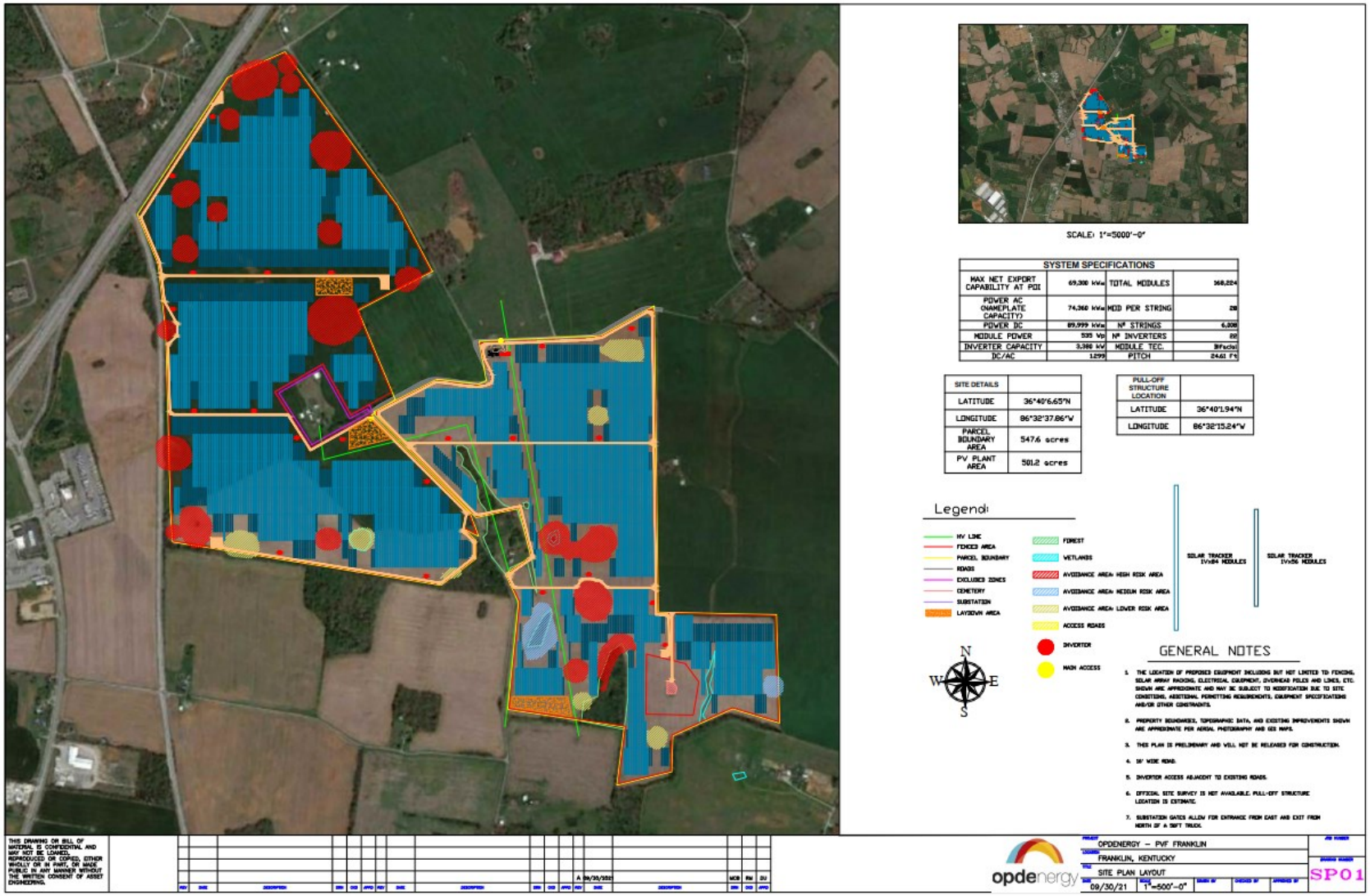

Figure 2.3 Proposed Horus Kentucky Solar Project Site Layout

Network Transmission Line Upgrades

In order to support the operations of Horus Kentucky Solar, structural upgrades to approximately 20.96 miles of existing transmission lines (L5402 and L5775) connecting to the Project would also be required. The Proposed Transmission Line Upgrades would encompass both structure replacements and upgrades along the edge of the existing right-of-way (ROW) and the height change of structures are proposed to be no greater than 7-10 feet in height from the existing infrastructure. All upgrade work would occur at existing TVA substations and on existing TVA transmission lines within existing ROW. No new property or easement rights would be needed. Transmission Line L5402 is approximately 10.94 miles in length that originates at the Project Site in Franklin, Kentucky, runs south and terminates in Portland, Tennessee. Transmission Line L5775 is approximately 10.03 miles in length that originates at Wilson, Tennessee, runs northeast and terminates in Gallatin, Tennessee. This work is being completed since the current conductor size cannot support the load required for these transmission line sections and the conductor must be replaced and upgraded. Bucket trucks would be utilized for access and stringing equipment. Reels of conductor would be delivered to various staging areas along the ROW, and temporary clearance poles would be installed at road crossings to reduce interference with traffic. The new conductor would be connected to the old conductor and pulled down the line through pulleys suspended from the insulators. A bulldozer and specialized tensioning equipment would be used to pull conductors to the proper tension. Crews would then clamp the wires to the insulators and remove the pulleys. Wire pulls vary in length but are limited to a maximum of 5 mile pulls. Pull point locations depend on the type of structures supporting the conductor as well as the length of conductor being installed. Pull points are typically located along the most accessible path on the ROW (adjacent to road crossings or existing access roads). After the work is completed, the ROW would be revegetated using native, low-growing plant species in appropriate areas. Areas such as pasture, agricultural fields, or lawns would be returned to their former condition. The proposed transmission line structure upgrades will herein be referred to as the “Project Transmission Line Upgrades” (see Figure 2.4 – Proposed Upgrades to Transmission Line L5402 & L5775).

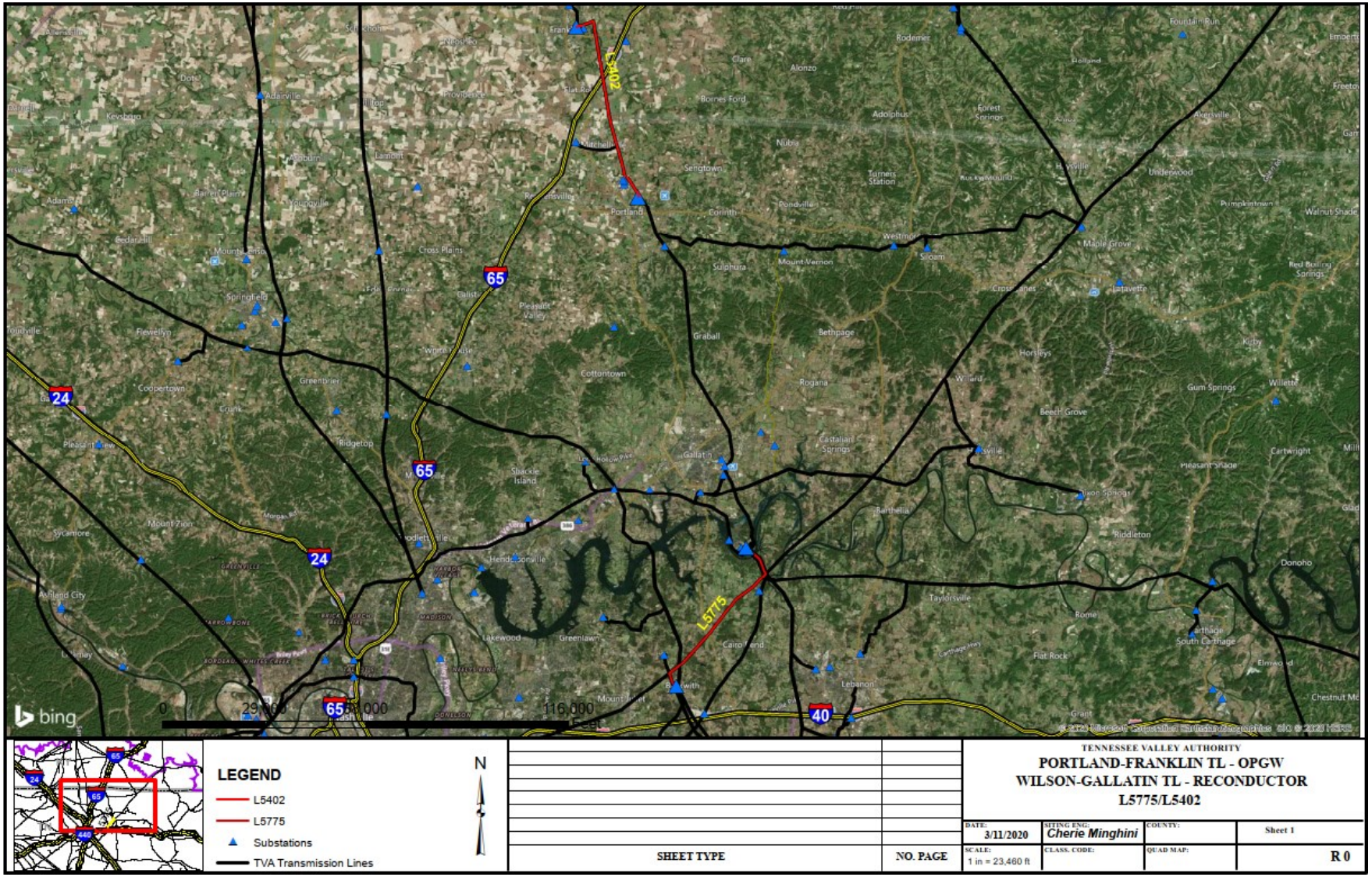

Figure 2.4 Proposed Upgrades to Transmission Lines L5402 & L5775

Access Roads

TVA's Proposed Action would result in the need for additional access roads associated with the Project Transmission Line Upgrades. Access roads are typically about 12 to 16 feet wide and are surfaced with dirt, mulch, or gravel. Additional access roads would be needed to allow vehicular access to each structure and other points along the ROW. Typically, new permanent or temporary access roads used for transmission lines are located on the ROW whenever possible and are designed and located to avoid severe slope conditions and to minimize impacts to environmental resources.

The proposed access road improvements associated with the transmission line structure upgrades will herein be referred to as the "Access Road Improvements" and are depicted in red (see Figure 2.5 – Proposed Access Road Improvements Along L5402 & Figure 2.6 – Proposed Access Road Improvements Along L5775).

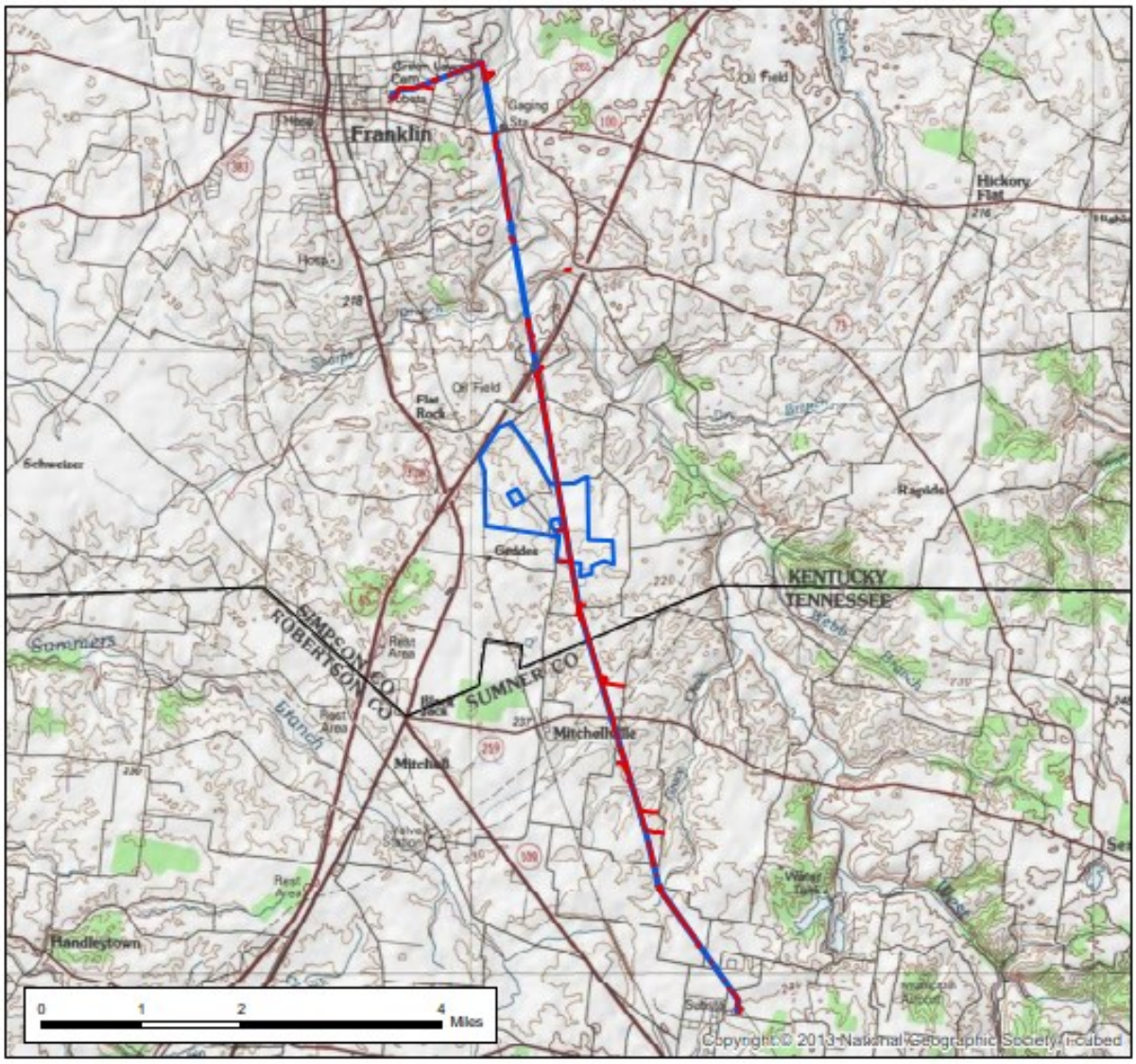

Figure 2.5 Proposed Access Road Improvements Along L5402

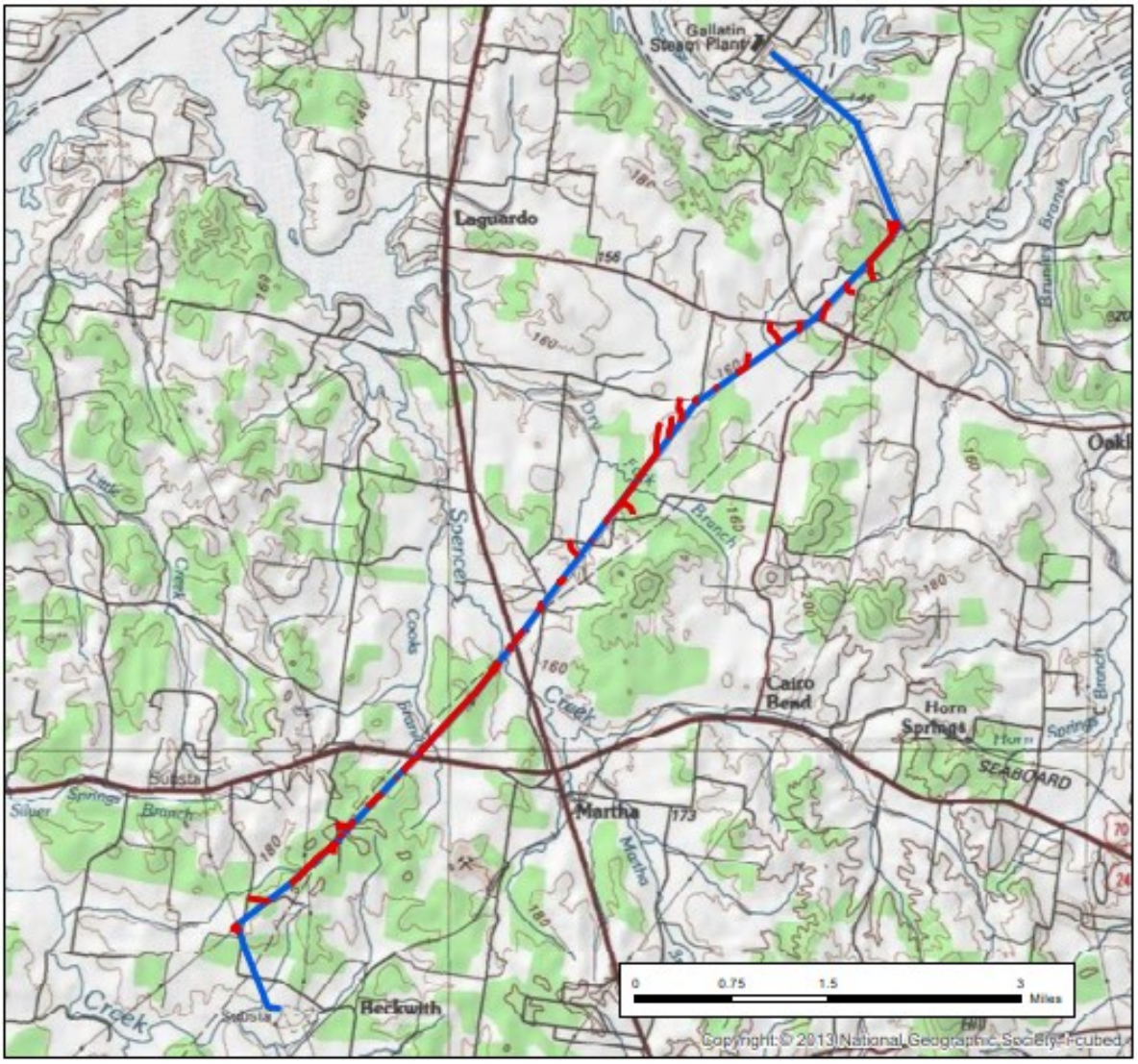

Figure 2.6 Proposed Access Road Improvements Along L5775

Therefore, the total area under evaluation in this Environmental Assessment (EA) is referred to as the "Project Area" which includes the 550-acre solar power generation facility, approximately 20.96 miles of proposed transmission line structure upgrades, and associated access road improvements.

Construction

Construction activities would take approximately 12 months to complete using a crew of ranging from a minimum of 50 workers to a peak of 300 workers. The park construction period is expected to last approximately four months. Construction activity would occur between the hours of 7:00 a.m. and 8:00 p.m., Monday through Saturday, with the exception of holidays. Additional hours after dark could be necessary to make up schedule deficiencies or to complete critical construction activities. Night-time construction, if deemed 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 sensitive receptors including nearby households. Construction of the Project Site

would require site preparation to including surveying and staking, removal of vegetation, light grading and clearing, installation of a perimeter security fence, installation of sedimentation basins, and preparation of construction laydown areas. Following site preparation, solar arrays would be assembled and constructed which would include driving steel pikes for the tracker support structures, installation of the solar panels, and electrical connections and testing and verification of the facility's functionality.

During construction, various acres within the Project Site would be used as construction assembly areas (also called laydown areas) for worker assembly, safety briefings, vehicle parking, temporary offices, and material storage. Some of the assembly areas, which would be spread out across many of the Project parcels, would be staged within the locations proposed for the PV solar arrays. The laydown areas would be on-site for the duration of construction. Temporary construction trailers for material storage and office space would be parked on-site. Following completion of construction activities, trailers, unused materials, and construction debris would be removed from the Project Site. Construction materials would be transported by track and/or rail to the Project Site, where materials would be staged, assembled, and moved into place. No operations and maintenance buildings or other permanent construction would be on-site.

Horus Kentucky Solar would use the existing landscape, such as slope, drainages, and roadways where feasible, minimizing grading work where practicable. Grading activities that could not be avoided would be performing using mobile earth-moving equipment, resulting in a fairly consistent slope on land. Native topsoil would be preserved to the greatest extent practicable during grading. In addition, native topsoil would be stockpiled on-site and preserved for redistribution over the disturbed area after grading is complete. After the construction, the disturbed areas would be seeded with native seed mixture of certified weed-free, low-growing, non-invasive grasses, and herbaceous plants. Flowering vegetation also would be used, if available, to attract pollinator species such as honeybees and butterflies. Furthermore, erosion control measures and BMPs would be inspected and maintained until the status of the vegetation within the disturbed areas returns to the pre-construction environment of the Project Site. Water would be used for fugitive dust control and/or soil compaction during construction on an as-needed basis.

To manage stormwater during construction, on-site temporary sediment traps and erosion control silt fence would be utilized. All buffered streams and wetlands would be protected by erosion control silt fences, and sediment traps would be placed in strategic drainage areas to prevent sediment from entering on-site stream and wetlands. Off-site sediment migration would be moderated by placement of silt fences around each area of ground disturbance within the Project Site. These stormwater BMPs would minimize the potential for sediment to enter on-site jurisdictional streams and wetlands and to minimize sediment migration off-site during construction. Once sufficient revegetation cover is achieved, the Project Site would be considered stabilized and temporary construction BMPs would be discontinued and/or removed. Water would be provided by tanker trucks as needed for dust control and other general Project uses. Portable toilets would be located on-site.

Construction would be sequenced to minimize the time that bare soil on the disturbed areas would be exposed. As described above, silt fences would surround the perimeter of the area to be cleared and graded. Other appropriate controls such as temporary cover would be used as needed to minimize exposure to soil and to prevent eroded soil from leaving the work area. Disturbed areas including but not limited to road shoulder, 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. As part of the KPDES permit authorization (see Section 1.7), 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 could vary depending on the final PV technology and vendor selected. Based on preliminary geotechnical exploration results for the Project Site, the trackers would 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 would be driven with a hydraulic ram. Soil disturbance would be restricted to the pile insertion location to a depth typically less than 20 feet below grade. The solar panels would be manufactured off-site and shipped to the Project Site ready for installation. All final electrical collection cables would be underground, and electricians would run the electrical cabling throughout the Project Site. The trenches to hold the cabling are typically approximately 3 to 4 feet deep and 2 to 12 inches wide. The trenches would be backfilled with native soil and appropriately compacted.

Project Operations

Operations of the Horus Kentucky Solar Facility would require routine maintenances such as periodic motor replacement, inverter air filter replacement, fence repair, vegetation control, array inspection, repairs, and maintenance. The Project would implement traditional mechanized landscaping using lawnmowers, string trimmers, etc. Traditional trimming and mowing would be performed periodically to maintain the vegetation at a height ranging from 6 inches to 2 feet. Selective use of herbicides may also be employed around structures to help control weeds. Products used would be limited to post-emergent herbicides and would be applied by a professional contractor. While some minor disturbance could occur to soils with traditional landscaping practices, no major physical disturbance would occur as a result of facility operation. Moving parts of the facility would be restricted to the east-to-west tracking motion of the solar modules, which typically amounts to a movement of less than 1-degree angle every few minutes which makes this movement barely perceptible. The solar modules would start to backtrack west to east in a similar slow motion to minimize shading in the late afternoon. At sunset, the solar modules would track to a flat stow position. Otherwise, the solar modules would simply collect solar energy and transmit it to the TVA power grid.

With the exception of fence repair, vegetation control, and periodic array inspection, repairs, and maintenance, the Project Site would require relatively little human activity during operation. No water or sewer service, or permanent lighting would be required on-site during project operations. In addition, precipitation in this region is adequate to remove dust and other debris from the PV panels while maintaining energy production. Therefore, manual panel washing is not anticipated unless a specific issue is identified. The Project Site would be monitored remotely to identify any security or operational issues. If a problem is discovered during non-working hours, repair or law enforcement personnel would be contacted if an immediate response is warranted.

Security fencing (six-foot high chain link fencing, without razor wire at the top) would enclose the Project Site; the project substation would have its own additional security fencing. All fencing would meet the National Electric Safety Code requirements. Site entrances would be gated and locked when workers are not on-site and security cameras would be in place during construction and operations of the facility.

Decommissioning and Reclamation
Following the expiration of the 15-year PPA with TVA, Horus Renewables would reassess the Project operation and determine whether to cease operation or attempt to enter into a new PPA or other arrangement. If TVA or another entity is willing to enter into such an arrangement, the Project would continue operating. If no commercial arrangement is possible, the Project would be decommissioned and dismantled, and the Project Site would be restored. As the lease agreement with the landowners would be for an average of 30 to 40 years, site control would be maintained for longer than the 15-year PPA period, and Horus Renewables may attempt to renegotiate further PPA terms with TVA. In general, the majority of decommissioned equipment and materials would be recycled. Materials that cannot be recycled would be disposed of appropriately at approved facilities in accordance with applicable federal, state, and local laws and regulations. Horus Renewables would develop a decommissioning plan to document recycling and disposal of materials in accordance with applicable laws and regulations. If additional PPA terms are arranged or if TVA chooses to operate the facility, these activities would be evaluated through separate NEPA processes.

2.1.3 Alternatives Considered but Eliminated from Further Discussion

In determining the suitability for development of a proposed solar facility within TVA's existing service area that would meet the goals of expanding TVA's renewable energy portfolio as determined in the 2019 IRP, various factors were considered to screen potential solar facility locations. Ultimately, various potential sites were eliminated as they did not provide the needed attributes such as location within TVA's service area, location near existing electric infrastructure for interconnection, contiguous land to accommodate solar arrays, generally flat landscape with minimal slope, land with suitability geology for construction suitability, and minimal features like floodplains, wetlands, surface water features, or large forested areas. Lastly, through initial due diligence, Horus Renewables focused on land which would avoid or minimize impacts to known sensitive biological, visual, and cultural resources. While various tracts of land were considered as part of the initial due diligence, due to potential confidentiality issues, specific location and ownership details of previously considered tracts of land will not be provided in detail within this EA document. The process of screening potential locations and ultimately eliminating sites that did not possess the necessary attributes led to the selection of the Project Site.

2.2 Comparison of Alternatives

The environmental impacts anticipated under the No Action and the Proposed Action Alternative are compared and summarized below in Table 2-1. These summaries are derived from the information and analyses provided in the Affected Environment and Environmental Consequences sections of each resource evaluated in Chapter 3.

Table 2.1 Summary and Comparison of Alternatives by Resource Area

Resource Area	Impacts from No Action Alternative	Impacts from Proposed Action Alternative
Land Use, Natural Areas, Parks, and Recreation	No direct or indirect impacts anticipated	Conversion of agricultural land to solar generation is consistent with Simpson County's zoning. Minor direct adverse impacts as land use on the Project Site would change from agricultural to industrial. Project construction would not result in a long-term adverse direct impact. The surrounding area is largely agricultural, undeveloped, and

		residential, which would not change. No indirect impacts to natural areas, parks, and recreation.
Geology, Soils, and Prime Farmland	No direct or indirect impacts anticipated	Project would directly impact agricultural production for the duration of the Project. Minor direct impacts on potential shallow subsurface geological resources. In addition, minor temporary direct impacts related to erosion and sedimentation during construction. Once stabilized and Project is operational, impacts on soils would be offset by the beneficial effects to soil health with the use of native and non-invasive vegetation. Direct impacts on farmland from the conversion of agricultural land to solar generation for the duration of the Project.
Water Resources	No direct or indirect impacts anticipated	Potential minor beneficial impacts to groundwater and surface water from reducing fertilizer and pesticide runoff from current farming operations entering surface and/or groundwater once agricultural operations cease at Project Site. Minor temporary direct impacts from sedimentation due to run-off from ground disturbing activities (minimized through implementation of BMPs) until Project Site is stabilized. Delineated streams and wetland features are being avoided as part of project design. No direct or indirect adverse impacts to wetlands. Minor direct impacts to floodplains due to access road construction.
Biological Resources	No direct or indirect impacts anticipated	Three main vegetation communities would be affected: actively cultivated bean and corn fields, hay pastures, and forested land. Negligible and temporary minor impacts on wildlife during construction. Wildlife that can use early successional habitat is expected to return to Project Site once operational. No significant impact or long-term impacts on migratory birds of conservation concern. Avoidance and minimization measures would be used to ensure no significant impacts to federal or state-listed species would occur.
Cultural Resources	No direct or indirect impacts anticipated	Due to TVA's Avoidance Agreements for known NRHP-eligible and NHRP-listed sites, no impacts on archaeological resources would be anticipated. Identified cultural resources would be avoided from ground disturbing activities in project design. No adverse effect anticipated on architectural resources.
Visual Resources	No direct or indirect impacts anticipated	Minor temporary impacts would occur during construction due to the alteration of the existing agricultural viewshed and construction activity. Moderate direct impacts would occur during operation of Project Site due to presence and quantity of solar panels. Impacts on residents within the vicinity of Project Site would be minimized through the presence of existing natural screening buffers (forest areas and

		topography) as well as privacy fence and vegetative screening buffer that would be placed along Project boundaries.
Noise	No direct or indirect impacts anticipated	Minor temporary noise impacts during construction. Negligible adverse impacts from noise associated with operation.
Transportation	No direct or indirect impacts anticipated	Minor temporary impacts from increased traffic during construction (workers commuting to/from Project Site and transportation of equipment). Negligible direct impacts on transportation would occur from an operational standpoint.
Air Quality & Climate Change	No direct or indirect impacts anticipated	Minor temporary impacts in local air emissions from construction activities, but no impacts to air quality from an operational standpoint. Negligible increase in carbon dioxide from heavy equipment vehicles. However, net positive impact would occur from operation of nearly emissions-free power generation by the Project, off-setting power that would otherwise be generated by the combustion of fossil fuels.
Public Health & Safety	No direct or indirect impacts anticipated	Minor temporary impacts during construction. No public health or safety hazards anticipated as a result of Project operations.
Solid Waste & Hazardous Waste	No direct or indirect impacts anticipated	Minor impact from generation of solid waste during construction. BMPs would be implemented during construction.
Socioeconomics & Environmental Justice	No direct or indirect impacts anticipated	Beneficial impacts to regional socioeconomics from construction and operation of the Project, which would include the purchase of materials, equipment, and services and temporary increase in employment, income, and population. Local tax base would increase from construction of project with benefits to Simpson County region. Positive, long-term, direct impacts on economics and population from Project operation. No disproportionally high or adverse impacts to environmental justice (EJ) populations.

2.3 Identification of Mitigation Measures

Mitigation measures identified in Chapter 3 are summarized below. TVA's analysis includes mitigation, as required, to reduce or avoid, minimize, or reduce adverse effects. Project-specific BMP's are also identified.

- Implementation of the following TVA guidelines for the duration of the Project construction and operations:
  - A Guide for Environmental Protection and Best Management Practices for TVA Construction and Maintenances Activities.
  - TVA Environmental Quality Protection Specifications for Transmission Line Construction.
  - TVA Environmental Quality Protection Specifications for Transmission Substations or Communications Construction.
  - TVA ROW Clearing Specifications.

- TVA Site Clearing and Grading Specifications.
- TVA Substation Lighting Guidelines.
- Unanticipated Discovery Plan.

- Design of the final layout of the Project Site would avoid direct impacts to identified aquatic features and need for tree clearing.
- Development and implementation of a SWPPP as prepared as part of the KPDES permitting process.
- Development and implementation of a Spill Prevention, Control, and Countermeasures Plan (SPCC).
- Installation of silt fence along the perimeter of areas that would be cleared, consistent with local and state stormwater regulations.
- Installation of anti-reflective PV panel surfaces to minimize glare and reflection.
- Maintain stormwater BMPs in each ground disturbing area until stabilization has been achieved.
- Avoid direct impacts on identified streams and wetlands by maintaining a 50-foot buffer during construction.
- Avoid direct impacts on identified caves and karst features by maintaining a 50-foot buffer during construction.
- Plant or seed with non-invasive vegetation and include native and naturalized plant species to encourage beneficial habitat, reduce erosion, and limit the spread of invasive species.
- Utilization of vegetation that benefits pollinator species to the extent practicable.
- Utilization of timer and/or motion-activated downward facing security lighting to limit attracting wildlife, such as migratory birds or bats.
- Utilization of dust mitigation activities such as watering dry exposed soils, covering open-body trucks, and establishing a speed limit to minimize fugitive dust.
- Installation of temporary construction fencing around natural resources that should be avoided.
- Installation of a privacy fence and vegetative screening buffer that would be placed along Project boundaries (where existing natural buffers are not sufficient in shielding adjacent residents).
- Utilization of downward-facing and timer and/or motion-activated security lighting to minimize impacts to wildlife and any surrounding sensitive receptors including nearby households.
- Should traffic flow become a problem during construction, implementation of staggered worker shifts during construction and a flag person along the roadside during deliveries that may coincide with heavy commute times to manage the flow of traffic near the Project Site would be considered.
- Compliance with Simpson County set-back requirements:
    - 50 feet from any public road ROW.
    - 250 feet from any abutting residential zoned properties, rural village districts, churches, cemetery, school or nursing home.
    - 100 feet from any abutting internal or external agricultural zoned properties.
    - In addition, no structure may exceed the maximum height of 15 feet. However, under special circumstances in the development plan phase, the Planning Commission may approve a waiver for up to a maximum of 25 feet.

2.4 The Preferred Alternative

The Preferred Alternative that best fulfills the Purpose and Need is the Proposed Action Alternative. The Preferred Alternative would produce renewable energy for TVA and its customers with minimal direct and indirect environmental impacts, while at the same time having environmental benefits such as helping meet TVA's current and future renewable energy goals.

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Chapter 3 describes the existing environmental conditions of the Project Site and discusses the affected environmental and potential impacts (direct and indirect) on the identified resource areas if the No Action Alternative or the Proposed Action Alternative is implemented. In addition, it discusses cumulative impacts in relation to the other on-going and reasonably foreseeable proposed activities within the surrounding area of the Project Site.

3.1 Land Use, Natural Areas, Parks, and Recreation

This section describes the existing land use, natural areas, parks, and recreation within the Project Area and the potential impacts on these resources that would be associated with the No Action and Proposed Action Alternatives.

3.1.1 Land Use

Affected Environment

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." Imagery data collection from the National Land Cover Database identifies the entirety of the Project Site as "cropland". The Project Site is relatively flat, with a slight gradient towards the northeast. Southwest and northwest portions of the Project Site have varied topographic gradient due to rolling topography. The closest town to the Project Site is the City of Franklin, which is located roughly five miles northwest of the Project Site. The Project Site does not include any residential structures. However, there are multiple residences that are directly adjacent to the Project Site boundaries. The areas immediately surrounding the Project Site are similar in land use and are primarily agricultural land and pasture land with scattered residential dwellings and limited commercial development.

Based on review of historical aerial photographs and topographic quadrangle maps, the Project Site appears to have been primarily utilized as agricultural land since at least 1950. The current land use of the Project Site has remained primarily agricultural with no significant land use changes in recent history. Horus Renewables would maximize the use of agricultural land to the greatest extent practicable, thus not requiring tree clearing and avoiding aquatic impacts. Figure 3.1 below provides the land use classifications provided in the Natural Resource Conservation Service (NRCS) Land Use Land Cover Dataset.

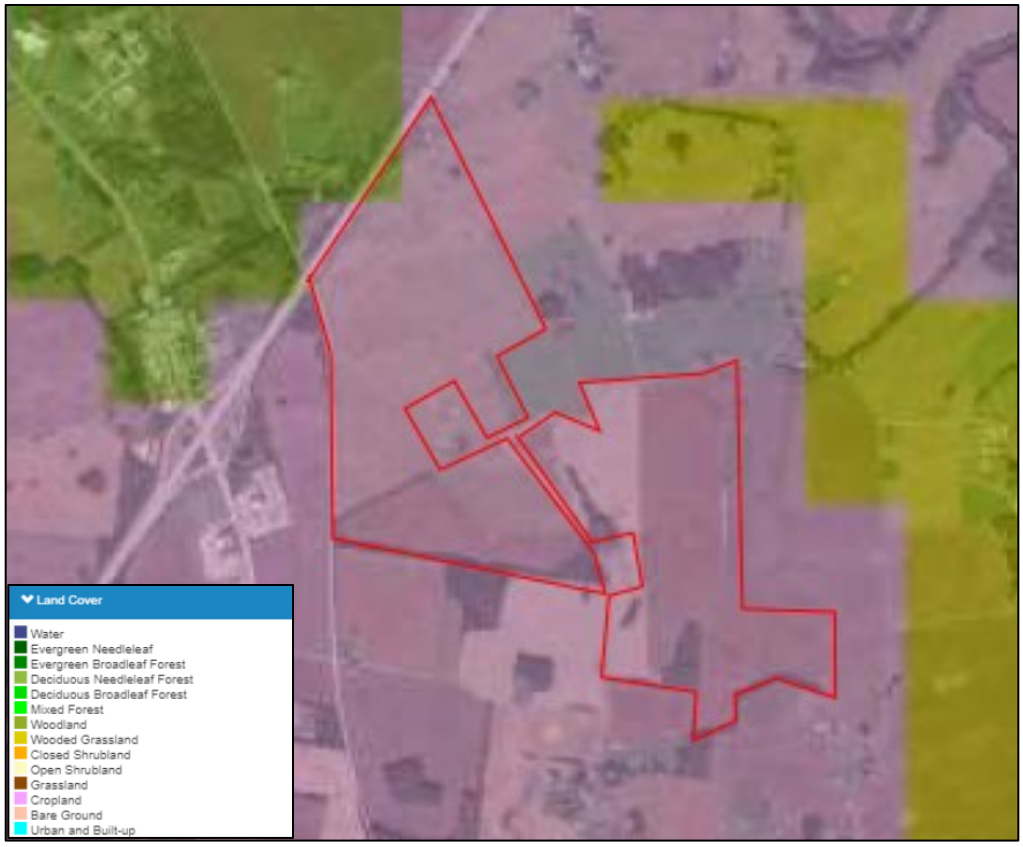

Figure 3.1 Proposed Horus Kentucky Solar Project Land Cover

The entire Project Site is located in a rural area of Simpson County and is zoned as "Agricultural". The Franklin Simpson County Zoning Regulations stipulates zone districts which allow for siting of large-scale proposed solar power generation projects of 10 acres or greater through the issuance of a CUP. Simpson County also stipulates the following set-back requirements as part of their ordinances:

- 50 feet from any public road ROW.
- 250 feet from any abutting residential zoned properties, rural village districts, churches, cemetery, school or nursing home.
- 100 feet from any abutting internal or external agricultural zoned properties.

In addition, no structure may exceed the maximum height of 15 feet. However, under special circumstances in the development plan phase, the Planning Commission may approve a waiver for up to a maximum of 25 feet.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, the Project Site would not be constructed; therefore, no Project-related impacts to land use would result. Existing land use would be expected to remain agricultural for the foreseeable future. However, indirect impacts to land use are possible as growth occurs within the City of Franklin and Simpson County. Over time, it is possible that the agricultural areas within and surrounding the Project Site could be developed if the residential population in the area grows significantly. Additionally, if the

agricultural activities within the Project Site are discontinued, the existing land could revert to undeveloped property. Therefore, indirect impacts to land use are possible under the No Action Alternative as the current agricultural land may become residential, abandoned, or developed for other industrial purposes over the long-term.

Proposed Action Alternative
Implementation of the Proposed Action would result in construction and operation of the Project Site; therefore, the land use within the Project Site would change from primarily agriculture to renewable energy production. The undeveloped forested portions of the Project Site would remain undeveloped. The Project Site is located within a rural area with limited zoning restrictions and would be compatible with land uses in the surrounding areas with the issuance of a CUP by Simpson County. If the Project Site were to be decommissioned, the land would be returned to agricultural production or used for a variety of other development strategies as allowed by the local zoning regulations. Minor direct impacts are anticipated from the conversion of actively cultivated agricultural land to solar generation. No impacts would be anticipated to land use within the Project Transmission Line Upgrades or Access Road Improvements, as the land use within the existing corridor would not change.

3.1.2 Natural Areas, Parks, and Recreation

Affected Environment
This section addresses natural areas (managed areas and sites) that are on, immediately adjacent to (within 0.5 miles), or within the region of the Project Area (5-mile radius). Natural areas include ecologically significant sites; federal, state, or local park lands; national or state forests; wilderness areas; scenic areas; wildlife management areas (WMAs); recreational areas; greenways; trails; Nationwide Rivers Inventory (NRI) streams; and Wild and Scenic rivers. Managed areas include lands held in public ownership that are managed by an entity (e.g., TVA, U.S. Department of Agriculture, U.S. Forest Service) to protect and maintain certain ecological and/or recreational features. Ecologically significant sites are either tracts of privately-owned land that are recognized by resource biologists as having significant environmental resources or identified tracts on TVA lands that are ecologically significant but not specifically managed by TVA's Natural Areas program. NRI streams are free-flowing segments of rivers recognized by the National Park Service (NPS) as possessing remarkable natural or cultural values.

Based on a review of data from the TVA Natural Heritage Program, there are seven managed and natural areas within a 5-mile radius of the Project Site (see Table 3.1 – Record of Managed and Natural Areas):

Table 3.1 Record of Managed and Natural Areas

Managed Area Name
GLB 91-19/White Oak Cave 25.97 acres Sumner County, TN Located greater than a mile south of the Project Site
Porter Farm 89.65 acres Robertson County, TN Located greater than 2 miles southwest of the Project Site
The Land Trust for Tennessee Easement 121.05 acres TN Located greater than a mile south of the Project Site
Faith Grain Farm 102.2 acres Simpson County, Kentucky Located approximately one mile north of the Project Site
Jamie Summers Farms 70.27 acres Simpson County, Kentucky Located approximately 1.5 miles north of the Project Site
FMHA - Farmers Home Administration Easement 65.48 acres Robertson County, TN Located greater than 2 miles southwest of the Project Site
FMHA – Robertson County Wetland – TWRA 68.95 acres Robertson County, TN Located greater than 2 miles southwest of the Project Site

It should be noted that the Project Site is not located within or immediately adjacent to a Federal, state, or local park, national or state forest, wildlife preserves, wilderness area, scenic areas, conservation easements, WMA, recreational areas, greenway, trails, NRI streams, or Wild and Scenic Rivers.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, the Project Site would not be constructed; therefore, no Project-related impacts to natural areas, parks, and recreation would result.

Proposed Action Alternative

There are no outdoor recreational 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. While there are seven managed and natural areas located within a 5-mile radius of the Project Site, direct impacts to these sites are not anticipated as activities would not occur within the boundaries or immediate vicinity of these natural areas. In addition, no impacts would be anticipated to natural areas, parks, and recreation within the Project Transmission Line Upgrades and Access Road Improvements, as the activities would be temporary and would occur along the existing ROW.

3.2 Geology, Soils, and Prime Farmland

This section describes the existing geological resources within the Project Area 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 Geology

Affected Environment

The Project Site is located within the Mississippian Plateau Physiographic Region of Kentucky, specifically within the Western Pennyroyal subsection. The Pennyroyal is largely farmland where underlain by limestone bedrock, particularly the St. Louis Limestone or Ste. Genevieve Limestone. In some areas of the Pennyroyal, the limestone is capped with an overlying sandstone stratum. Where the capping sandstone is intact, the land surface is usually forested, with rugged hills. In many places the sandstone has collapsed into the underlying karst-forming carbonate bedrock. The Pennyroyal region, consists of a limestone plain characterized by karst terrain, including sinkholes, sinking streams, stream-less valleys, springs, and caverns. Sinkholes or closed depressions on the ground surface are usually circular and often funnel-shaped and range in size from a few feet to hundreds of feet in diameter. There are relatively few surface streams in the region, and the sinkholes are often the principal surface drains. The karst terrain occurs in the eastern and southern parts of the region due to the presence of thick deposits of Mississippian-age limestones.

Referencing the USGS 7.5-minute topographic quadrangles for Frankfort, Kentucky-Tennessee, the parcels comprising the Project Site are in a broad, gently rolling lowland with numerous depressions. The ground surface within the Project Site ranges from about elevation 689 feet to 771 feet. The Project Site is mapped as underlain by bedrock of the Ste. Genevieve Limestone (Msg) and St. Louis Limestone (Msl) formations, both dated to the Upper Mississippian Sub-Period of the Carboniferous Geologic Period. These limestones are ranked by the Kentucky Geological Survey (KGS) as having a very high karst potential. The Ste. Genevieve is a thick-bedded oolitic limestone overlying the St Louis limestone formation characterized by scattered chert beds. The below rock unit descriptions are referenced from KGS:

- Ste. Genevieve Limestone (Msg): Predominantly oolitic; some crystalline, argillaceous, and fossiliferous, detrital interbeds. Light-gray to almost white, oolitic, medium crystalline, massive to thin-bedded or slightly cross bedded; contains thin shale partings. Gray to white, weathers slightly darker; where exposed to much direct sunlight, weathered rock may be white, commonly speckled red-brown by iron oxide stain; mostly thick bedded and massive but ranges to thin bedded. Upper limestone layers weather to a thick deep-red or maroon clay containing abundant residual chert. Much of residual chert weathers to chalky fragments. Ste. Genevieve grades imperceptibly into underlying St. Louis Limestone.

- St. Louis Limestone (Msl): Limestone, light- to dark-gray, fine- to medium -crystalline; contains blue gray chert nodules, particularly abundant in uppermost part; several light- to medium-gray, oolitic limestone beds in upper part of unit; scattered colonies of corals in middle and lower part; scattered gypsum and anhydrite seams in lower part. Formation weathers to dark-reddish -brown chert residuum. Grades upward into Ste. Genevieve.

The L5402 corridor proposed for the Project Transmission Line Upgrade and Access Road Improvements is situated within the Western Pennyroyal Karst Plain region of the Interior Plateau physiographic province. The L5775 corridor proposed for the Project Transmission Line Upgrade and Access Road Improvements is within the Outer and Inner Nashville Basin regions of the Interior Plateau physiographic province. The Interior Plateau extends from southern Indiana and Ohio to northern Alabama. The open hills and irregular plains of the ecoregion are composed of Mississippian to Ordovician-age limestone, chert, sandstone, siltstone, and shale. The Western Pennyroyal Karst Plain is characterized by irregular plains with few perennial streams. Small sinkholes and depressions are common as the area consists of a thin loess mantle over Mississippian-age limestones. This region is noted for its fertile soils, and as such is used extensively for agriculture. Elevations typically range from about 760 to 800 feet above mean sea level (AMSL) along the L5402 project corridor. The Outer Nashville Basin is characterized by rolling and hilly topography. The higher elevations are composed of Mississippian-age chert formations as well as Devonian-age Chattanooga shale. Streams are generally nutrient-rich. The Inner Nashville Basin is less hilly and lower in elevation than the Outer Nashville Basin; however, outcrops of the Ordovician-age limestone are common and were noted in the project area. The soils in this region tend to be more shallow and redder. Streams flow over large expanses of limestone bedrock, which was also noted often in the project area. Elevations typically range from about 445 to 650 feet AMSL along the L5775 project corridor.

Geological Hazards

Geological hazards can include landslides, volcanoes, earthquake/seismic activity, and subsidence/sinkholes. The Project Site does not have conditions for a majority of these types of hazards with the exception of subsidence/sinkholes due to documented karst features. 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 formulated spaces. Eventually, a collapse of the land can occur, which can vary greatly in size and shape. Human activities can also expedite cavity formation in more susceptible materials and trigger a collapse or collapse an existing subsurface cavity site.

A preliminary geotechnical exploration (including Karst Survey) was performed in two separate phases within the Project Site. The field reconnaissance entailed walking the Project Site in a systematic manner to locate and delineate visible surface karst features (e.g., sinkholes and subsidence, closed depressions, and sinking and losing streams). Particular emphasis was on features inferred to have direct communication with the phreatic zone such as “open-throat” sinkholes, karst windows, cave entrances, and sinking streams. The geotechnical survey included subsurface exploration using Geophysical and air-track probe (ATP) drilling methods and Geophysical exploration using Electrical Resistivity Imaging (ERI) with an emphasis on karst features identified during the desktop review and field reconnaissance. Drilling exploration by ATP was performed at areas delineated with possible karst activity and along the ERI lines to calibrate the resistivity profiles, investigate anomalies revealed by the ERI, determine depth to bedrock, and explore for soil filled solution channels or voids. The following model layers within the subsurface profile were identified for the Project Site:

Model Layer	Layer Name	General Description
1	**Cohesive Soil**	Lean Clay (CL) to Fat Clay (CH), brown to reddish brown, medium stiff to stiff
2	**Cohesive Soil**	Lean Clay (CL) to Fat Clay (CH), with rock fragments, brown to reddish brown, very stiff to hard

Borings at 20 of 36 exploration locations were advanced to auger refusal at depths of about 12½ to 23 feet below existing grade. Auger refusal is defined as the depth below the ground surface at which a test boring can no longer be advanced with the soil drilling technique being used. Karst bedrock, such as the limestone formations underlying the Project Site are known for producing several obstructions that can cause the augers to refuse above sound bedrock. Due to the residual nature of the overburden soils, rock fragments, chert, and cobbles should be expected. Therefore, it is possible that piles driven into the overburden soils and weathered rock stratum might encounter difficult driving.

The geotechnical reports are provided in Appendix B. Figures 3.2-3.6 provides mapping of the karst features, geophysical ERI & ATP drilling locations, and karst avoidance areas for the Project Site.

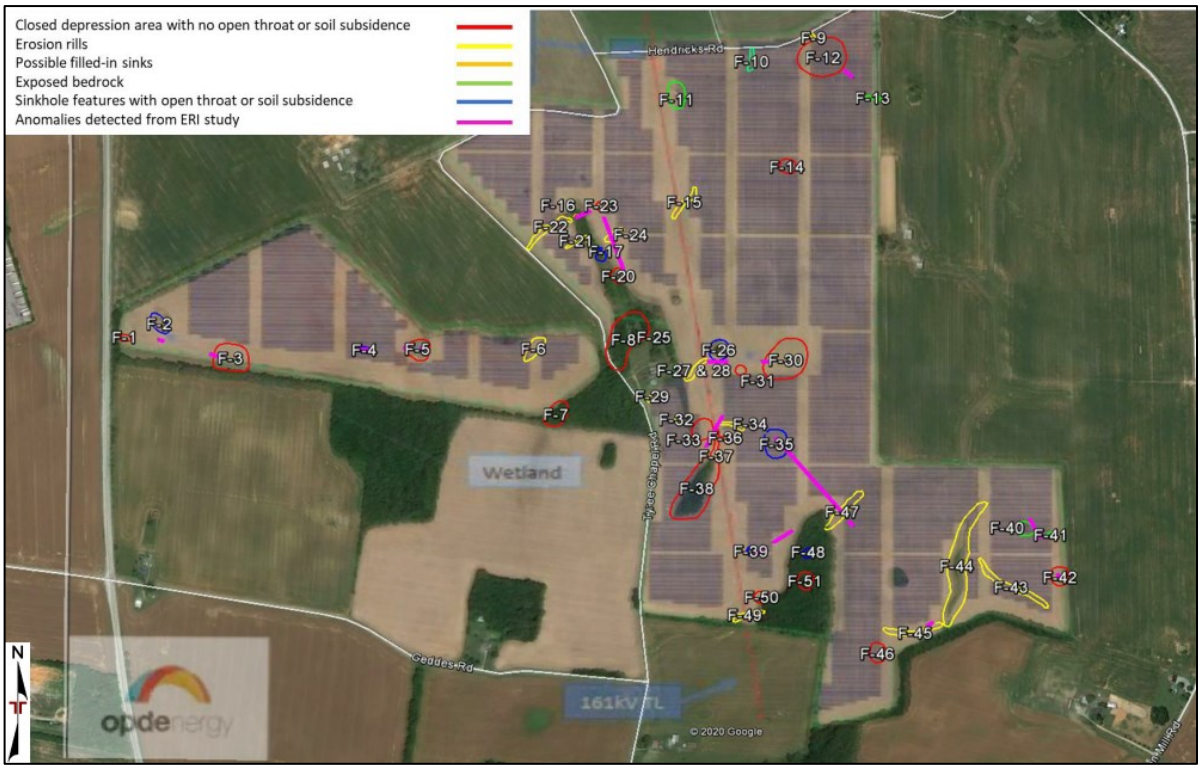

Figure 3.2 Proposed Horus Kentucky Solar Project Karst Feature Inventory Map 1

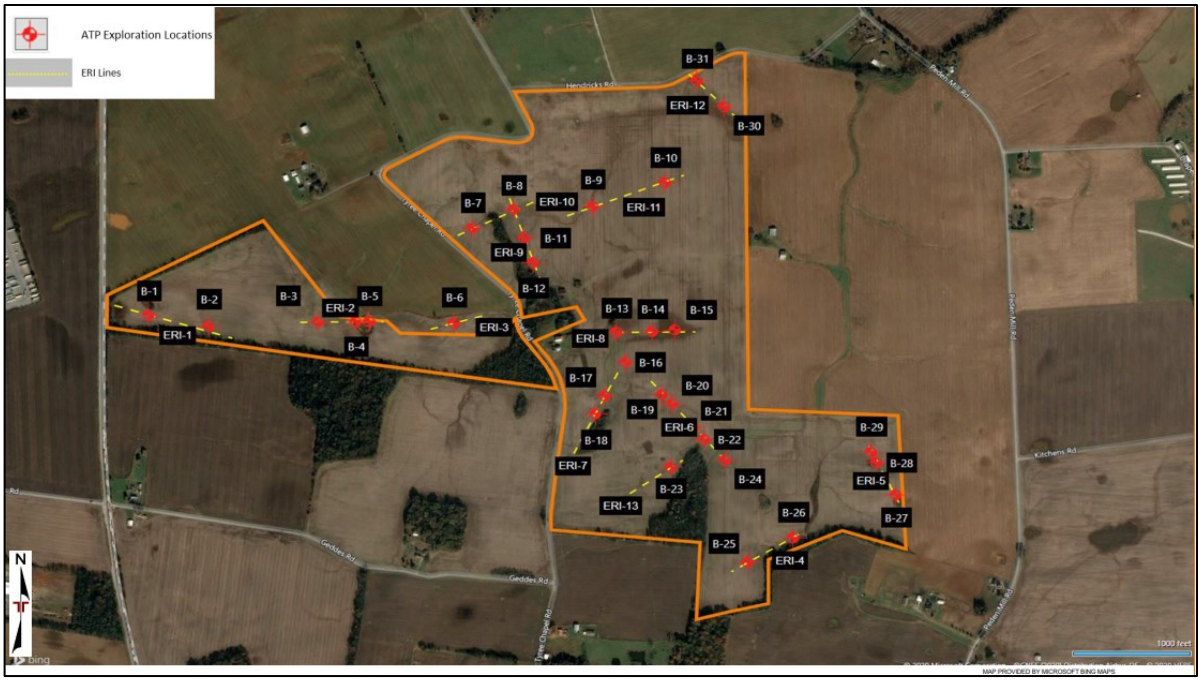

Figure 3.3 Proposed Horus Kentucky Solar Project Geophysical ERI & ATP Drilling Locations Map 1

Figure 3.4 Proposed Horus Kentucky Solar Project Kast Avoidance Area Map 1

Figure 3.5 Proposed Horus Kentucky Solar Project Karst Feature Inventory Map 2

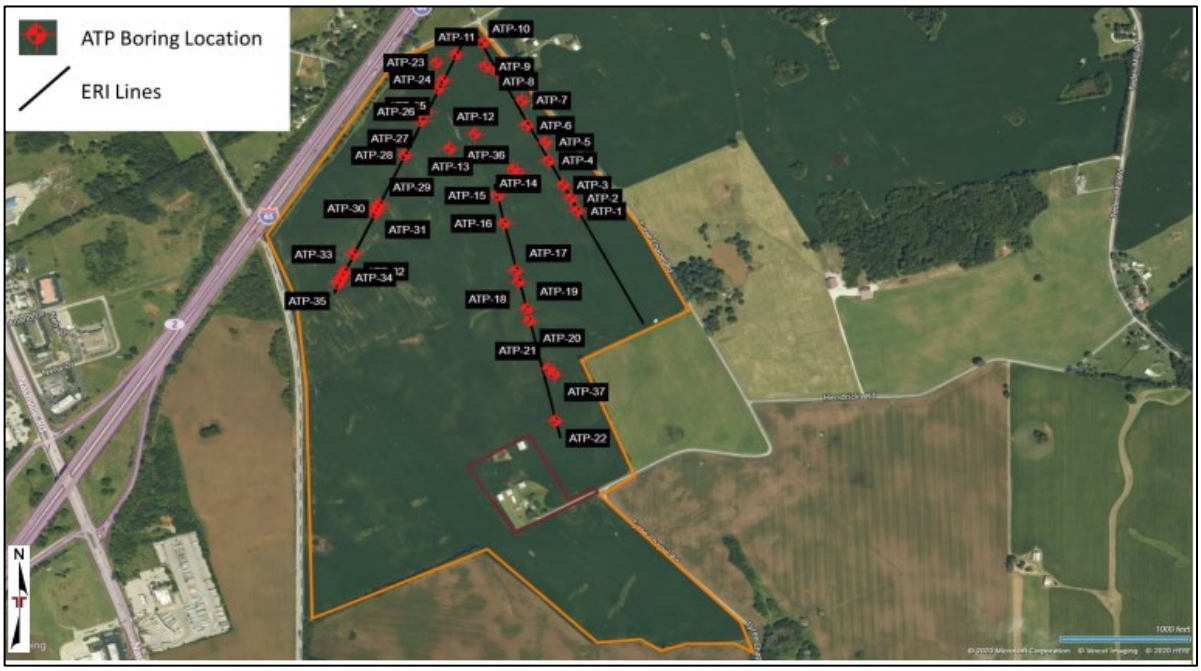

Figure 3.6 Proposed Horus Kentucky Solar Project Geophysical ERI & ATP Drilling Locations Map 2

Based on the results of the geotechnical survey, karst features are not expected to be reactivated by fill or structural loading. Reactivation of karst features would be sensitive to changes in surface water drainage and concentrated water flow. The Project Site has historically been used for agricultural purposes and has been stripped and grubbed over time.

With no anticipated tree removal within the Project Site, interruptions to Project Site drainage and infiltration should be expected to be minimal. Figure 2.4 – Proposed Horus Kentucky Solar Project Site Layout includes the karst avoidance areas based on the results of the field survey and subsurface exploration. In general, the karst avoidance areas were set at 50-foot buffer from the mapped parapet of the closed depression. In cases where observations indicated sinkholes with open throats, apparent more recent subsidence shallow bedrock, and voids encountered by drilling, the buffer distance was increased to 100 feet. Figure 3.7-3.9 are representative karst features encountered during the field reconnaissance within the Project Site.

Figure 3.7 Representative Photograph of Sinkhole Feature Encountered During Karst Survey

Figure 3.8 Representative Photograph of Open-Throat Sinkhole Feature Encountered During Karst Survey

Figure 3.9 Representative Photograph of Open-Throat Sinkhole Feature Encountered During Karst Survey

Environmental Consequences

No Action Alternative

Under the No Action Alternative, the Project Site would not be constructed; therefore, no direct or indirect Project-related impacts on geology would result. Existing land use would be expected to remain agricultural land. However, the bedrock and overlying soil below the Project Site are susceptible to sinkhole development, and there can be extensive areas of shallow bedrock, and shallow groundwater, all of which can pose a risk to the future of the current land. Risk associated with these factors can be minimized with proper planning and design. Conversely, if agricultural practices were continued without proper caution, the risk of sinkhole and hydrologic-related damage to the Project Site would continue to exist.

Proposed Action Alternative

Under the Proposed Action Alternative, minor direct impacts to geology would be anticipated as a result of construction and operation of the Project Site. Approximately 500 acres (of the total 550 acres) of the Project Site (which is 90 percent of the Project Site) would be cleared and/or lightly graded for the Project with the exception of culturally and biologically sensitive areas. The solar arrays would likely be supported by steel piles which would either be driven or screwed into the ground to a depth ranging of 6 to 10 feet. On-site sedimentation basins would be shallow and, to the extent feasible, utilize the existing terrain without requiring extensive excavation. The PV panels would be connected with underground wiring placed in excavated trenches and backfilled with Project Site native soil.

As indicated in the geotechnical report, the bedrock and overlying soil below the Project Site are susceptible to sinkhole development, there can be extensive areas of shallow bedrock, and shallow groundwater, all of which can pose a risk to the Project Site development process. Risk associated with these factors can be minimized during Project Site development with proper planning and design. Development plans should consider guidance for sinkhole surface drainage analysis in the KGS Ordinance for the Control of Urban Development in Sinkhole Areas in the Blue Grass Karst Region, Lexington, Kentucky as well as regulatory permits. Prior to the Project Site development, additional geotechnical studies would need to be conducted. Per Figure 2.4 – Proposed Horus Kentucky Solar Project Site Layout, the development of the Project Site incorporates the karst avoidance areas based on the results of the field survey and subsurface exploration. Therefore, identified karst features and caves would be avoided for the construction of the Project Site. Should hazards resulting from geological conditions occur, structural damage to PV panels, support structures, and other associated equipment could occur. Since the Project Site would not be staffed full-time during operation, potential damage to on-site structures would pose very limited risk to humans. Geologic hazard impacts on-site would be unlikely to impact off-site resources. Similarly, minor direct impacts would be anticipated to geology within the Project Transmission Line Upgrades and Access Road Improvements, as the activities would be temporary and would occur along the existing ROW.

Should paleontological resources be exposed during construction or operation activities, a paleontological expert would be consulted to determine the nature of the paleontological resources, recover these resources, and analyze the potential for additional impacts, and develop and implement a recovery plan and mitigation strategy as appropriate.

3.1.2 Soils

Affected Environment

Based on the information from the USDA NRCS, the Project Site contains six known soil types. The predominant soil on the Project Site is Mountview silt loam, comprising approximately 58 percent of the on-site soil. The remaining soil types include Baxter gravelly silt loam, Nicholson silt loam, and Nolin silt loam. Figure 3.10 provides the approximate distribution area of each soil type while Table 3.2 provides a list of soils identified within the Project Site.

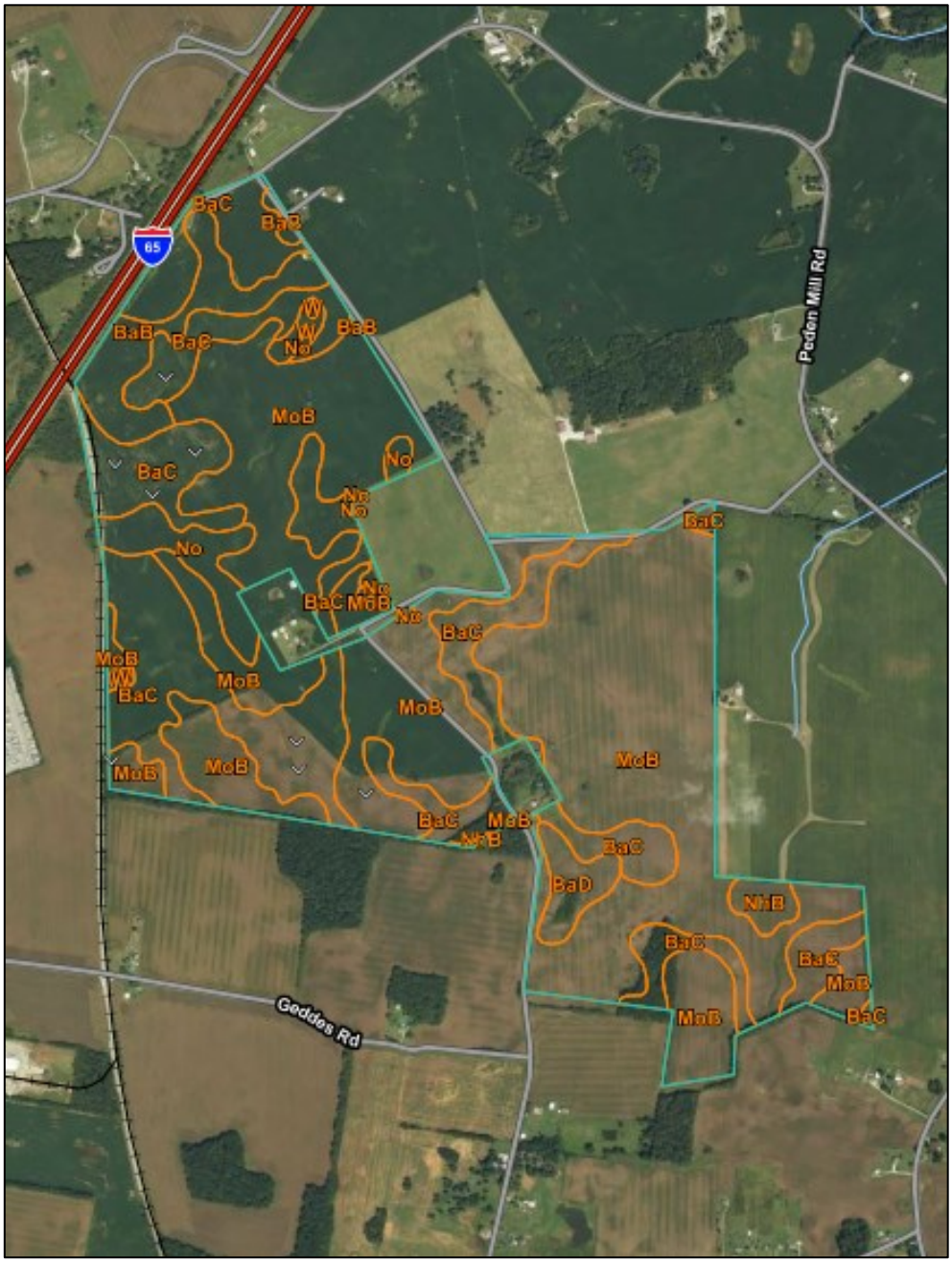

Figure 3.10 Proposed Horus Kentucky Solar Project Soils Map

Table 3.2 Proposed Horus Kentucky Solar Project Soils List

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BaB	Baxter gravelly silt loam, 2 to 6 percent slopes	26.4	4.8%
BaC	Baxter gravelly silt loam, 6 to 12 percent slopes	170.4	30.9%
BaD	Baxter gravelly silt loam, 12 to 20 percent slopes	9.5	1.7%
MoB	Mountview silt loam, 2 to 6 percent slopes	316.8	57.5%
NhB	Nicholson silt loam, 2 to 6 percent slopes	5.5	1.0%
No	Nolin silt loam	20.9	3.8%
W	Water	1.4	0.3%
Totals for Area of Interest		**550.9**	**100.0%**

Baxter gravelly silt loam is defined as deep, well drained, and is typically found on karst uplands, steep hillsides, and ridgetops. This soil color is typically yellowish brown to strong brown. Mountview silt loam soil is defined as deep, well drained and is typically found on sloping broad ridgetops and plateau-like areas. This soil color is typically brown to strong brown. Nicholson silt loam is defined as deep, moderately well drained, gently sloping, and is typically found on smooth ridgetops and stream terraces. This soil color ranges from brown to yellowish brown. Nolin silt loam is defined as moderately deep, sloping, well drained and is typically found on level floodplains and depressions receiving runoff. This soil color ranges from brown to dark yellowish brown. Soils within the Project Transmission Line Upgrades and Access Road Improvements are composed of silty, clayey, or loamy alluvium and residuum derived from sedimentary rocks such as limestone, siltstone, shale, and sandstone. Each of the soil types in the project area is below.

Section	Soil Series	Texture	Slope	Drainage Class
L5204	Bewleyville	Silty clay loam	2–12 %	Well drained
	Dickson	Silt loam	2–5 %	Moderately well drained
	Nolin	Silt loam	n/a	Well drained; occasionally flooded
	Sengtown	Gravelly silt loam	5–20 %	Well drained
L5775	Agee	Silty clay loam	n/a	Poorly drained; rarely flooded
	Bradyville	Silt loam	2–12 %	Well drained
	Byler	Silt loam	2–5 %	Moderately well drained
	Capshaw	Silt loam	2–6 %	Moderately well drained
	Eagleville	Silty clay loam	n/a	Somewhat poorly drained; occasionally flooded
	Gladeville-Rock Outcrop Complex	n/a	2–15 %	Well drained; extremely stony
	Hampshire	Silt loam	5–20 %	Well drained; eroded
	Inman	Flaggy silt clay loam	5–30 %	Well drained; eroded
	Lindell	Silt loam	0–2 %	Moderately well drained; occasionally flooded
	Lomond	Silt loam	2–12 %	Well drained; eroded
	Maury	Silt loam	2–5 %	Well drained; eroded
	Nesbitt	Silt loam	2–5 %	Moderately well drained
	Norene	Silt loam	n/a	Poorly drained; rarely flooded
	Stiversville	Silt loam	5–12 %	Well drained; eroded
	Talbott	Silt loam	2–20 %	Well drained; eroded; rocky
	Tupelo	Silt loam	0–2 %	Somewhat poorly drained
	Waynesboro	Loam	12–20 %	Well drained; eroded
	Udorthents	n/a	2–8 %	n/a

Environmental Consequences

No Action Alternative
Under the No Action Alternative, the Project Site would not be constructed; therefore, no direct or indirect Project-related impacts to soils would result. Existing land use would be expected to remain agricultural land. However, over time, impacts to soils could occur if the current land use practices are changed. Conversely, if agricultural practices were continued without proper conservation practices, soils could eventually become depleted in nutrients or erode, resulting in minor changes to the Project Site. The potential degradation of soil quality could be mitigated with proper farming practices such a terracing and application of soil amendments.

Proposed Action Alternative
Under the Proposed Action Alternative, minor direct impacts to soil resources would be anticipated due to construction and operation of the Project Site. Much of the land in the Project Site would be cleared and/or graded for the Project with the exception of any biologically sensitive areas. The Project Site grading and clearing would cause minor impacts to soils, including minor localized increased in erosion and sedimentation. Minor disturbance to soils would occur during operations of the Project Site. Activities ranging from routine to non-routine maintenance of the solar arrays, array inspections, facility maintenance, fence repairs, and vegetation control would be an on-going potential disturbance to soils within the Project Site. Similarly, minor direct impacts would be anticipated to soil resources within the Project Transmission Line Upgrades and Access Road Improvements, as the activities would be temporary and would occur along the existing ROW. Limited amount of ground disturbance would occur along discrete locations along the Project Transmission Line Upgrades and Access Road Improvements, where new poles would be installed, or existing poles would be replaced. Excess soils from pole installation would be spread within the existing ROW or hauled to an approved disposal site. Areas within the existing 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.

3.1.2 Prime Farmland

Affected Environment
The 1981 Farmland Protection Policy Act requires all federal agencies to evaluate impacts to prime and unique farmland prior to permanently converting to land use incompatible with agriculture. The purpose of the Act is to "minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses." Prime farmland is land that is the most suitable for economically producing sustained high yields of food, feed, fiber, forage, and oil seed crops. In addition, prime farmland has the best combination of soil type, growing season, and moisture supply available for agricultural use (i.e., not water or urban built-up land). The Project Site contains six soil types, three of which are considered prime farmland soils (Table 3.3 – Proposed Horus Kentucky Solar Project Prime Farmland Soils List).

Based on Information from the USDA NRCS, prime farmland soils occur on nearly 63 percent, encompassing over 348 acres of the Project Site. This is comprised of BaB, MoB, and NhB soils. The remaining soils, BaC, appears for Simpson County as farmland of statewide importance listing, but is not considered prime farmland, and No is considered prime farmland if protected from flooding or not frequently flooded during the growing season. The last soil

listing, BaD, is not considered prime farmland. Table 3.4 provides farmland statistics for Simpson County and Kentucky.

Table 3.3 Proposed Horus Kentucky Solar Project Prime Farmland Soils List

Soil Type	Farmland Classification	Hydric Rating	Area (Acres)	Percentage of Area
BaB	All areas are prime farmland	N/A	26.4	4.8 %
BaC	Farmland of statewide importance	N/A	170.4	30.9%
BaD	Not prime farmland	N/A	9.5	1.7%
MoB	All areas are prime farmland	N/A	316.8	57.5%
NhB	All areas are prime farmland	N/A	5.5	1.0%
No	Prime farmland if protected from flooding or not frequently flooded during the growing season	N/A	20.9	3.8%
	Total Prime Farmland		**348.7**	**63.3%**

Table 3.4 Farming Statistics for Simpson County and Kentucky

Region	Number of Farms	Land in farms (Acres)
Simpson County	471	110,864
Kentucky	74,500	12,900,000

Environmental Consequences

No Action Alternative

Under the No Action Alternative, the Project Site would not be constructed; therefore, no direct or indirect Project-related impacts on prime farmland would result. Existing land use would be expected to remain farmland. However, over time, impacts to prime farmland soils could occur if the current land use practices are changed. Conversely, if agricultural practices were continued without proper conservation practices, prime farmland soils could eventually become depleted in nutrients or erode, resulting in minor changes to the Project Site. The potential degradation of soil quality could be mitigated with proper farming practices such a terracing and application of soil amendments.

Proposed Action Alternative

Under the Proposed Action Alternative, minor direct impacts to prime farmland soils would be anticipated as a result of construction and operation of the Project Site. Approximately 63 percent (348 acres) of land in the Project Site would be cleared and/or lightly graded for the Project Site with the exception of biologically sensitive areas, changing the land use from existing agricultural uses to renewable energy production. Implementation of the Proposed Action Alternative would result in temporary adverse effects to prime farmland during operation of the Project Site. Stockpiling topsoil for reuse and installing appropriate erosion control devices would further preserve topsoil at the Project Site. Adhering to BMPs during

construction and operation of the Project Site and revegetating the Project Site with native plant cover would limit erosion. Implementation of BMPs would result in minor impacts to prime farmland soils. Based on the above BMPs as well as availability of farmable land in Simpson County, impacts on prime farmland soils would be minor and mostly reversible.

Following the expiration of the PPA, the Project Site would be decommissioned as described in Section 2.1.2. Once Project equipment would be removed and the Project Site is stabilized, farming operations could subsequently be resumed with limited long-term loss of agricultural production and negligible loss to soil productivity.

Limited amount of ground disturbance would occur along discrete locations along the Project Transmission Line Upgrades and Access Road Improvements, where new poles would be installed, or existing poles would be replaced. Upon completion, areas within the existing ROW that are actively cultivated would continue to be cultivated. Therefore, no loss of prime farmland or changes to agricultural practices are anticipated along the existing ROW.

3.3 Water Resources

This section describes the existing water resources within the Project Area 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, surface water, wetlands, and floodplains.

3.3.1 Groundwater

Affected Environment

Groundwater is water located beneath the ground surface, within soils and rock formation, Aquifers are rock units that have sufficient permeability to conduct groundwater and to allow economically significant quantities of water to be produced by man-made water wells and natural springs. Wells and natural springs provide approximately one-third of public domestic water supplies within the Commonwealth of Kentucky. Surface streams, the major source of Kentucky's water supply, are primarily sustained during base flow by groundwater discharge from adjacent aquifers. To be productive, the aquifer must be permeable and porous and retain qualities that allow water to flow through it easily. Sandstones, conglomerates, and fractured rocks can often be productive aquifers. The Project Site is located within the Mississippian Plateaus Region and lies within the West Fork of Drakes Creek portion of the Green River Drainage Basin in Simpson County, Kentucky.

The quality of groundwater in the Mississippian Plateaus Region varies considerably and is determined by the water's geologic source and the length of time it has been in contact with the rocks. Generally, deeper wells produce more mineralized water and are less likely to become polluted by anthropogenic activities. In Simpson County, water obtained from most drilled wells in limestone aquifers is considered hard. In addition, common salt and hydrogen sulfide are the two naturally occurring constituents most often encountered in objectionable amounts in groundwater.

As part of the geotechnical investigations, borings at 20 of 36 exploration locations were advanced to auger refusal at depths of about 12½ to 23 feet below existing grade at the Project Site. Auger refusal is defined as the depth below the ground surface at which a test boring can no longer be advanced with the soil drilling technique being used. Karst bedrock, such as the limestone formations underlying the Project Site are known for producing several obstructions that can cause the augers to refuse above sound bedrock. The boreholes were

observed while drilling and after completion for the presence and level of groundwater. Groundwater was not observed in any of the borings while drilling, or for the short duration the borings could remain open. However, this does not necessarily mean the borings terminated above groundwater. Due to the relatively low permeability of the soils encountered in the boring, a relatively long period of time may be necessary for a groundwater level to develop and stabilize in a borehole in these materials. Long-term observations in piezometers or observation wells sealed from the influence of surface water are often required to define groundwater levels in materials of this type. Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were performed. Therefore, groundwater levels during construction of the Project Site may be higher or lower than the levels indicated on the boring logs. In particular, groundwater will tend to perch over the near- surface clayey and hardpan sands during and following periods of prolonged or intense rainfall. Based on the drilling, the Project Site's groundwater is anticipated to consist of a horizontally and vertically discontinuous zone of overburden saturation perched atop underlying bedrock of relatively lower intrinsic primary permeability, likely within 20 feet below ground surface (bgs). Such overburden saturation zones, where present, are strongly controlled by bedrock surface topography and recent precipitation history. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the Project Site.

According to the USEPA, there are no USEPA-designated sole-source aquifers located in Simpson County, Kentucky.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, the Project Site would not be constructed; therefore, no direct or indirect Project-related impacts on groundwater would result. Existing land use would remain as farmland, and groundwater resources 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 groundwater within the Project Site and adjacent areas.

Proposed Action Alternative

Under the Proposed Action Alternative, minor short-term impacts from construction would be expected on groundwater from sedimentation of exposed soils. BMPs would be installed, inspected, and maintained until satisfactory stabilization is achieved. In addition, hazardous materials would be on-site that could potentially contaminate groundwater resources. Hazardous materials that could be on-site include petroleum products for fuel and lubrication of construction equipment, hydraulic fluids, and a variety of other chemicals used for general construction projects. Implementation of BMPs would provide measures to minimize potential for leaks or spills from construction equipment as well as outline procedures and protocols to quickly address potential spills that may occur. Therefore, construction activities would be in accordance with BMPs outlined in TVA's "A Guide to Environmental Protection and Best Management Practices for TVA Construction and Maintenance Activities" to avoid contamination to groundwater.

Water needed for construction of the Project Site 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. If practicable, groundwater wells and holding tanks would reduce and further avoid impacts to groundwater. Local rainfall is generally consistent enough to avoid the need for dust control on PV arrays. Therefore, regular panel washing is not anticipated during operations of the Project Site. Groundwater withdrawal volumes during construction and operations of the Project Site are expected to be significantly less than the existing volume needed for agricultural irrigation, thus resulting in a net positive impact on groundwater resources. Overall impacts to local aquifers and groundwater are not anticipated due to the limited volume of groundwater required for construction, operation, maintenances, and eventual decommissioning of the Project Site.

Per Section 3.1.1, multiple sinkholes were identified within the Project Site. Figure 2.4 – Proposed Horus Kentucky Solar Project Site Layout includes the karst avoidance areas based on the results of the field survey and subsurface exploration, which would eliminate the potential for direct groundwater contamination from stormwater, chemical, or solid waste runoff during construction and operations of the Project Site.

Beneficial, direct impacts to groundwater would result from a reduction in broad applications of pesticides, herbicides, and fertilizers used in support of the current agricultural operations. 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. Minor application of fertilizer may be needed for initial revegetation following construction of the Project Site. Therefore, this application would be in accordance with the manufacturer's recommendation and be short-term. Change in land use from agriculture to solar power generation would be a long-term beneficial impact to groundwater.

No direct impacts are anticipated to groundwater within the Project Transmission Line Upgrades and Access Road Improvements, as the activities would be temporary and would occur along the existing ROW.

3.4.2 Surface Water and Wetlands

Affected Environment

Territorial seas and traditional navigable waters (TNWs), includes large rivers and lakes, such as the Ohio River. Surface waters are defined as water features that are on the surface, typically consisting of streams, lakes, ponds, and wetlands. Surface water features are further segregated into perennial, intermittent, and ephemeral. 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 limited or no precipitation, 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 the diversity of biological and hydrological characteristics that perennial streams do. Ephemeral waters are features that only hold water for part of the year or flow as a result of stormwater events. Ephemeral streams, also known has wet-weather conveyances, are features that only flow in direct response to precipitation events. Flow would only occur during and shortly after large precipitation events. These features typically lack the biological, hydrological, and physical characteristics of intermittent and perennial streams. Examples of ephemeral streams and drainages include topographic swales or dry-drainages with poor bed and bank development.

Wetlands are areas inundated by surface or groundwater often enough to support vegetation or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, mud flats, and natural ponds. Wetlands generally have three essential characteristics: hydrophytic (wetland) vegetation, hydric soils, and wetland hydrology.

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 United States (WOTUS) and are under the regulatory jurisdiction of U.S. Army Corps of Engineers (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. Additionally, 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."

The eastern and southern portions of the Project Site appear to drain to the east-northeast into a tributary of West Fork Drakes Creek, located approximately 1,000 feet east of the Project Site. The western and northern portions of the Project Site do not have apparent drainage pathways. Based on the review of the LIDAR generated 2-foot contour map, it appears that the Project Site generally drains surface water externally off the site toward north and northeast side of the parcels with some closed depression locations within the parcels that drain surface water internally. The USGS map indicates the presence of multiple intermittent and perennial streams, as well as ponds across the Project Transmission Line Upgrades. Named streams include Cooks Branch, Spencer's Creek, and the Cumberland River in the southern portion, and Grace Creek, and West Fork Drakes Creek in the northern portion.

A wetland delineation was conducted and is included in Appendix C which was performed to determine if wetlands or other waters under the jurisdiction of the USACE and the Kentucky Division of Water (KDOW) are present within the Project Area. Prior to conducting the field survey, aerial photographs, USGS topographic maps, National Wetlands Inventory (NWI) maps, and soil survey maps were reviewed to identify current and historic drainage patterns of the Project Area and connectivity of potential wetlands to other jurisdictional wetlands. The field investigation was conducted to evaluate areas of potential jurisdiction using procedures established for delineations as found in the USACE 1987 Wetland Delineation Manual and with additional information as provided in the Eastern Mountains and Piedmont Regional Supplement.

The NWI Map of the Project Site is published by the USFWS and depicts probable wetland areas based on stereoscopic analysis of high-altitude aerial photographs and analysis of infrared bands from remotely-sensed imagery. The NWI map for the Project Site depicts eight freshwater, excavated ponds (PUBHx, PUBSCx, and PUBFx) in the western and northern portions of the Project Site and two freshwater, excavated ponds (PUBHx and PUSCx) in the southern and eastern portions of the Project Site. The NWI map depicts three perennial streams (R5UBH and R2UBH), four ponds (PUBHh and PUBHx), three intermittent streams (R4SBA and R4SBC), one forested wetland (PFO1A) and two emergent wetlands (PEM1C) throughout the northern portion and depicts one lake (L1UBH), seven ponds (PUBHx, PAB, and PUBSx), one forested wetland (PFO1A), and eight intermittent streams (R4SBC)

throughout the southern portion of the Project Transmission Line Upgrades. The NWI maps depicts a linear forested wetland area (PFO1A) and a pond (PUBHx) transecting the proposed L5402 access road corridor on the east side of Blue Door Rd southwest of Mitchellville, Tennessee. The maps depict a perennial stream (R5UBH) transecting the access road to the southeast of Blue Door Rd. Additionally, the maps indicate the presence of one perennial stream (R5UBH) transecting the proposed L5775 access road corridor on the north side of Lebanon Rd northeast of Mt. Juliet.

Figure 3.11 summarizes the wetland type data from NWI for the Project Site.

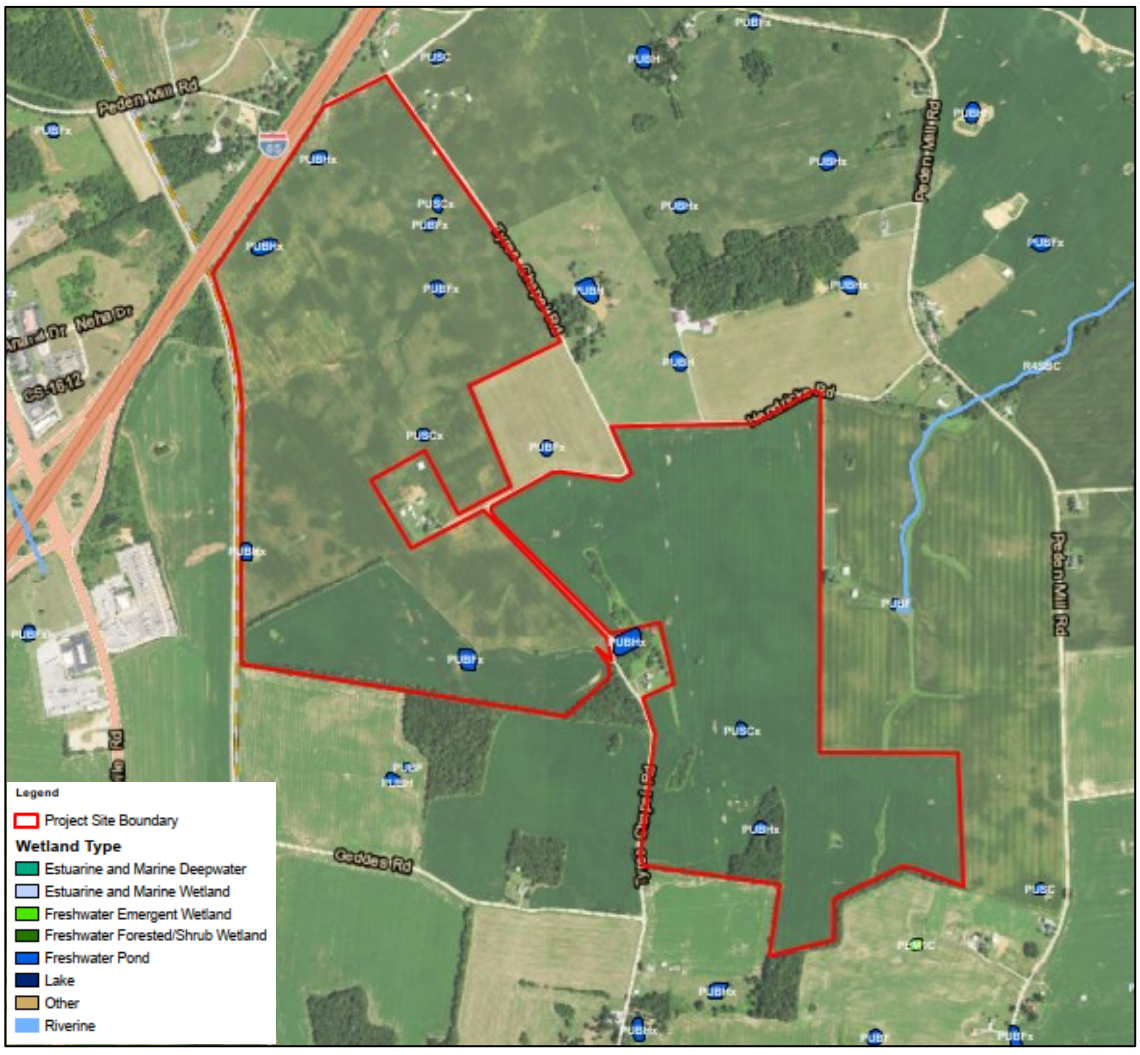

Figure 3.11 Proposed Horus Kentucky Solar Project Site NWI Map

Figure 3.5-3.6 summarizes the streams that were identified within the Project Area:

Table 3.5 Streams Identified within Project Site

Streams	Length (linear feet)	Flow Regime	Average Stream Width at Top of Bank (feet)	USACE Jurisdictional (Y/N)	TVARAM SCORES
1	451	Ephemeral	7-9	No	N/A
2	442	Ephemeral	7-9	No	N/A
3	462	Ephemeral	5-7	No	N/A
TOTAL	**1,355 lf**				

Figure 3.12 Proposed Horus Kentucky Solar Project Site Wetland Delineation Map

Table 3.6 Streams Identified within Project Transmission Line Upgrades

Streams	Length (linear feet)	Flow Regime	Average Stream Width at Top of Bank (feet)	USACE Jurisdictional (Y/N)	TVARAM SCORES
1 (West Fork Dry Creek)	487	Perennial	7-9	Y	68
2	101	Intermittent	7-9	Y	34
3	106	Ephemeral	5-7	N	N/A
4	659	Ephemeral	2-4	N	N/A
5	106	Ephemeral	5-7	N	N/A
6	172	Intermittent	2-4	Y	34
7	83	Ephemeral	2-4	N	N/A
8 (Grace Creek)	138	Perennial	1-3	Y	40
9	154	Ephemeral	2-4	N	N/A
10 (Cumberland River)	122	Perennial	2-4	Y	68
11	112	Intermittent	2-4	Y	25

12	296	Ephemeral	5-7	N	N/A
13	106	Ephemeral	5-7	N	N/A
14	33	Ephemeral	5-7	N	N/A
15	37	Ephemeral	3-5	N	N/A
16	116	Intermittent	2-4	Y	20
17	54	Intermittent	10-12	Y	34
18	114	Ephemeral	3-5	N	N/A
19	102	Perennial	3-5	Y	37
20	205	Intermittent	3-5	Y	35
21 (Dry Fork Creek)	113	Perennial	3-5	Y	41
22	116	Intermittent	5-7	Y	24
23	105	Intermittent	3-5	Y	34
24	105	Intermittent	3-5	Y	34
25	361	Ephemeral	3-5	N	N/A
26 (Spencer Creek)	133	Perennial	2-4	Y	47
27 (Cooks Branch)	136	Perennial	8-10	Y	44
28	200	Intermittent	2-4	Y	23
29	109	Ephemeral	5-7	N	N/A
30A	133	Ephemeral	2-4	N	N/A
30B	373	Intermittent	5-7	N	N/A
31	126	Ephemeral	5-7	N	N/A
32	105	Ephemeral	5-7	N	N/A
33	117	Intermittent	5-7	Y	27
TOTAL	**5,535 lf**				

Streams Identified within Access Road Improvements

Streams	Length (linear feet)*	Flow Regime	Average Stream Width at Top of Bank (feet)	USACE Juris-dictional (Y/N)	TVARAM Scores	Anticipated Impacts (acres)
1	16	Intermittent	8-10	Y	N/A	0.01
TOTAL	**16 lf**					

Streams 3-5, 7, 9, 12-15, 18, 25, 29, 30, 31, and 32 are considered ephemeral, which would likely be considered non-jurisdictional features by the USACE per 33 CFR 328.3(b)(3). The remainder of on-site streams are considered intermittent or perennial, which are considered jurisdictional waters of the U.S.

Other waters were not identified within the Project Site. The following ponds were identified within the Project Transmission Line Upgrades:

Table 3.7 Ponds Identified within Project Transmission Line Upgrades

Pond	Size (acres)	Cowardin Classification	Water Sources	USACE Jurisdictional (Y/N)
A	0.70	PUBHx	Precipitation, Surface Runoff,	N
B	0.10	PUBHx	Precipitation, Surface Runoff	N
C	0.12	PUBHx	Precipitation, Surface Runoff	N
D	0.25	PUBHh	Precipitation, Surface Runoff	N
E	0.02	PUBHx	Precipitation, Surface Runoff	N
F	0.01	PUBHx	Precipitation, Surface Runoff	N
G	0.03	PUBHx	Precipitation, Surface Runoff	N

H	0.22	PUBHx	Precipitation, Surface Runoff	N
I	0.02	PUBHx	Precipitation, Surface Runoff	N
J	0.06	PUBHx	Precipitation, Surface Runoff	N
K	0.01	PUBHx	Precipitation, Surface Runoff	N
L	0.01	PUBHx	Precipitation, Surface Runoff	N
TOTAL	**1.55 acres**			

PUBHh/PUBHx – Palustrine unconsolidated bottom; diked or impounded

The above-identified ponds do not appear to have connections to Traditional Navigable Waters (TNWs) and would likely be non-jurisdictional waters of the U.S., per 33 CFR 328.3(b)(8).

Figure 3.8-3.9 summarizes the wetlands that were identified within the Project Area:

Table 3.8 Wetlands Identified within Project Site

Wetland	Size (acres)	Cowardin Classification	Water Sources	USACE Jurisdictional (Y/N)	TVARAM Scores
A	0.22	PEM	Precipitation, Surface Runoff	N	N/A
TOTAL	**0.22**				

PEM – Palustrine emergent wetland

Table 3.9 Wetlands Identified within Project Transmission Line Upgrades

Wetland	Size (acres)	Cowardin Classification	Water Sources	USACE Jurisdictional (Y/N)	TVARAM Scores
A	1.49	PEM	Precipitation, Surface Runoff	Y	32
B	0.01	PEM	Precipitation, Surface Runoff	N	15
C	0.06	PEM	Precipitation, Surface Runoff	N	19
D	0.10	PEM	Precipitation, Surface Runoff	Y	38
E	0.01	PEM	Precipitation, Surface Runoff	Y	26
F	2.63	PEM	Precipitation, Surface Runoff	N	64
G	0.98	PEM	Precipitation, Surface Runoff	Y	35
H	0.08	PEM	Precipitation, Surface Runoff	N	19
TOTAL	**5.36**				

PEM – Palustrine Emergent Wetland; PSS – Palustrine Scrub-Shrub Wetland; PFO – Palustrine Forested Wetland

Within the Project Site, one wetland, totaling 0.22-acres was identified on-site. The wetland is considered to be non-jurisdictional based on the lack of significant nexus to TNWs. This decision is based on 33 CFR 328.3(b)(1), which includes waters or water features that are not identified in 33 CFR 328.3(a)(1), (2), (3), or (4). In addition, three streams, totaling 1,355

linear feet, were identified within the Project Site. These streams are considered non-jurisdictional based on their ephemeral flow status and lack of connection, due to termination in karst features, to TNWs. This decision is based on 33 CFR 328.3(b)(3), which defines ephemeral features as including ephemeral streams, swales, gullies, rills, and pools.

Within the Project Transmission Line Upgrades, eight wetlands, totaling 5.36-acres were identified on-site. Wetlands B, C, F, and H do not appear have significant connection to any on-or-off site TNWs and are therefore considered non-jurisdictional by the USACE. This decision is based on 33 CFR 328.3(b)(1), which includes waters or water features that are not identified in 33 CFR 328.3(a)(1), (2), (3), or (4). The remaining on-site wetlands appear to have a connection to TNWs and are considered jurisdictional by the USACE. In addition, 33 streams, totaling 5,535 linear feet, were identified on-site during the site reconnaissance. Streams 3-5, 7, 9, 12-15, 18, 25, 29, 30, 31, and 32 are considered ephemeral, which are considered non-jurisdictional features by the USACE. This designation is based on 33 CFR 328.3(b)(3), which identifies ephemeral features as ephemeral streams, swales, gullies, rills, and pools. The remainder of on-site streams are considered intermittent or perennial, which are considered jurisdictional by the USACE. Lastly, 12 ponds, totaling 1.55-acres, were identified on-site during the site reconnaissance. The on-site ponds do not appear to have connections to TNWs and are therefore considered non-jurisdictional by the USACE. This designation is based on 33 CFR 328.3(b)(3), which identifies ephemeral features as ephemeral streams, swales, gullies, rills, and pools.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, the Project Site would not be constructed; therefore, no Project-related impacts to surface waters and wetlands would be expected to occur. Existing land use would remain agricultural and the water resources would remain as they are at the present time. However, indirect impacts to surface water and wetlands could result from the continuing use of the Project Site as agricultural land. Increases in erosion and sediment runoff could occur if farming practices are not maintained using appropriate BMPs. Erosion and sedimentation at the Project Site could alter runoff patterns and impact downstream surface water quality. In addition, the continued use of chemical fertilizers, pesticides, and herbicides could impact water resources if the local aquifers are recharged from surface water runoff.

Proposed Action Alternative

Under the Proposed Action Alternative, minor temporary direct impacts from sedimentation due to run-off from ground disturbing activities would be anticipated until the Project Site is stabilized. Soil erosion and sedimentation can clog small streams and threaten aquatic life. Appropriate BMPs would be followed, and Project construction activities would be conducted in a manner to ensure waste materials are contained and the introduction of pollution materials to the receiving waters would be minimized. A general construction stormwater permit would be needed as more than one acre of land would be disturbed. The permit would also require the development and implementation of a SWPPP. During construction of the Project Site, portable toilets would be provided for the construction workforce as needed. The portable toilets would be pumped out regularly, and the sewage would be transported by tanker truck to a publicly-owned wastewater treatment facility.

Due to location and easement constraints, complete avoidance of impacts to jurisdictional water features and wetlands along the Project Transmission Line Upgrades may not be

practicable. Per the wetland delineation conducted, eight wetlands, 35 streams, and 12 ponds were identified along the 100-foot wide survey corridor within the Project Transmission Line Upgrades and Access Road Improvements.

During stages of the design process, efforts would be made to avoid and minimize impacts to jurisdictional waterbodies and wetlands to the greatest extent practicable. TVA is subject to EO 11990, Protection of Wetlands. Under the Proposed Action, impacts to jurisdictional waterbodies and wetlands are anticipated to be minor and temporary.

As the current Project Site layout shows, the area of impact has been designed to avoid impacts to delineated streams and wetland features with appropriate buffers. In addition, adherence to TVA specifications and BMPs would ensure that the upgrade/improvement activities do not adversely affect delineated wetlands. Construction and operation of the Project Site would not affect jurisdictional streams or wetlands.

As described above for groundwater, minor beneficial, direct impacts to surface water would result from the change in land use and reduction in the amount of fertilizer and pesticide runoff to surface water resources.

3.4.3 Floodplains

Affected Environment

A floodplain is the relatively level land area along a stream or river that is subject to periodic flooding. Flood hazard areas are identified on the Flood Insurance Rate Map (FIRM) as Special Flood Hazard Areas (SFHA). SFHA are defined as areas that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year and are normally called 100-year floodplains. The 1-percent annual chance flood is also referred as the 100-year flood. The area subject to a 0.2 percent chance of flooding in any given year is normally called the 500-year floodplain.

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 possible 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” (EO 11988, Floodplain Management). 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 (U.S. Water Resources Council, 1978). The EO requires that agencies avoid the 100-year floodplain unless there is no practicable alternative.

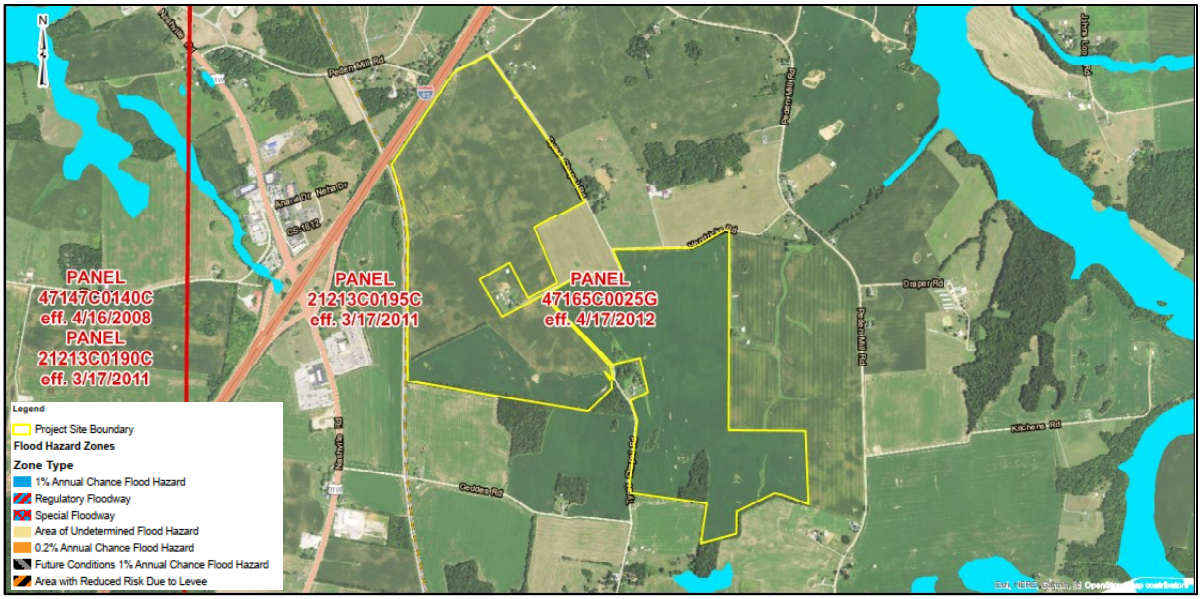

Figure 3.13 Proposed Horus Kentucky Solar Project Site FEMA FIRM Map

Based on Simpson County, Kentucky, Flood Insurance Rate Map (FIRM) Panel Number 21213C0195C, effective 3/17/2011, the entirety of the Project Site is located outside 100-year floodplains.

Based on Sumner County, Tennessee, FIRM Panel numbers 47165C0025G, 47165C0132G, 47165C0134G, 47165C0175G, 47165C0434G, and 47165C0442G, all effective 4/17/2012, portions of the northern section of the Project Transmission Line Upgrades are located within 100-year floodplains.

Based on Wilson County, Tennessee, FIRM Panel numbers 47189C0045E, effective 5/18/2009; and 47189C0152D, 47189C0153D, 47189C0154D, and 47189C0156D, all effective 2/20/2008, portions of the southern section of the Project Transmission Line Upgrades are located within 100-year floodplains.

FIRM Panel number 21213C0185C, effective 03/17/201, indicates that several proposed L5402 access road corridors in the northern portion of the site are in Zone A, a 100-year floodplain around the West Fork Drakes Creek. In addition, FIRM Panel number 47189C0156D, effective 02/20/2008, indicates that one proposed access road corridor for the L5775 off of Highway 109 N is also in Zone A around the Spencer Creek. Otherwise, the remainder of the Access Road Improvements are in Zone X, an area of minimal flood hazard.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, the Project Site would not be constructed; therefore, no Project-related impacts to floodplains would be expected to occur.

Proposed Action Alternative

The Project Site would be entirely located outside 100-year floodplains, which would be consistent with EO 11988. A portion of the Project Transmission Line Upgrades and Access

Road Improvements would be located within 100-year floodplains. The transmission lines are existing. Work would consist of replacing existing poles or modifying transmission equipment located on existing poles. Replacing poles would be considered a repetitive action within the 100-year floodplain, which would be consistent with EO 11988. In addition, access roads are considered to be repetitive actions in the 100-year floodplain that should result in minor impacts. By implementing the following mitigation measures, the Project Site, Project Transmission Line Upgrades, and Access Road Improvements would have no significant impact on floodplains and their natural and beneficial values:

- Standard BMPs would be used during construction activities.
- Non-recyclable and/or non-reusable material remaining following development of the Project Site would be disposed of at a location outside 100-year floodways.

Additionally, the amount of potential fill required to grade the Project Site would be negligible and should not impact any adjacent properties with respect to flooding frequency or intensity. Although minimal grading and fill could be necessary to construct the Project, no indirect impacts to floodplains associated with construction and operation of the Project Site would be anticipated.

3.4 Biological Resources

This section describes the existing biological resources within the Project Area and the potential impacts on these biological resources that would be associated with the No Action and Proposed Action Alternatives. Components of biological resources that are analyzed include vegetation, wildlife, threatened and endangered and other rare species.

3.4.1 Vegetation

Affected Environment

The Project Site predominantly consisted of row crop agricultural land, and with a small forested area located in the southeastern portion of the Project Site and a low-lying wooded/shrubby area in the eastern-central portion of the Project Site. The dominant plant species observed in the row crop agricultural upland portions of the Project Site were remnants of corn (*Zea mays*) and soybeans (*Glycine max*). The dominant plant species observed in the forested uplands of the Project Area were black walnut (*Juglans nigra*), red maple (Acer rubrum), white grass (*Leersia virginica*), amur honeysuckle (Lonicera maackii), tulip poplar (*Liriodendron tulipifera*), shagbark hickory (*Carya ovata*), and hackberry (*Celtis occidentalis*). Lastly, the dominant plant species observed in the emergent wetlands in the Project Area were phragmites (*Phragmites australis*), cattail (*Typha angustifolia*), box elder (*Acer negundo*) saplings, and Virginia whitegrass (*Leersia virginica*).

A seasonal survey for rare plant communities (specifically the Leafy Prairie-Clover [*Dalea foliosa*]) was conducted in early August, which was timed appropriately for the species to be in full bloom and most readily detectable (based on herbarium specimen documentation). The Project Transmission Line Upgrades has abundant areas of limestone glade and the following vegetation was observed: Canada goldenrod (*Solidago canadensis*), Blackberry (*Rubus*), redcedar (*Juniperus virgiana*). The seasonal survey resulted in no individual species to be located within the Project Area.

Environmental Consequences

No Action Alternative
Under the No Action Alternative, the Project Site would not be constructed; therefore, no Project-related impacts to vegetation would be expected to occur. Existing land use would remain as farmland and vegetation would remain as they are at the present time.

Proposed Action Alternative
Under the Proposed Action Alternative, the Project Site would be constructed which would lead to the conversion of actively cultivated agricultural vegetation to native or non-invasive vegetation. Although a small forested area is located in the southeastern portion of the Project Site, no tree clearing is proposed during construction or operation of the Project Site. Construction activities have the potential to temporarily affect storm water runoff, which could result in temporary disturbances that affect surrounding plant and environment interactions. These disturbances have the potential for invasive species to rapidly spread and displace native vegetation; however, these activities would be managed under the implementation of a SWPPP and BMPs. Revegetation using non-invasive native plants and seed mixtures would be required. Proper implementation of BMPs would result in only minor temporary impacts to plant species onsite and immediately adjacent. Upon completion of construction, the Project Site would establish low-growing native species. The conversion of agricultural crops to native or non-invasive species would result in long-term benefit to the vegetation community within the Project Site.

Limited amount of ground disturbance would occur along discrete locations along the Project Transmission Line Upgrades and Access Road Improvements, where new poles would be installed, or existing poles would be replaced. A seasonal survey for rare plant communities (specifically the Leafy Prairie-Clover [*Dalea foliosa*]) was conducted in early August, which was timed appropriately for the species to be in full bloom and most readily detectable (based on herbarium specimen documentation). The seasonal survey resulted in no individual species to be located within the Project Area. Areas within the existing 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. With the use of BMPs and avoidance and minimization measures, proposed actions would not significantly impact vegetative communities.

2.5.2 Wildlife

Affected Environment
Wildlife occurring within the Project Area includes mammals, reptiles, and birds commonly native to all areas in the State of Kentucky and 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 both states include coyotes (*Canis latrans*), white-tailed deer (*Odocoileus virginianus*), gray fox (*Urocyon cinereoargenteus*), beavers (*Castor canadensis*), skunks (*Mephitis mephitis*), opossums (*Didelphis virginiana*), racoons (*Procyon lotor*), squirrels (*Sciurus spp*.), bobcat (*Lynx rufus*), and armadillos (*Dasypus novemcinctus*). In addition, 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*). 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).*

Surveys for protected species and habitat assessments were conducted and are provided in Appendix C. 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.

Review of the TVA Regional Natural Heritage Database (NHD) in April 2021 indicated the following records:

- Records of 8 osprey nests, 2 wading bird colony nests, and 4 caves within 3 miles of the Project Site.

Field surveys did not identify any osprey nests or wading bird colonies within potential areas of impact. One 15-foot-deep vertical cave was identified in the Project Site during field reviews.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, the Project Site would not be constructed; therefore, no Project-related impacts to wildlife would be expected to occur. Existing land use would remain as farmland and wildlife would remain as they are at the present time.

Proposed Action Alternative

The Project would include installation of security fencing around the perimeter of the Project Site. The fencing would deter deer and other large migrating animals from entering the Project Site, while allowing for movement of small animals such as reptiles, amphibians, and small mammals. Although the Project Site would include installation of multiple rows of PV panels on supporting structures, transition from row crows to native species and the resulting change in land management would 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 not frequent and on-going land disturbance activities associated with agricultural production. Per Figure 2.4 – Proposed Horus Kentucky Solar Project Site Layout, the development of the Project Site incorporates the karst avoidance areas based on the results of the field survey and subsurface exploration. Therefore, identified karst features and caves would be avoided for the construction of the Project Site. In addition, identified streams and wetlands would also be avoided as part of the Project Site development. In addition, a 50-foot buffer would

be maintained from the identified caves, karst features, streams, and wetlands to avoid any direct impacts to these features. Although a small forested area is located in the southeastern portion of the Project Site, no tree clearing is proposed during construction or operation of the Project Site. All other known osprey nests or heronries are far enough away such that no impacts would occur. Due to successional and herbaceous composition of habitat within the existing ROW and Project Site, it is expected that wildlife currently utilizing the existing habitat would be able to relocate successfully to nearby areas of similar habitat and food sources during construction. Therefore, during the Project Area construction, temporary, negligible impacts to wildlife would be anticipated. Once construction is complete, wildlife would return to the Project Area as construction equipment and workers demobilize.

2.5.3 Threatened & Endangered and Other Rare Species

Affected Environment

A review of species extracted from the TVA NHD and USFWS Information for Planning and Consultation (IPaC), and Office of Kentucky Natural Preserves (OKNP) for threatened, endangered, and candidate species for the Project Site and Simpson County, Kentucky is presented below in Table 3.10.

Table 3.10 TVA Natural Heritage Database information for state and federally-listed species within a 10-mile search radius of the Project Site and within the counties in which the Project Site is located

Habitat	Scientific Name	Common Name	County	State	State Rank	State Status	Federal Status	Habitat Observed
Aquatic	*Villosa ortmanni*	Kentucky Creekshell	Simpson	KY	S1, S2	E	-	No
Aquatic	*Etheostoma barrenense*	Splendid Darter	Sumner	TN	S3	D	-	No
Aquatic	*Carychium stygium*	Cave Thorn	Sumner	TN	S2	-	-	No
Aquatic	*Etheostoma bellum*	Orangefin Darter	Sumner	TN	S3	D	-	No
Aquatic	*Etheostoma barbouri*	Teardrop Darter	Sumner	TN	S2	D	-	No
Aquatic	*Typhlichthys subterraneus*	Southern Cavefish	Simpson	KY	S2, S3	-	-	No
Aquatic	*Orconectes pellucidus*	Mammoth Cave Crayfish	Simpson	KY	S3	S	-	No
Aquatic	*Percina stictogaster*	Frecklebelly Darter	Sumner	TN	S1	D	-	No
Aquatic	*Villosa vanuxemensis*	Mountain Creekshell	Simpson	KY	S2	T	-	No
Aquatic	*Percina macrocephala*	Longhead Darter	Allen	KY	S1	E	-	No
Aquatic	*Barbicambarus cornutus*	Bottlebrush Crayfish	Simpson	KY	S2, S3	S	-	No
Aquatic	*Cryptobranchus alleganiensis*	Eastern Hellbender	Simpson	KY	S2S3	S	PS:PE	No
Terrestrial	*Spiranthes odorata*	Sweetscent Ladies'-tresses	Sumner	TN	S1	E	-	No
Terrestrial	*Hypericum adpressum*	Creeping St. John's-wort	Sumner	TN	S1	E	-	No
Terrestrial	*Batriasymmodes quisnamus*	Cave-Obligate Beetle	Simpson	KY	SH	H	-	No
Terrestrial	*Myotis grisescens*	Gray Bat	Robertson, Sumner	TN	S2	E	LE	Foraging
Terrestrial	*Myotis grisescens*	Gray Bat	Simpson	KY	S2	T	LE	Foraging
Terrestrial	*Perimyotis subflavus*	Tricolored Bat	Robertson	TN	S2S3	T	-	Yes

The aquatic habitat observed on the Project Site consisted of small, low quality ephemeral channels that terminated into karst features and a low-quality, isolated wetland that appears to be a filled-in agricultural pond. Based on the characteristics of these aquatic features, suitable habitat for the aquatic species listed in the NHD were not observed at the Project Site. With the exception of bats, habitat for the remaining terrestrial species above were not observed within the Project Site. The Tri-Colored bat (*Perimyotis subflavus)* typically hibernates in caves and/or mines and forages in open, forested habitat during the summer. Both gray bat and tricolored bat forage over streams and wetlands. Based on observations made during the site reconnaissance, hibernacula for tricolored bat and suitable foraging habitat for tricolored bat and gray bat is present on the southeastern portion of the Project Site.

Table 3.11 TVA Natural Heritage Database information for state and federally-listed aquatic species within a 10-mile search radius and terrestrial species within the counties in which the Project Transmission Line Upgrades and Access Road Improvements are located

Habitat	Scientific Name	Common Name	County	State	State Rank	State Status	Federal Status	Habitat Observed
Aquatic	*Barbicambarus cornutus*	Bottlebrush Crayfish	Simpson	KY	S2, S3	S	-	No
Aquatic	*Carychium stygium*	Cave Thorn	Sumner	TN	S2	-	-	No
Aquatic	*Etheostoma barbouri*	Teardrop Darter	Sumner	TN	S2	D	-	No
Aquatic	*Etheostoma barrenense*	Splendid Darter	Sumner	TN	S3	D	-	Potential
Aquatic	*Etheostoma bellum*	Orangefin Darter	Sumner	TN	S3	D	-	No
Aquatic	*Hemitremia flammea*	Flame Chub	Simpson	KY	S1	E	-	
Aquatic	*Orconectes pellucidus*	Mammoth Cave Crayfish	Simpson	KY	S3	S	-	No
Aquatic	*Percina macrocephala*	Longhead Darter	Allen	KY	S1	E	-	No
Aquatic	*Percina stictogaster*	Frecklebelly Darter	Sumner	TN	S1	D	-	No
Aquatic	*Rabdotus dealbatus*	Whitewashed Rabdotus	Warren	KY	S1, S2	T	-	No
Aquatic	*Typhlichthys subterraneus*	Southern Cavefish	Simpson	KY	S2, S3	-	-	Potential
Aquatic	*Villosa ortmanni*	Kentucky Creekshell	Simpson	KY	S1, S2	E	-	No
Aquatic	*Villosa vanuxemensis*	Mountain Creekshell	Simpson	KY	S2	T	-	No
Terrestrial	*Batriasymmodes quisnamus*	Cave-Obligate Beetle	Simpson	KY	SH	H	-	No
Terrestrial	*Cryptobranchus alleganiensis*	Eastern Hellbender	Simpson	KY	S2, S3	S	PS:PE	No
Terrestrial	*Cryptobranchus alleganiensis*	Eastern Hellbender	Sumner	TN	S3	E	PS	No
Terrestrial	*Dalea foliosa*	Leafy Prairie-Clover	Sumner	TN	S2S3	E	E	Potential
Terrestrial	*Haliaeetus leucocephalus*	Bald Eagle	Sumner	TN	S3	D	DM	Foraging
Terrestrial	*Hypericum adpressum*	Creeping St. John's-Wort	Sumner	TN	S1	E	-	Potential
Terrestrial	*Myotis grisescens*	Gray Bat	Robertson, Sumner	TN	S2	E	LE	Foraging
Terrestrial	*Myotis grisescens*	Gray Bat	Simpson	KY	S2	T	LE	Foraging
Terrestrial	*Myotis septentrionalis*	Northern Long-eared Bat	Sumner	TN	S1S2	T	-	Foraging

Terrestrial	*Perimyotis subflavus*	Tricolored Bat	Robertson	TN	S2, S3	T	-	YES
Terrestrial	*Spiranthes odorata*	Sweetscent Ladies'-Tresses	Sumner	TN	S1	E	-	Potential
Terrestrial	*Zapus hudsonius*	Meadow Jumping Mouse	Sumner	TN	S4	-	PS	Yes
Terrestrial	*Neotoma magister*	Allegheny Woodrat	Wilson	TN	S3	-	-	Yes

The aquatic habitat observed within the Project Transmission Line Upgrades ranged from small, low quality ephemeral channels to large perennial channels such as West Fork Drakes Creek and the Cumberland River. Several ponds and ephemeral and shrub-scrub wetlands were observed in the Project Transmission Line Upgrades. None of the listed species were observed during the site reconnaissance. Based on the characteristics of these aquatic features, suitable habitat for several of the aquatic species listed in the NHD is present in the Project Transmission Line Upgrades. Presence of the above-mentioned aquatic species are assumed, and appropriate avoidance measures would be implemented.

The aquatic habitat observed on the Access Road Improvements consisted of one low quality, intermittent stream crossing the proposed access road to the east of Blue Door Road southeast of Mitchellville, Tennessee. Due to the stream area in the access road currently impacted as an existing drive, suitable habitat for these species was not observed along the Access Road Improvements.

The terrestrial habitat observed within the Project Transmission Line Upgrades and Access Road Improvements ranged from open successional field, shrub land and marshy wetlands and wet meadows. None of the listed species were observed during the initial site reconnaissance. Based on the characteristics of these terrestrial features, suitable habitat for several of the species listed in the NHD is present within the Project Transmission Line Upgrades and Access Road Improvements. See additional descriptions below for federally listed or federally protected species.

The OKNP listed the following species to potentially occur within the Project Area, which are discussed below:

The Eastern hellbender (*Cryptobranchus alleganiensis*) is an amphibian species listed as imperiled and vulnerable in the state of Kentucky. This species is typically confined to running water in large streams and rivers. Suitable habitat for this species was not observed on the Project Area. The Loggerhead shrike (*Lanius ludovicianus*) is an avian species listed as vulnerable to secure in the state of Kentucky and identified as occurring in the northeastern section of the Franklin, KY USGS 7.5' Topographic Quadrangle. This species is typically found in areas of low vegetation with interspersed short trees/shrubs and/or fences for perches. Suitable habitat for this species was not observed on the Project Area.

Another species of concern that may occur in areas of proposed Project Transmission Line Upgrades is the streamside salamander (*Ambystoma barbouri*). Three known records of Streamside salamanders within 3 miles of the Project Transmission Line Upgrades, all within tributaries of Spencer creek (with the closest record located at 1.1 miles from the Project Area). Wet weather conveyances and intermittent streams occur along segments of ROW with proposed upgrades. Presence of the above-mentioned species are assumed, and appropriate avoidance measures would be implemented.

Federally-Listed Species

The USFWS IPaC listed the following species to potentially occur within the Project Site, which are discussed below: The Indiana bat (*Myotis sodalis*) is a federally-listed endangered species and the Northern long-eared bat (*Myotis septentrionalis*) is a federally-listed threatened species, both known to occur in Simpson County, Kentucky. Potential summer roosting habitat for these species generally consists of sites that contain mature and/or standing dead trees with exfoliating bark, and/or stream/river corridors which serve as flight paths. Additionally, sites that contain caves could be used by the Indiana bat and Northern long-eared bat for winter hibernacula. Karst features were observed on the Project Site. The deepest karst sinkhole observed on the project site was approximately 15 feet deep and nearly vertical in structure. The interior of the aforementioned sinkhole was observed, and horizontal space that would accommodate Indiana and/or Northern long-eared bat hibernacula was not observed. A small forested area containing mature trees with features that could be used for summer bat roosting and with a relatively open understory were observed in the southeastern portion of the Project Site. Additionally, two tree lines on the western portion of the project site contained potential roost trees (PRTs). Therefore, potential summer habitat was identified on the Project Site. Suitable foraging habitat occurs over forested areas and streams and wetlands. No known captures or hibernacula records of Indiana bat occur within 10 miles of the Project Area. No Northern Long-Eared Bat records are known within 5 miles of the Project Area. The closest known Indiana Bat maternity roosts is located in Wilson County, Tennessee, approximately 14 miles away from the Project Area. The closest known Northern Long-Eared Bat hibernacula is located approximately 14.6 miles away from the Project Area.

The Gray bat (*Myotis grisescens*) is a federally-listed endangered species known to occur in Simpson County, Kentucky. The Gray bat typically lives in caves year-round and forages over streams, wetlands, and ponds. The closest known Gray bat hibernaculum is located approximately 0.8 miles from the Project Area. Numerous karst features were observed on the Project Site. The deepest karst sinkhole observed on the Project Site was approximately 15 feet deep and nearly vertical in structure. Based on observation of the interior of the aforementioned sinkhole, and horizontal space that would accommodate Gray bat roosting and use was not observed. Based on the observations made during the site reconnaissance foraging habitat is present on the Project Site.

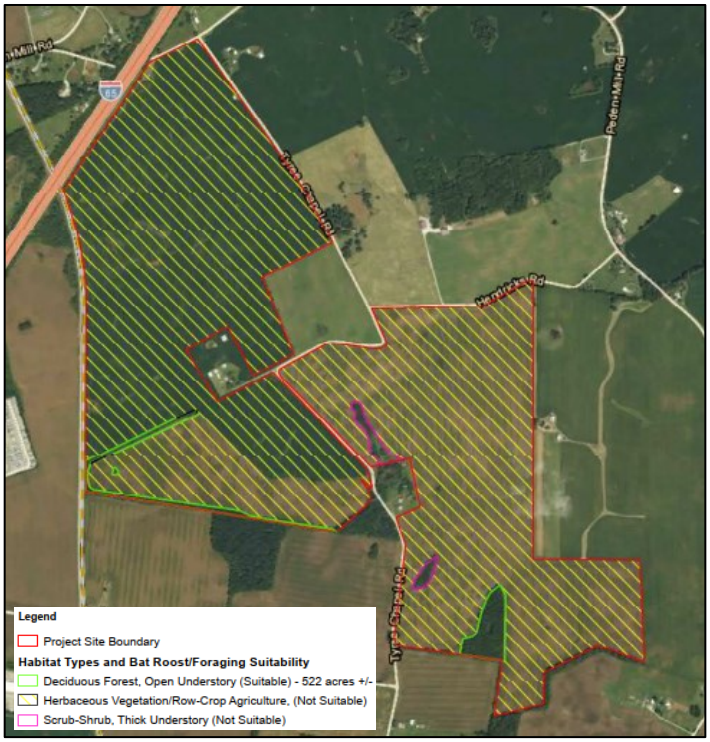

Figure 3.14 Proposed Horus Kentucky Solar Project Site Habitat Types Map

Figure 3.15 Representative Photograph of Forested Area within Proposed Horus Kentucky Solar Project Site

The Snuffbox mussel (*Epioblasma triquetra*) is a federally-listed endangered species listed as occurring in Simpson County, Kentucky. Snuffbox mussels are found in small to medium-

sized creeks and in larger rivers and lakes. In addition, they are found in swift currents of riffles and shoals and along wave-washed lakeshores over gravel and sand with cobble and boulders. The aquatic habitat observed on the Project Site consisted of ephemeral channels terminating in karst features and without downstream connections and an isolated wetland; therefore, the potential habitat for this species is not present on the Project Site.

The USFWS IPaC listed the following species to potentially occur within the Project Transmission Line Upgrades, which are discussed below:

Suitable hibernacula for gray bat, Indiana bat, and northern long-eared bat does not occur in areas of proposed upgrades. However suitable foraging for all three species does occur over bodies of water and along forested edges in areas of proposed upgrades.

The Cumberlandian Combshell (Epioblasma brevidens) is a species that inhabits medium-sized streams to large rivers with shoals and riffles in coarse sand, gravel, cobble, and boulders. This species is not associated with small streams. The Dromedary Pearlymussel (Dromus dromas) is a species that inhabits small to medium, low turbidity, high to moderate gradient streams. The species is commonly found near riffles on sand and gravel substrates with stable rubble. The Fanshell (Cyprogenia stegaria) is a mussel that is found in medium to large rivers. It buries itself in sand or gravel in deep water of moderate current, with only the edge of its shell and its feeding siphons exposed. The Orangefoot Pimpleback (pearlymussel) (Plethobasus cooperianus) is a species that is typically found in medium to large rivers. The Pink Mucket (pearlymussel) (Lampsilis abrupta) is a species is typically found in mud and sand substrate and shallow riffles, with relatively low amounts of silt, of major rivers and tributaries. The Purple Cat's Paw (Epioblasma obliquata obliquata) is a species that is typically found in shallow waters of silt-free gravel and sandy substrates of larger rivers. The Ring Pink (mussel) (Obovaria retusa) is a species that is typically found in shallow waters of silt-free gravel and sandy substrates of larger rivers. The Rough Pigtoe (Pleurobema plenum) is a species that is typically found in a wide variety of stream sizes in a mixed substrate of clean silt, sand, and gravel. The Snuffbox mussel (Epioblasma triquetra) is a species that is typically found in small to medium-sized creeks in areas of swift currents, most often in sand, gravel, and/or cobble substrates. The Tubercled Blossom (pearlymussel) (Epioblasma torulosa torulosa) is a species that is typically found in shallow sand and gravel shoals in large rivers with swift currents. The White Wartyback (pearlymussel) (Plethobasus cicatricosus) is a species that is typically found in clean, fast flowing water with sand and gravel bottoms of large rivers. The aquatic habitat observed within the Project Transmission Line Upgrades ranged from small, low quality ephemeral channels to large perennial channels such as West Fork Drakes Creek and the Cumberland River. Based on the characteristics of these aquatic features, suitable habitat for the listed clam species is present within the Project Transmission Line Upgrades. Presence of the above-mentioned aquatic species are assumed, and appropriate avoidance measures would be implemented.

The Braun's Rock-cress (Arabis perstellata) is a federally-listed endangered species potentially occurring in Sumner and/or Wilson Counties, Tennessee. According to NatureServe Explorer this species is often "…found on mesic, shady, steep, north-facing wooded slopes" or "in sheltered areas, such as around the bases of larger trees, or in areas where there is little competition…" Based on the absence of trees beyond early sapling stage and the high amount of herbaceous competition along the majority of the Project Transmission Line Upgrades, neither this species nor its habitat is present within the Project Transmission Line Upgrades.

The Leafy Prairie-clover (Dalea foliosa) is a federally-listed endangered species potentially occurring in Sumner and/or Wilson Counties, Tennessee. According to NatureServe Explorer, this species prefers "open, thin-soiled limestone glades and moist prairies, near streams or limestone seeps. Habitat with these characteristics was observed in various areas within the Project Transmission Line Upgrades, with the highest concentration between the Cumberland River and the intersection of Coles Ferry Road and Academy Road. A seasonal survey for rare plant communities (specifically the Leafy Prairie-Clover [*Dalea foliosa*]) was conducted in early August, which was timed appropriately for the species to be in full bloom and most readily detectable (based on herbarium specimen documentation). The Project Transmission Line Upgrades has abundant areas of limestone glade and the following vegetation was observed: Canada goldenrod (*Solidago canadensis*), Blackberry (*Rubus*), redcedar (*Juniperus virgiana*). The seasonal survey resulted in no individual species to be located within the Project Area.

The Spring Creek Bladderpod (Lesquerella perforata) is a federally-listed endangered species known to occur in the floodplain of two creeks in Wilson County, Tennessee. According to NatureServe Explorer, this species is found on flood plains where disturbances limit encroachment and competition from woody species and grasses. However, no potential habitat was seen for this species, due to the absence of proximity of the floodplain to the stream on-site.

Bald Eagles and Migratory Birds

The bald eagle is protected under the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Protection Act (MBTA). This avian species is typically found in the vicinity of large water features and nests in tall trees or cliffs near waterways. Nesting habitat was not observed on the Project Area; however, foraging habit may be present along the Project Transmission Line Upgrades at West Fork Drakes Creek and the Cumberland River. While there are records of osprey nests and wading bird colony nests on structures immediately adjacent to the Project Transmission Line Upgrades and Access Road Improvements on either side of the Cumberland River, no bald eagles, ospreys, or nests were observed during the environmental field surveys within the Project Area or along public roadways near the Project Area. In addition, review of the USFWS IPaC did not result in the identification of any migratory bird species of conservation concern that have the potential to occur in the Project Area.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, the Project Site would not be constructed; therefore, no Project-related impacts to Federal or state threatened, and endangered species would occur.

Proposed Action Alternative

Suitable habitat for state-listed species including Allegheny woodrat and meadow jumping mouse was observed in the Project Area. Due the avoidance of cave and karst features, Allegheny woodrat is not likely to be impacted. Any habitat fragments for meadow jumping mouse that may occur along the Project Transmission Line Upgrades may be impacted by proposed actions. However, due to the small isolated areas of impact along the ROW, populations of meadow jumping mouse would not be impacted. While suitable summer roosting and/or foraging habitat for the Indiana bats, Northern long-eared bats, and Tricolored bats is present on the Project Site, tree clearing is not proposed within the Project Site, so there would be no direct impacts to the listed bat species. Per Figure 2.4 – Proposed Horus

Kentucky Solar Project Site Layout, the development of the Project Site incorporates the karst avoidance areas based on the results of the field survey and subsurface exploration. Therefore, identified karst features and caves that could offer hibernacula for tricolored bat would be avoided for the construction of the Project Site. In addition, identified streams and wetlands are also being avoided as part of the Project Site development. In addition, a 50-foot buffer would be maintained from the identified caves, karst features, streams, and wetlands to avoid any direct impacts to these features. Therefore, impacts to foraging habitat for these bat species as well as gray bat would be minimized or avoided on the Project Site.

Danger trees that are or have the potential to be an immediate hazard to the safety and reliability of TVA's transmission line system would be removed during winter months, November through March. Danger trees are located off the ROW that, under maximum sag and blowout conditions, would strike a transmission line structure or come within an unsafe distance of a transmission line if it were to fall toward the line. For most transmission lines, this distance is generally 10 feet.

During environmental field surveys, no bald eagles, ospreys, or nests were observed in or adjacent to the Project Area. Therefore, the Proposed Action Alternative is 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.

3.5 Cultural Resources

This section describes the existing cultural resources within the Project Area and the potential impacts on these cultural resources that would be associated with the No Action and Proposed Action Alternatives. Components of cultural resources that are analyzed include prehistoric and historic archaeological and architectural resources. It should be noted that no architectural survey was required along the Proposed Transmission Line Upgrades within Kentucky and Tennessee as any height change of the transmission lines are proposed to be no greater than 7–10 feet in height from the existing infrastructure.

Affected Environment

Cultural resources are properties and places that illustrate aspects of prehistory or history or have long-standing cultural associations with established communities and/or social groups. Cultural resources may include archaeological sites, unmodified landscapes and discrete natural features, modified landscapes, human-made objects, structures such as bridges, buildings, and groups of any of these resources, sometimes referred to as districts. Section 106 of the National Historic Preservation Act (NHPA), as amended (54 U.S.C. § 300101 et seq.) is specifically designed to address the effects of federal and/or federally funded projects on tangible cultural resources—that is, physically concrete properties—of historic value. The NHPA provided 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 National Register of Historic Places (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 (unless in exceptional cases) and if found to embody one or more of four different types of values, or criteria, in accordance with 36 CFR § 60.4:

- 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.

- 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.
- 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.
- 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.

Cultural resources that are listed or considered eligible for listing on the NRHP are called "historic properties." Federal agencies are required by the NHPA to consider the possible effects of their undertakings on historic properties and take measures to avoid, minimize, or mitigate any adverse effects. NEPA requires federal agencies to consider how their undertakings may affect the quality of the human environment, including both cultural resources and those defined as historic properties, so that the nation may "preserve important historic, cultural, and natural aspects of our national heritage." "Undertaking" includes any project, activity, or program that has the potential to have an effect on a historic property and that is under the direct or indirect jurisdiction of a federal agency or is licensed or assisted by a federal agency. Considering an undertaking's possible effects on historic properties is accomplished through a four-step review process outlined in Section 106 of the NHPA (36 CFR § 800). These steps are:

1. Initiation (defining the undertaking and the Area of Potential Effect [APE] and identifying the parties to be consulted in the process);
2. Identification (studies to determine whether cultural resources are present in the APE and whether they qualify as historic properties);
3. Assessment of adverse effects (determining whether the undertaking would affect the qualities that make the property eligible for the NRHP); and
4. Resolution of any adverse effects (by avoidance, minimization, or mitigation).

A resource may be eligible under one or more of these criteria. Criteria A, B, and C are most frequently applied to historic buildings, structures, objects, non-archaeological sites (e.g., battlefields, cemeteries, natural features, and designed landscapes), or districts. Also, a general guide of 50 years of age is used to define "historic" in the NRHP evaluation process. A resource may, however, be eligible for the National Register even if it is less than 50 years of age but has exceptional significance. The most frequently used criterion for assessing the significance of an archaeological site is Criterion D, although other criteria were considered where appropriate. For an archaeological site to be considered significant, it must have potential to add to the understanding of the area's history or prehistory. A commonly used standard to determine a site's research potential is based on a number of characteristics including artifact variety and quantity, site integrity, clarity, and environmental context. Another important factor is the uniqueness of the site. Sites that are commonly found should exhibit exceptional integrity and research potential to be eligible for inclusion in the NRHP.

Site types that are rarely found (e.g., Clovis Period sites), or those that have strong cultural significance to descendant populations (e.g., burial mounds), may have less stringent technical requirements for inclusion in the NRHP.

Additional cultural resource laws that protect historic resources include the Archaeological and Historic Preservation Act (16 USC 469-469c), Archaeological Resources Protection Act (16 USC 470aa-470mm) and the Native American Graves Protection and Repatriation Act (25 USC 3001-3013). Throughout the process, the lead federal agency must consult with the appropriate State Historic Preservation Officer (SHPO), federally recognized American Indian tribes that have an interest in the undertaking, and any other party with a vested interest in the undertaking. Through various regulations and guidelines, federal agencies are encouraged to coordinate Section 106 and NEPA review to improve efficiency and allow for more informed decisions. Under NEPA, impacts to cultural resources that are part of the affected human environment but not necessarily eligible for the NRHP must also be considered by federal agencies. Generally, these considerations are accomplished through consultation with parties having a vested interest in the undertaking, as described above.
A project may have effects on a historic property that are not adverse, if those effects do not diminish the qualities of the property that identify it as eligible for listing on the NRHP. However, if the agency determines (in consultation with the SHPO and other parties) that the undertaking's effect on a historic property within the area of potential APE would diminish any of the qualities that make the property eligible for the NRHP (based on the criteria for evaluation at 36 CFR Part 60.4 above), the effect is said to be adverse. Examples of adverse effects would be ground-disturbing activity in an archaeological site or erecting structures within the viewshed of a historic building in such a way as to diminish the structure's integrity of feeling or setting.

Federal agencies must resolve the adverse effects of their undertakings on historic properties. Resolution may consist of avoidance (such as choosing a project alternative that does not result in adverse effects), minimization (such as redesign to lessen the effects), or mitigation. Adverse effects to archaeological sites are typically mitigated by means of excavation to recover the important scientific information contained within the site. Mitigation of adverse effects to historic structures sometimes involves thorough documentation of the structure by compiling historic records, studies and photographs. Agencies are required to consult with SHPOs, tribes and others throughout the Section 106 process and to document adverse effects to historic properties resulting from agency undertakings.

As part of the evaluation process, an archaeological survey (of the Project Area) and a separate architectural survey (of Project Site only) were conducted in May, October, November, December 2020 and January, August 2021 to determine the presence of prehistoric and historic cultural resources that are listed or eligible for listing in the NRHP (Appendix D). The Section 106 review process commences with the delineation of the project's area of potential effect (APE). The 550-acre Project Site and approximately 20.96 miles of existing TVA Transmission Lines L5402 and L5775 (100-foot wide survey corridor) and associated Access Road Improvements comprises the APE for cultural resources. Two APEs were defined for the Proposed Action: a direct effects APE and an indirect effects APE. The direct effects APE is defined as the area that would be directly affected by potential Project construction, clearing, and operations. The direct effects APE overlaps with the Project Area and consists of the Project Site and Project Transmission Line Upgrades and Access Road Improvements. The indirect effects APE is defined as a 0.5-mile radius surrounding the Project Site. The Project Area and a 0.5-mile radius surrounding the tract were evaluated during background research. The cultural resources assessment for the

direct and indirect effects APEs consisted of background research, field surveys, archaeological analysis, initial NRHP evaluations, and results summary.

Architectural Resources

Desktop and field analyses were completed regarding the Proposed Action's potential to affect historic properties. The purpose of the analyses was to identify previously recorded historic architectural resources within the APE, which was defined to include a 0.5-mile buffer surrounding the proposed fence line of the Project Site. The review included an analysis of historical aerial imagery and topographic quadrangles, a review of the files maintained by the Kentucky Heritage Council, and a review of the NRHP and National Historic Landmark databases maintained by the National Park Service. Information on known historic architectural resources occurring in or near the APE was examined, as well as previously completed cultural resources reports and historic documents pertinent to the APE.

As a result of the investigations, 26 resources were identified. Two resources, SI 520 and SI 526, were unable to be evaluated due to their distance from the right-of-way or publicly accessible roads. Resource SI 526 is separated by I-65 and a wooded area from the project and the Project Site would not be visible from the resource. Resource No. SI 520 is separated from the project area by open fields and the proposed solar farm would be visible. Because Resource SI 520 could not be evaluated and could be visually impacted, vegetative screening is recommended to shield the resource and minimize potential adverse effects. The remainder of the APE contains no significant above-ground historic resources and no additional work is recommended.

Archaeological Resources

As the Project Area goes into Kentucky and Tennessee, background research for the Project Area was obtained from both the Kentucky Historical Commission (KHC) and the Kentucky Office of State Archaeology (OSA) and the Tennessee Division of Archaeology (TDOA).

Kentucky

Fieldwork for the Phase I Archaeological Survey was conducted in six intermittent sessions between May 26, 2020, April 28, 2021, and July 27 to August 2, 2021. In total, 1,273 shovel tests were excavated within the Project Area. As a result of the archaeological investigations, one previously recorded site, 15Si17, four newly recorded sites—15Si60, 15Si62, 15Si61, and 15Si63—six isolated finds (IFs 1–6) and one small family cemetery (Kitchens Cemetery, 15Si64/ KHC number SI 536) were identified. Previously recorded archaeological sites 15Si31 and 15Si327, reported to be in or near the project, were not re-located.

Tennessee

During the survey of TL L5402, a total of 216 shovel tests was excavated along a single transect placed in the center of transmission line. During the survey, no archaeological sites were identified. As a result of the investigations, two Precontact isolated finds (IF-1 and IF-2) and the Williams Family Cemetery were identified. All three resources are recommended as being ineligible for inclusion in the NRHP. Based on these results, no historic properties would be affected by the proposed undertaking and no further cultural resources work should be necessary. To comply with Tennessee State Law, however, the Williams Cemetery should be avoided by any ground disturbing activities.

During the survey of the Access Road Improvements, a total of 35 shovel tests along 15 proposed access routes for TL L5402 and 75 shovel tests along 32 proposed access routes for TL L5775 were conducted. The survey includes a total of 47 proposed access routes.

There are 15 proposed access routes totaling approximately 1.75 miles for TL L5402 and 32 proposed access routes totaling approximately 2.47 miles for TL L5775. The ROW for new or improved access routes would be approximately 4.88 meters (16 feet) wide. Areas containing existing paved or gravel drives 4.88 meters or more in width were not surveyed as there would be no changes to these routes. Shovel tests were placed at 30-meter intervals along a single transect down the center of the 4.88-meter ROW. A total of 31 shovel tests for TL L5402 and 72 shovel tests for TL L5775 were not excavated in areas where there was an existing paved or gravel road or where the slope was greater than 15 percent. As a result of the archaeological investigations, no cultural resources were identified along Access Road Improvements for TL L5402. One archaeological site, 40WI269, was identified along an access route associated with TL L5775. Site 40WI269, a Mississippian Period lithic scatter, was not fully delineated as the site extends outside of the ROW. Therefore, the site's NRHP eligibility is undetermined. However, the portions of site within the ROW do not retain sufficient integrity and do not contribute to the site's potential significance therefore the proposed undertaking would have no adverse effect on site 40WI269.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, the Project Site would not be constructed; therefore, no Project-related impacts to cultural resources would occur.

Proposed Action Alternative

It should be noted that no architectural survey was required along the Proposed Transmission Line Upgrades and Access Road Improvements within Kentucky and Tennessee as any height change of the transmission lines are proposed to be no greater than 7–10 feet in height from the existing infrastructure.

As a result of the architectural survey of the Project Site, 26 resources were identified. The Project would include installation of a privacy fence and vegetative screening buffer that would be placed along Project boundaries (where existing natural buffers are not sufficient in shielding adjacent residents). The remainder of the APE contains no significant above-ground historic resources and no additional work is recommended.

As a result of the archaeological investigations within Kentucky, one previously recorded site, 15Si17, four newly recorded sites—15Si60, 15Si62, 15Si61, and 15Si63—six isolated finds (IFs 1–6) and one small family cemetery (Kitchens Cemetery, 15Si64/ KHC number SI 536) were identified. Previously recorded archaeological sites 15Si31 and 15Si327, reported to be in or near the project, were not re-located. Of the identified resources, archaeological site 15Si61, a Middle or Late Archaic base camp, is recommended as being potentially eligible for inclusion in the NRHP. Site 15Si17 was previously listed as an "Inventory Site" and will retain its recommendation of not eligible for the NRHP. The remainder of the sites and isolated finds are recommended as being ineligible for inclusion in the NRHP. Based on these results, it is recommended that archaeological site 15Si61 and the Kitchens Cemetery should be avoided by any ground disturbing activities. If this is not possible, then additional investigations may be required. Figure 2.4 – Proposed Horus Kentucky Solar Project Site Layout includes the archaeological resource avoidance areas based on the results of the archaeological investigation. The remainder of the Project Area contains no significant resources and no additional archaeological investigations are warranted in these areas.

During the archaeological survey within Tennessee, no archaeological sites were identified. As a result of the investigations, two Precontact isolated finds (IF-1 and IF-2) and the Williams Family Cemetery were identified. All three resources are recommended as being ineligible for inclusion in the NRHP. Site 40WI269, a Mississippian Period lithic scatter, was not fully delineated as the site extends outside of the ROW. Therefore, the site's NRHP eligibility is undetermined. However, the portions of site within the ROW do not retain sufficient integrity and do not contribute to the site's potential significance therefore the proposed undertaking would have no adverse effect on site 40WI269. Based on these results, no further cultural resources work should be necessary. To comply with Tennessee State Law, however, the Williams Cemetery should be avoided by any ground disturbing activities within the existing ROW.

3.6 Visual Resources

This section describes an overview of the visual resources in and surrounding the Project Site and the potential impacts on these visual resources that would be associated with the No Action and Proposed Action Alternatives. It should be noted that no visual resources assessment was required along the Proposed Transmission Line Upgrades within Kentucky and Tennessee as any height change of the transmission lines are proposed to be no greater than 7–10 feet in height from the existing infrastructure. No impacts would be anticipated to visual resources within the Project Transmission Line Upgrades or Access Road Improvements, as the land use within the existing corridor would not change.

Affected Environment

Visual resources are visual characteristics of a place that includes both natural and man-made attributes. Such resources are important to people living in or traveling through an area and can be an essential component of historically and culturally significant settings. For this analysis, the scenery management system and associated analytical assessment procedures developed by the U.S. Forest Service are adapted for use within a natural and human-built environment and integrated with planning methods used by TVA. The general Project Site viewshed is evaluated based on its scenic attractiveness and scenic integrity. Scenic attractiveness is a measure of the scenic beauty of a landscape and is based on perceptions of the visual appeal of landforms, waterways, vegetation, and the human-built environment. Scenic attractiveness is assessed as either distinctive, typical/common, or indistinctive. As adapted for this analysis, scenic integrity measures the degree of visual unity of the natural and cultural character of the landscape. Scenic integrity is evaluated as either low, moderate, or high. This analysis also considers the existing character of the Project Site as an important factor in understanding the affected environment.

The Project Site is near the City of Franklin in Simpson County, Kentucky. The regional character is mostly rural, with agricultural fields, rolling hills, forested areas, and generally small towns. The Project Site is bounded to the north by Interstate-65 (I-65) and Old County Farm Road; to the east by Tyree Chapel Road and Hendricks Road; to the south by Tyree Chapel Road; and to the west by railroad tracks. The Project Site is surrounded by scattered residential and agricultural structures adjacent to the Project Site boundaries. The closest adjacent industrial development is the gas station/convenience store and truck stop located across the railroad tracks (along Nashville Road) approximately 500 feet west of the Project Site. The Tyree Chapel Church of Christ is located approximately 1,500 feet south of the Project Site. R&D Farms is located approximately 3,000 feet east of the Project Site. Based on a review of historical aerial photographs, the Project Site appears to have been primarily utilized as agricultural land since at least 1950. Adjoining properties appear to have been primarily utilized as agricultural and residential land since at least 1950. The Project Site is mostly agricultural land which is actively farmed with shrubby and forested areas present.

The existing viewsheds constitute an almost completely agricultural setting, with few man-made attributes. Existing man-made attributes in the vicinity of the Project Site include residential and agricultural structures, farm equipment, railroads, highways, paved and dirt roads. In addition, as the Project Site is actively farmed, the uniformity of the cropland is a man-made visual disturbance. Due to the farming practices, the visual appearance of the Project Site varies throughout the year depending on the harvest cycle. As a consequence of the existing agricultural practices of the area, the Project Site already has an industrial aspect inserted into its aesthetics. The scenic attractiveness of the Project Site is rated as typical or common of a rural-agricultural and sparsely residential area. Scenic integrity is assessed as moderate to high due to the relative unity of the surrounding natural and cultural character. In addition, a Glare Memo was conducted and is included in Appendix F, which states that due to the project design, atmospheric attenuation in tandem with distances from PV panels to observation and route receptors, project beneficial elevation changes and existing line(s) of vegetation that contributes to the natural screening of the Project Site throughout the majority of the site, no problematic glare is predicted.

In addition, a viewshed analysis was conducted for the Project Site and surrounding sensitive receptors (such as residencies, churches, cemeteries) within a 2-mile radius. Figure 3.16 depicts the results of the viewshed analysis. Areas highlighted in red are areas where the Project Site would not be visible, areas highlighted in green are areas where the Project Site would be partially be visible. Figure 3.17 is a representative photograph of the visual aesthetics the Project Site.

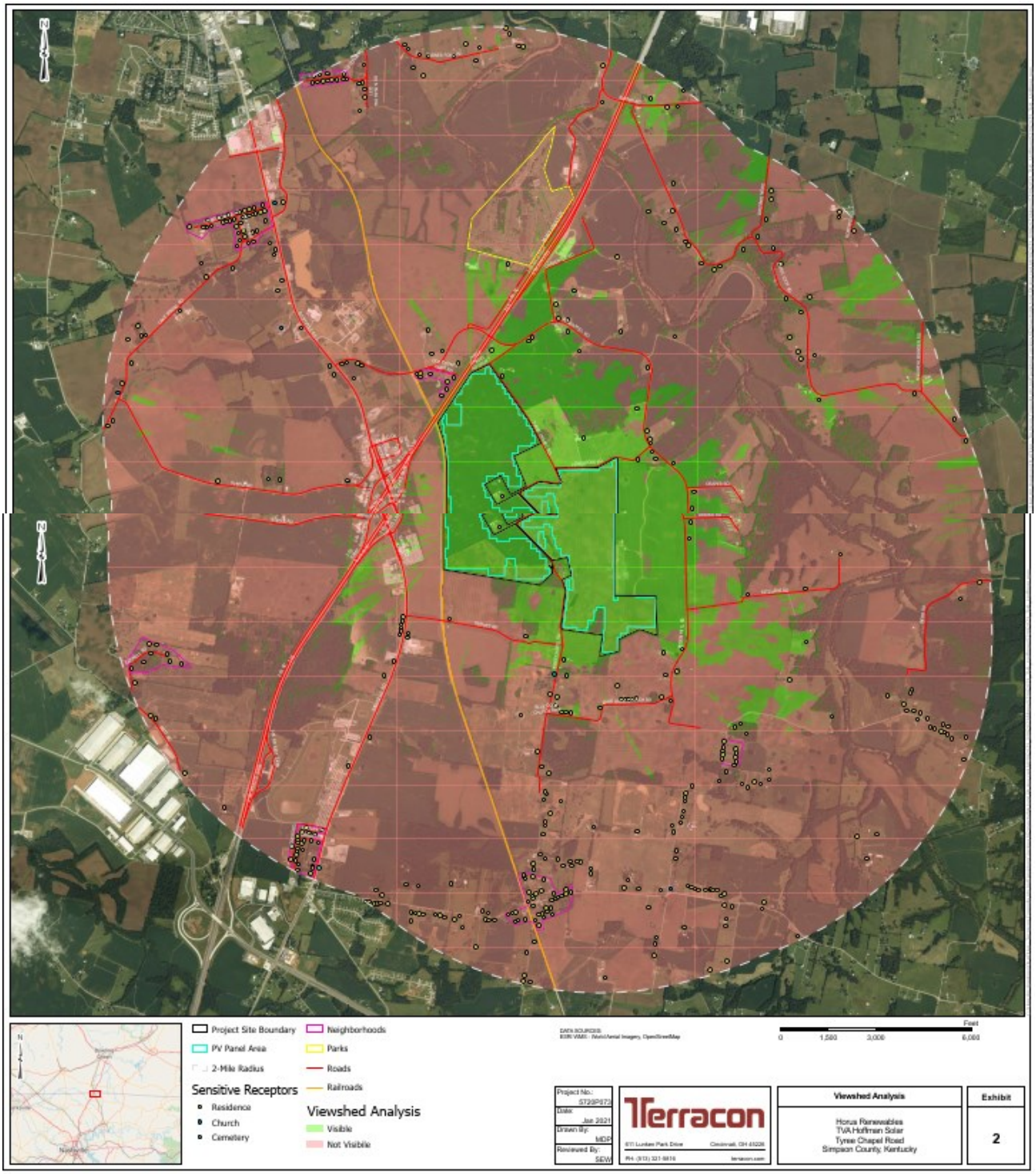

Figure 3.16 Viewshed Analysis of Proposed Horus Kentucky Solar Project Site

Figure 3.17 Representative Photograph of the Visual Aesthetics of Horus Kentucky Solar Project Area

In order to comply with Simpson County ordinances, the following local set-back requirements are applicable to this Project Site:

- 50 feet from public road right-of-way.
- 100 feet from any abutting agricultural properties.
- 250 feet from any residential-zoned properties, churches, cemeteries, nursing homes, and schools.

In addition, based on a Property Value Impact Study conducted by Kirkland Appraisals, LLC for the Project Site, the study concludes that the Project Site "would have no impact on the value of adjoining or abutting property and that the proposed use is in harmony with the area in which it is located". The Property Value Impact Study further states that there have historically been more positive implications from a solar farm that have been expressed by various residents living next to solar farms to include: protection from future development of more intrusive uses, reduced dust, odor, and chemicals from former farming operations, protection from light pollution at night, minimal generation of noise or traffic from its operations, and lack of any potential hazardous waste byproduct or odor from its operations.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, the Project Site would not be constructed; therefore, no Project-related impacts to visual resources would occur. Existing land use would remain as farmland and visual resources would remain as they are at the present time. However, indirect impacts to visual resources are possible as growth occurs within the City of Franklin and Simpson County. Over time, it is possible that the agricultural areas within and surrounding the Project Site could be developed if the residential population in the area grows significantly. Additionally, if the agricultural activities within the Project Site are discontinued, the existing land could revert to undeveloped property or developed for industrial purposes that may be more visually obtrusive than a solar power generating facility. Therefore, indirect impacts to visual resources are possible under the No Action Alternative as the current agricultural land may become residential or developed for other industrial purposes over the long-term.

Proposed Action Alternative

It should be noted that no visual survey was required along the Proposed Transmission Line Upgrades and Access Road Improvements within Kentucky and Tennessee as any height change of the transmission lines are proposed to be no greater than 7–10 feet in height from the existing infrastructure.

Visual concerns are often associated with both large and small-scale solar facilities and its electrical infrastructure. The Project Site and its vicinity consists of relatively flat to gently sloping terrain, and the Proposed Action Alternative would convert what is largely now agricultural, rural-residential, and forested lands to an industrial use mostly consisting of low-profile PV arrays. The solar panels would incorporate anti-reflective treatment to minimize glare and reflection and are proposed at less than 15 feet in height, which means that the visual impact of the solar panels would be similar in height to a typical greenhouse structure (which are common within the Project Site's agricultural region) and lower in height than a single-story residential dwelling.

The Simpson County setbacks would be followed, which would provide appropriate setbacks from the Project Site to abutting public road right-of-way, agricultural properties, and any residential-zoned properties, churches, cemeteries, nursing homes, and schools. Overall, while portions of the Project Site would be visible across open fields or otherwise clear areas, proposed visual barriers in the form of privacy fencing and vegetative screening would further mitigate the visual effects of the Project Site with its surrounding environment and aesthetics, and largely shield views from most Project Site vantage points to the solar facility.

Construction of the proposed Project Site would temporarily alter the visual character of the surround area. During construction, heavy machinery would be present, changing the visual aspects from Project Site vantage points. Within the 550-acre area to be developed, most of the area would be graded, changing the contour, color, and texture of the scenery attributes. The Project Site would appear as a mixture of neutral colors such as browns and grays due to earthmoving, road construction, and concrete activities. Water would be used to keep soil from aerosolizing; thus, dust clouds are not anticipated. Visual impacts from construction would be minimal at night since most construction is anticipated to occur during the day. Erosion control silt fence and sediment traps would be removed once construction is complete, and bare areas would be promptly vegetated. Indirect impacts to visual resources in the Project Site may occur due to increased traffic and movement of heavy machinery on

the Project Site and along local roads. Overall, there would be minor direct and indirect impacts to visual resources during the construction phase of the Proposed Action. However, these impacts would be temporary (approximately 12 months). Lastly, the Glare Memo concluded that no problematic glare is predicted for the Project Site.

3.7 Noise

This section provides an overview of the existing ambient sound environment in the Project Area, and the potential impacts to the ambient sound environment that would be associated with the No Action and Proposed Action Alternatives.

Affected Environment

Noise pollution is sound that becomes unwanted with normal activities, disrupts normal activities, or diminishes one's quality of life. Noise pollution can adversely affect a person's health and lead to several stress related issues. Sound is usually represented on a logarithmic scale with a unit called the decibel (dB). Sound on the decibel scale is referred to as sound level. The threshold of human hearing is approximately zero dB, and the threshold of discomfort or pain is around 120 dB. Noise levels are computed over a 24-hour period and adjusted for nighttime annoyances to produce the day-night average sound level (DNL). DNL is the community noise metric recommended by the USEPA and has been adopted by most federal agencies. A DNL of 65 A-weighted decibels (dBA) is the level most commonly used for noise planning purposes and represents a compromise between community impact and the need for activities such as construction. The A-weighted sound level represents the approximate frequency response characteristic of the average young human ear. Areas exposed to a DNL above 65 dBA are generally not considered suitable for residential use. A DNL of 55 dBA was identified by USEPA as a level below which there is no adverse impact. For reference, approximate noise levels (measured in dBA) of common indoor and outdoor noises are provided in Table 3.12.

Table 3.12 List of Sound Pressure Levels of Common Indoor and Outdoor Noises

Common Indoor and Outdoor Noise	Approximate Sound Pressure Levels (dBA)
Airplane Flyover at 1,000 Feet	120
Construction Saw at 3 Feet	110
Lawnmower at 100 Feet	90
Vacuum at 10 Feet	80
Traffic	60
Serene Wilderness Areas	≤30

Noises occurring at night generally produce a greater annoyance than do noises of the same levels occurring during the day. People generally perceive intrusive noise at night as being 10 dBA louder than the same level of noise during the day. This perception is largely because background environmental sound levels at night in most areas are about 10 dBA lower than those during the day.

The Noise Control Act of 1972 established a federal policy to promote an environment free from noise that jeopardizes health and welfare. The USEPA guidelines, published in 1974, identified noise levels thresholds, measured in dBA that permit normal activities. The USEPA guidelines found that levels of ≤55 decibels outdoors and ≤45 decibels indoors were considered noise levels which permit daily activities such as conversation, sleeping, working, and recreation. In 1981, the USEPA determined that noise issues were best handled at the state and local level. However, the USEPA still has the authority to investigate noise and its effect and effectiveness of existing regulations.

The amount of noise can be affected by distance and obstruction between the source and receiver. For example, as distance increases, the sound waves are dispersed. It is estimated that sound levels for a point source will decrease by 3 dBA for each doubling distance (AZ DOT, 2017).

Construction of the Project Site is expected to start in third quarter of 2021. It is expected that the weekly construction schedule would occur Monday through Friday between 7:00AM and 7:00PM; however, some construction activities could also occur on weekends if necessary. The Project Site would be constructed in several phases as it is expanded from one area to another. The beginning of construction in each phase would generate the most noise as this is when the heavy machinery would be operated.

In an open field, noise level dissipates at a rate of 6 dBAs every time the distance from the source doubles. If a source generates 100 dBA 3 feet from the source, then the source generates 94 dBA at 6 feet away and 88 dBA at 12 feet away and so on. Equation 1 can be used to calculate the difference in sound pressure level[1].

$$\text{Equation 1:} \quad dL = 10 * \log(R_2 / R_1)^2$$

Where;

dL: change in sound pressure level (dBA)
R_1: distance from source to location 1 (ft, m)
R_2: distance from source to location 2 (ft, m)

In order to calculate the increase in the sound level from multiple sources the pressure from each sound source at the point of interest is summed and converted to decibels. Equation 2 is used to calculate the total raw pressure at a location from multiple sources using the raw pressure from each sound source[2].

$$\text{Equation 2:} \quad P_T = (P_A^2 + P_B^2 + \ldots + P_F^2)^{0.5}$$

Where;

P_T: Total combined pressure at location 1 (µPa)
P_A: Pressure from source A at location 1 (µPa)
P_B: Pressure from source B at location 1 (µPa)
P_F: Pressure from the last source at location 1 (µPa)

The construction activities that would generate the most noise would take place during the construction phase are due to pile driving, potential rock drilling, vehicular traffic, and dozer grading work. The U.S. Department of Transportation Federal Highway Administration has

[1] Equation 1 from Estimating Sound Levels with the Inverse Square Law on HyperPhysics, an online reference book for physics by Georgia State University
[2] Equation 2 from Adding Decibels on Engineering Toolbox, an online reference book for engineering equations.

measured noised impacts from construction activities and the expected noise associated with the potential equipment to be used during construction can be seen in Table 3.13.

Table 3.13 Common Construction Equipment

Equipment Description	Actual Measured L_{max} @ 50 feet (dBA, slow) (Samples Averaged)
Dozer	82
Excavator	81
Front End Loader	79
Impact Pile Driver	101
Man Lift	75
Pickup Truck	75
Vibratory Pile Driver	101

Neighbors in close proximity to the construction activities likely would be able to notice the noises associated with the machinery required for construction. However, according to the study Farm Noise Emissions During Common Agricultural Activities done by Depczynski, Franklin, Challinor, Williams, and Fragar, the machinery required for construction has similar noise levels as farm equipment that are currently used in the area. Dozers, combines, tractors, irrigation pumps, semi-trucks, and chainsaws used by farmers can generate noise levels between 80 and 110 dBA. The specific farm related sources and noise levels as predicted in the study can be seen in Table 3.14.

Table 3.14 Common Farm Sound Levels

Machinery	Average Noise Level at Operators ear (dBA)	Noise Level Range at Operators ear (dBA)
Air Compressor	86	72-95
All-Terrain Vehicle	86	84-87
Angle Grinder	98	96-100
Auger	93	89-96
Bulldozer	99	97-100
Chainsaw	106	104-107
Farm Truck	85	83-88
Fork Lift	84	81-88
Harvester	83	75-91
Irrigation Pump	100	96-104
Tractor	92	90-93

Any noise generated by the transport of equipment in and out of the Project Site would be comparable to the sound levels generated by the hauling of crops each season. Although construction noise levels would vary from day to day during construction depending on the activity being performed, the overall generated noise levels during construction are expected to be similar to noise levels generated from typical farm activities. The sound levels indicated by the construction activities in Table 3.7 range from 75-101 dBA at a distance of 50 feet. Per Simpson County Zoning ordinances, the anticipated setbacks are 250 feet from any residential-zoned properties, churches, cemeteries, nursing homes, and schools. Intermittent ranges at the nearest property boundary are estimated to range from 61-87 dBA, when construction is within the closest range of the property boundary.

The noise impacts from constructing the Project Site on existing farmland would be temporary. The construction process would last approximately 12 months and would primarily occur during daylight hours during weekdays. Construction activities would not occur in a single location for the total duration but would occur in various locations around the project area. Most of the project area is large enough that noise sources would be sufficiently far from sensitive receptors to avoid impacts. The noise impacts from construction equipment is expected to be similar to the operation of typical farm equipment; as such, the construction of the solar project is not anticipated to have a significant impact on surrounding community noise levels or sensitive receptors.

The operation of the Project Site would primarily generate noise from two main sources; invertors and transformers. The emissions are generally not audible at the property line when the proper setback distances are used from sensitive receptors. The Project Site would have inverters and transformers. Inverters are used on solar farms to turn the DC power generated by the solar panels into AC. Transformers are used on solar farms to increase the alternating voltages generated by the invertors and help facilitate the transmission, distribution, and utilization of AC for electrical energy. The Project Site would also use a motorized tracking system in order to keep the panels facing the sun and optimize output during different times of the day and year. The motors used to move the panels are small and are inaudible when in close proximity. The other source of noise would be from the substation transformer.

The Project Site is anticipated to use 22 inverter/transformer located throughout the property. Each individual noise source adds to the total measurable noise level; however, as stated above, the doubling of the distance from the previous reference measuring point decreases the number of decibels registered. The inverters are rated by the manufacturer at <79 dBA at 3 feet and would be scattered throughout the solar array. Each inverter would produce 31 dBA using the 250-foot setback from any residential-zoned properties, churches, cemeteries, nursing homes, and schools. Rural ambient background levels during the day are generally 40-45 dBA depending on the proximity to existing noise sources. The inverters would not be audible over the background sound levels at sensitive receptors assuming the 250-foot setback. Similar propagation would also reduce the substation levels below ambient conditions at the 250-foot setback.

Anticipated operational maintenance operations would include grass mowing and general solar panel maintenance. The upkeep and small fixes are not anticipated to generate any loud or distinguishable noise from off the Project Site. The Project would generally have the grass mowed three to four times a year, this would be done during the day. Riding lawn mowers typically operate around 90 dBA. Due to the large area being mowed, the distance from the mower to anywhere off-site would create an environment where the sound generated from mowing would largely go unnoticed. Secondly, the mowing of grass already

takes place at each resident's household and is generally accepted as a common noise. Finally, the last potential for increasing the ambient noise level of the Project Site would be an increase in traffic into and around the site. The estimated number of vehicles needed to service the solar farm amounts to 10 vehicles on days when the panels are serviced, and the grass is mowed, which is not expected to have any significant noise impacts.

A more comprehensive Noise Sound Level Analysis is provided in Appendix G.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, the Project Site would not be constructed; therefore, no Project-related impacts to noise would occur. Existing land use would remain as farmland and the ambient sound environment would remain as they are at the present time. However, indirect impacts to noise are possible as growth occurs within the City of Franklin and Simpson County. Over time, it is possible that the agricultural areas within and surrounding the Project Site could be developed if the residential population in the area grows significantly. Additionally, if the agricultural activities within the Project Site are discontinued, the existing land could be developed for industrial purposes that may generate more noise than a solar power generating facility. Therefore, indirect impacts to ambient sound environment are possible under the No Action Alternative as the current agricultural land may be developed for other industrial purposes over the long-term.

Proposed Action Alternative

Under the Proposed Action Alterative, direct and indirect noise impacts would primarily occur during the construction phase as noise levels would temporarily increase during construction of the Project Site. Based on the above, noise-generating sources (inverters and transformers within the Project Site) were found to not result in sound levels of significance beyond the Project Site boundaries and are not anticipated to have a significant impact on surrounding community noise levels or sensitive receptors. In addition, Simpson County setbacks would be followed, which would provide appropriate setbacks from the Project Site to abutting sensitive receptors like public road right-of-way, agricultural properties, and any residential-zoned properties, churches, cemeteries, nursing homes, and schools.

Typical farming equipment like dozers, combines, tractors, irrigation pumps, semi-trucks, and chainsaws used by farmers can generate noise levels between 80 and 110 dBA. The current agricultural operations surrounding the Project Site likely already produces ambient sounds that would help make effects from the Project more minimal. Additionally, construction would primarily occur during daylight hours, between sunrise and sunset; therefore, the Project Site would not affect ambient noise levels at night during most of the construction period. Most of the proposed equipment would not be operating on-site for the entire construction period but would be phased in and out according to the progress of the Project.

Following completion of construction activities, the ambient sound environment on and surrounding the Project Site would be expected to return to existing levels or below, by eliminating some seasonal use of agricultural equipment. The moving parts of the PV arrays would be electric-powered and produce little noise. The periodic mowing of the Project Site to manage the height of vegetation surrounding the solar panels would produce sound levels comparable to those of commercial and agricultural operations in the Project Site; however, Project-related mowing would occur at less frequent quarterly intervals than typical agricultural operations. Consequently, the Proposed Action would have minimal effects on

noise levels as a result of normal continuous operation. Many residents living in the area are located along roadways with light to heavy levels of traffic or near agricultural fields where farming activities occur frequently. Overall, implementation of the Proposed Action would result in minor, temporary adverse impacts to the ambient noise environment in the Project Area during construction, and minimal to negligible impacts during operation and maintenance of the solar facility.

Similarly, minor, temporary adverse impacts to the ambient noise environment would be anticipated within the Project Transmission Line Upgrades and Access Road Improvements. These activities would be temporary and negligible since it would occur along the existing ROW that is regularly maintained.

3.8 Transportation

This section describes an overview of existing transportation resources at and near the Project 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 airport.

Affected Environment

The Project Site is bounded to the north by I-65 and Old County Farm Road; to the east by Tyree Chapel Road and Hendricks Road; to the south by Tyree Chapel Road; and to the west by railroad tracks. Several local roads extend through and, thus, provide access to the Project Site. There are also several unnamed, gravel local roads that extend through the Project Site as well. The closest rail line operated by CSX bounds the Project Site directly to the west. The closest general aviation airport is the Portland Municipal Airport located approximately 5.5 miles southeast of the Project Site.

The functional designation and Annual Average Daily Traffic (AADT) for the study roadways was obtained from the Kentucky Transportation Cabinet's (KYTC) online Interactive Statewide Traffic Counts Map. The Kentucky roadway system is comprised of interstate, arterial, collector and local streets. Interstates are limited access, high speed, high-capacity, divided highways that facilitate regional/national travel; Principal Arterials provide a high level of traffic mobility for substantial statewide travel and/or serve major activity centers and the longest trip demands within urban areas; Minor Arterials are roadways that serve trips of moderate length to smaller geographic areas and at a slightly lower level of traffic mobility than Principal Arterials; Major Collectors are roadways that distribute and channel trips between the lower classifications and the arterial systems; Minor Collectors are roadways that distribute and channel trips between Local Roads and the higher classifications at a lower level of traffic mobility than Major Collectors; Local Roads are roadways that primarily provide direct access to adjacent land and are not intended for use in long distance travel.

Regional Access

Interstate 65 (I-65) is a north-south six lane highway located west of the Project area that regionally runs from Bowling Green, Kentucky to Nashville, Tennessee. Access to I-65 from the Project area is provided via US 31W (approximately 1 mile west of the Project site).

Local Access

Local access to the Project area is provided by the roadways described below:

US 31W (Nashville Road) – KY 31W is a north south travel route that is designated a rural major collector roadway. In the vicinity of the Project area, the roadway has 2 travel lanes

12' wide with a 4' shoulder, in each direction and a 14' wide center turn lane. The roadway's Annual Average Daily Traffic (AADT) is approximately 10,841 vehicles. The posted speed limit within the study limits is 55 mph north of Geddes Road and 65 mph south of Geddes Road.

Geddes Road – Geddes Road runs east-west and is designated a rural local roadway. The roadway is a two-way unstriped roadway that is approximately 18' wide with no shoulder within the vicinity of the project area. Current AADT data for Geddes Road is not available and the assumed speed limit is 30 mph due to the narrowness of the roadway.

Tyree Chapel Road – Tyree Chapel Road runs primarily north-south and is designated a rural local roadway. The roadway is a two-way unstriped roadway that is approximately 14' wide with no shoulder within the vicinity of the project area. Current AADT data for Tyree Chapel Road is not available and the assumed speed limit is 30 mph due to the narrowness of the roadway.

Hendricks Road – Hendricks Road runs east-west and is designated a rural local roadway. The roadway is a two-way unstriped road that is approximately 12' wide with no shoulder within the vicinity of the project area. Current AADT data for Hendricks Road is not available. The assumed speed limit for Hendricks Road is 30 mph due to the narrowness of the roadway.

There are no pedestrian or bicycle facilities on any of the above roadways.

US 31W – Nashville Road is the only roadway with available volume data and was analyzed for this study. Traffic volumes for this segment were developed using AADT data obtained from the Kentucky Transportation Cabinet's (KYTC) online Interactive Statewide Traffic Counts Map. Hourly volumes were developed using the "K factors" and "D factors" included in this data. The "K factor" is the percentage of the AADT that represents the Design Hour Volume (DHV) which is the highest hourly roadway volume of the day. The "D factor" is the factor reflecting the proportion of peak-hour traffic traveling in the peak direction. To be conservative, it was assumed that the DHV would be used for both the AM and PM peak hours with counter flowing directional traffic volumes. The "D factor"/peak direction was assumed to travel toward the City of Franklin during the AM peak and away from the City of Franklin during the PM peak.

Table 3.15 Existing Roadway Traffic Volume Data

Roadway Segment	Existing AADT	% HV	K Factor	DHV	D Factor	Morning Peak Hour		Evening Peak Hour	
						NB	SB	NB	SB
US 31W (Nashville Rd.)	10,841	28%	8	867	54	468	399	399	468

Vehicular traffic operational levels of service (LOS) were evaluated for the study segment. Segment capacity analysis was conducted using HCS72 software, which is based on methods presented in the Highway Capacity Manual 6th Edition describing the levels of operation for Two-Lane and Multilane highways. Using this analytical approach, a Level of Service is determined for traffic travelling along a highway segment.

For a Multilane Highway the Level of Service is defined or quantified in terms of roadway density (passenger cars/mile/lane), which is equated to the letters 'A' to 'F'. The following provides density descriptions for each level of service:

Multilane Highway

A	< 11 pc/mi/ln
B	> 11 - 18 pc/mi/ln
C	> 18 - 26 pc/mi/ln
D	> 26 - 35 pc/mi/ln
E	>35 - 45 pc/mi/ln
F	Greater than 45 pc/mi/ln

This quantification applies to both rural and urban multilane highways. The upper value of LOS 'E' (45 pc/mi/ln) is the maximum density at which a sustainable flow will occur. With this methodology LOS 'F' occurs when the demand exceeds the capacity of the roadway segment being analyzed. This type of analysis does not allow for densities exceeding 45 pc/mi/ln and freeway methodology must be used to determine a more accurate density in these cases.

For conservative (worst-case) analysis purposes, the US 31W segment was analyzed using the 55-mph speed limit which provides lower capacities. Table 2.16 presents the results of the operational analysis for the study segment under Existing Conditions. Existing Conditions segment LOS calculations are provided in Appendix A. As shown in table below, all the study segments are currently operating at LOS A under Existing Conditions.

Table 3.16 Existing Conditions Peak Hour Segment LOS Results

Roadway Segment	Direction	Existing Conditions				Existing plus Project Conditions			
		Morning Peak Hour		Evening Peak Hour		Morning Peak Hour		Evening Peak Hour	
		LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)
US - 31W (Nashville Road)	NB	A	5.8	A	4.9	A	6.2	A	8.5
	SB	A	5.1	A	6.0	A	8.8	A	6.4

Construction of the facility is expected to take approximately 12 months. For conservative (worst-case) analysis purposes, it was assumed that construction would occur in one phase. Specific data used include the anticipated number of workers onsite during construction and truck haul trips required to complete construction. Worker vehicle trips and truck haul trips are estimated separately as they represent distinct trip types. Construction workers are expected to commute to/from the construction site during the AM peak hour (inbound) and PM peak hour (outbound). A total of 300 workers are anticipated to work on-site each day. For conservative (worst-case) calculation purposes, it was assumed that all workers would drive alone. An estimated 20 delivery trucks per day are anticipated at the Project site. For conservative (worst-case) calculation purposes, it was assumed that all trucks would be travelling to or from the construction site during both the AM and PM peak hours.

To estimate the maximum number of total Project trips, the worker and truck haul trips were combined to estimate the maximum number of total trips for use in the subsequent traffic analysis. Table 2.17 summarizes the number of trips to/from the Project Site.

Table 3.17 Trip Generation Summary

Trip Type	Morning Peak Hour			Evening Peak Hour		
	Inbound	Outbound	Total	Inbound	Outbound	Total
Worker Trips	300	0	300	0	300	300
Truck Haul Trips	20	0	20	0	20	20
Total Project Trips	320	0	320	0	320	320

It is assumed that the majority of the worker truck haul trips (90%) would generate from the City of Franklin and I-65 and the remaining trips would generate from locations to the south (10%). It is also assumed that truck haul trips would generate from I-65 and US 31W; 90% from the north and 10% from the south. All trips would utilize US 31W to Geddes Road to Tyree Chapel Road to get to the construction site access points. The total volume of project trips on the US 31W segment were added to the Existing Conditions traffic volumes to produce Existing plus Project Conditions segment traffic volumes.

Table 3.18 summarizes the project trip data including trip distributions, new trips and Existing + Project Conditions volumes.

Table 3.18 Existing plus Project Conditions Peak Hour Segment LOS Results

Roadway Segment	Direction	Existing Conditions				Existing plus Project Conditions			
		Morning Peak Hour		Evening Peak Hour		Morning Peak Hour		Evening Peak Hour	
		LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS	Density (pc/mi/ln)
US - 31W (Nashville Road)	NB	A	5.8	A	4.9	A	6.2	A	8.5
	SB	A	5.1	A	6.0	A	8.8	A	6.4

As shown in the above table, with the addition of Project construction traffic, all study segments are projected to continue to operate acceptably at LOS A with only slight degradations in operations. Therefore, the Project is not expected to cause a significant impact with respect to traffic. It should be noted that this analysis assumes a worst-case-scenario in which all workers drive to/from the Project Site alone and thus the Project could generate less impact if workers were encouraged to carpool.

The Transportation Effect & Route Evaluation Study is provided in Appendix H.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, the Project Site would not be constructed; therefore, no Project-related impacts to transportation resources would occur. Existing land use would remain as farmland and existing transportation network and traffic conditions would remain as they are at the present time.

Proposed Action Alternative

Under the Proposed Action, new construction and increase in construction related traffic is anticipated. The construction crew, ranging from a minimum of 50 workers to 300 workers at its peak, would commute to the Project Site between sunrise and sunset. 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 in local hotels in the vicinity. Traffic flow around the Project Site would be heaviest at the beginning of the work day, at lunch, and at the end

of the work day. The construction phase would last at least 12 months and would only take place during working hours, leading to a minimal increase in traffic for those months. This traffic would include cars, trucks, equipment taxiing, and larger construction vehicles. The primary phase of construction would include any necessary clearing and grading. The secondary phase of construction would include the construction. The construction of the facility is not expected to have any significant impact on road infrastructure other than increased wear due to increased traffic at the possible entrances. Any impact to the road due to construction of the facility would be repaired. Access drives and internal roads would be constructed or improved as needed to accommodate appropriate vehicles and equipment to construct the proposed solar facility. Internal roads would be compacted gravel, which may result in an increase in airborne dust particles. During construction, water may be applied to internal road system to reduce dust generation.

Construction activities would temporarily increase traffic through the area and along the three main roads with one primary entrance and exit to the site. Construction traffic impacts would be temporary and minor, and not result in the need for special traffic routes or road enhancements to accommodate construction equipment. However, should substantial traffic congestion occur, Horus Renewables would implement staggered work shifts during daylight hours 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. The construction and operation of the Project Site 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. Overall, direct impacts to transportation resources associated with implementation of the Proposed Action would be anticipated to be minor to moderate and minimized or mitigated. The Proposed Action would not result in any indirect impacts to transportation.

Similarly, minor, temporary impacts to transportation resources would be anticipated within the Project Transmission Line Upgrades. These activities would be temporary and negligible since it would occur along the existing ROW that is regularly maintained and experiences operations and maintenance traffic.

3.9 Air Quality and Climate Change

This section describes existing air quality and greenhouse gas (GHG) emissions in the Project Area and the potential impacts on air quality and GHG emissions that would be associated with the No Action and Proposed Action Alternatives.

Affected Environment

Regional Air Quality

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. Through its passage of the Clean Air Act of 1970 (CAA) 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 the public health and welfare: sulfur dioxide (SO_2), ozone, nitrogen dioxide, 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. The primary NAAQS were promulgated to protect public health, and the secondary NAAQS were promulgated to protect

public welfare (e.g., visibility, crops, forests, soils, and materials) from any known or anticipated adverse 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 being located in or near nonattainment areas may be subject to more stringent air permitting requirements. Nonattainment areas are usually defined by county. National standards, other than annual standards, may not be exceeded more than once per year (except where noted). Areas that cannot be classified on the basis of available information for a particular pollutant are designated as "unclassifiable" and are treated as attainment areas unless proven otherwise. Finally, areas that were formerly designated as nonattainment for a pollutant and later come into attainment are then categorized as "maintenance" for that pollutant for the next 20 years, assuming they continue to meet the NAAQS for that pollutant. If an area remains in attainment for the 20-year maintenance period, the status reverts back to normal attainment.

The primary NAAQS were promulgated to protect public health, and the secondary NAAQS were promulgated to protect public welfare (e.g., visibility, crops, forests, soils, and materials) from any known or anticipated adverse effects of air pollutants. Primary and secondary standards are listed in Table 3.16.

Table 3.19 National Ambient Air Quality Standards

Criteria Pollutant	Average	Primary Standard	Secondary Standard
CO	8 hours	9 ppm	none
CO	1 hour	35 ppm	none
SO_2	1 hour	75 ppb	none
SO_2	3 hours	none	0.5 ppm
NO_2	1 hour	100 ppb	none
NO_2	1 year	53 ppb	Same as primary
Pb	Rolling 3-month average	0.15 µg/m^3	Same as primary
O_3	8 hours	0.070 ppm	Same as primary
PM_{10}	24 hours	150 µg/m^3	Same as primary
$PM_{2.5}$	24 hours	35 µg/m^3	Same as primary
$PM_{2.5}$	1 year	12.0 µg/m^3	15 µg/m^3

Areas in compliance with the NAAQS are designated "attainment" areas. For areas USEPA designates as nonattainment, there are several categories from marginal to severe that USEPA could assign depending on the severity of the nonattainment. A nonattainment designation requires that a region submit a State Implementation Plan (SIP) that addresses how the NAAQS would be met in a future year. USEPA later determines whether the region has met the SIP goals, and if so, USEPA changes the designation from nonattainment area to maintenance area. The CAA General Conformity Rule requires that federal actions taking place in nonattainment areas conform to the region's SIP for reducing airborne concentrations of the nonattainment pollutant(s).

The State of Kentucky adopted the NAAQS as the state ambient air standards and administers the delegable provisions of the CAA. The Kentucky rules regarding Attainment and Maintenance of the National Ambient Air Quality Standards, set in place by the Department for Environmental Protection (DEP) of the Energy and Environment Cabinet (EEC), are found in Kentucky Administrative Regulations Title 401 (401 KAR), Chapters 51 and 53. Chapters 51 and 53 regulations include emission standards and control requirements on both a pollutant-specific basis and process/equipment/industry specific basis. Division 3 also sets forth the permitting requirements for air emission sources.

The Project Site is located in Simpson County, Kentucky. Simpson County is in attainment with applicable NAAQS and meets applicable federal and state air quality standards. The most recent available measurements of ambient air concentrations closest to the Project area shown in Table 3.17 are consistent with the above designation. Therefore, the Project Site is located in an area with good air quality.

Simpson County has not been included on the NAAQS non-attainment list for Kentucky, which includes all Kentucky counties in non-attainment since 1992; therefore, Simpson County, Kentucky has been in attainment since at least 1992. Table 3.17 lists the pollutant concentration values from the air monitoring sites closest to the Project area in Simpson County. These concentrations, which represent air quality near the Project area, are in the form used to determine attainment with NAAQS. The only NAAQS pollutant reported in Simpson County is Ozone. The other NAAQS do not require monitoring due to EPA's set minimum requirements. The monitored pollutant concentrations are well below the standards.

Table 3.20 Air Quality in Simpson County, Kentucky

Pollutant	Metric	Amount
CO	Second maximum non-overlapping 8-hour concentration	ND*
Pb	Maximum rolling 3-month average	ND*
NO_2	Arithmetic mean concentration	ND*
	98th percentile daily maximum 1-hour concentration	ND*
O_3	Fourth daily maximum 8-hour concentration	0.059 ppm**
PM_{10}	Second maximum 24-hour concentration	ND*
$PM_{2.5}$	Weighted annual mean concentration	ND*
	98th percentile 24-hour concentration	ND*
SO_2	99th percentile daily maximum 1-hour concentration	ND*

*** No Data**
**** Applicable NAAQS is 0.070 ppm**

Since Simpson County, where the Project Site is located, is in attainment for all criteria pollutants, the CAA General Conformity rules would not apply to the implementation of the Proposed Action and a general conformity applicability analysis is not required. Average emissions in Simpson County of pollutants for which NAAQS have been established are presented in Table 3.18.

Table 3.21 Average Emissions of NAAQS Pollutants in Simpson County, Kentucky for 2017

Pollutant	Emissions (tons per year)
CO	4,070.78
Pb	0.19
Nitrogen Oxides (NO_x)	1,250.99
$PM_{2.5}$	382.46
PM_{10}	1,475.40
SO_2	5.96
Volatile Organic Compounds (VOCs)	2,926.02

Regional Climate
Weather conditions determine the potential for the atmosphere to disperse emissions of air pollutants. Kentucky's climate is characterized by hot, wet, humid summers with average temperatures around 95 degrees Fahrenheit (°F) and cold winters with night temperatures

below 23°F. The average rainfall in Kentucky is 45" per year. Snowfall is typically 15-20" in Kentucky, mainly in the north and east. The southern region, to include Simpson County, receives an average of 50" of annual precipitation. On an annual basis, sunshine lasts approximately 2,700 hours. In the southern regions, there are roughly 60 freezing days.

GHGs

GHGs are compounds found naturally within the earth's atmosphere. These compounds trap and convert sunlight into infrared heat. In this way, GHGs act as insulation in the stratosphere and contribute to the maintenance of global temperatures. As the levels of GHGs increase at ground level, the result is an increase in temperature on earth, commonly known as global warming. The climate change associated with global warming is predicted to produce negative economic and social consequences across the globe through changes in weather (e.g., more intense hurricanes, greater risk of forest fires, flooding).

The most common GHG emitted from natural processes and human activities include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). The primary GHG emitted by human activities in the US is CO_2, representing approximately 81 percent of total U.S. emissions in 2018. The largest source of CO_2 and of overall GHG emissions is fossil fuel combustion. CH4 emissions, which have declined from 1990 levels, result primarily from enteric fermentation (digestion) associated with domestic livestock, decomposition of wastes in landfills, and natural gas systems. Agricultural soil management and mobile source fuel combustion are the major sources of N_2O emissions in the US.

TVA has ensured that climate change adaptation is integrated in agency-wide and regional planning efforts with other federal, state, and local agencies. In these efforts, TVA has established the Climate Change Adaption Action plan, which is integrated in major planning processes. This Adaption Action Plan allows TVA to identify and assess potential consequences and ability to mitigate climate change and develop adaptation planning action. In 2013, TVA initiated the Climate Change Sentinel Monitoring (CCSM) program, which assesses potential biological, ecological, and hydrological responses of aquatic ecosystems related to climate change. Additionally, TVA partakes in several partnerships aimed at improving energy infrastructure to climate change impacts.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, the Project Site would not be constructed; therefore, no Project-related air pollutants or GHGs would be generated by equipment or vehicles from construction or operation of the Project. Existing land use would remain as farmland as it is at present, with little effect on climate and air quality. The main source of emissions in the Project Site would continue to be from mobile sources such as automobiles and agricultural equipment.

Proposed Action Alternative

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

Emissions on a construction site generally result from the engine exhaust of heavy construction equipment (e.g., bulldozers, dump trucks, pile drivers, etc.) powered by internal combustion engines, other motor vehicle exhaust, and fugitive dust. Emissions associated

with the combustion of gas and diesel fuels by internal combustion engines would generate local emissions of particulate matter, NOx, CO, VOCs, and SO_2 during the construction period. Air quality impacts from construction activities would depend on both man-made factors (intensity of activity, control measures, etc.) and natural factors such as wind speed and direction, soil moisture, and other factors. However, even under unusually adverse conditions, these emissions would have, at most, a minor transient impact on off-site air quality, which would remain well below the applicable ambient air quality standard.

Fugitive dust emissions from earth-moving activities, the use of unpaved haul-roads and soil disturbance have the potential to lead to substantial amounts of airborne particulates (dust) that can negatively impact air quality. Approximately 500 acres of the Project Site could be subject to grading and/or ground-disturbing activities which have the potential to emit fugitive dust. In addition, grading activities result in soil disturbance that can make soils vulnerable to wind erosion. Properly implemented control and suppression measures, as well as BMPs (such as covered loads and wet suppression), greatly minimize fugitive dust emissions. In addition, standard erosion control measures, such as redistribution of removed topsoil and reseeding, would minimize the potential for wind erosion.

Overall, with adherence to regulations and BMPs, air emissions associated with the construction of the Project Site are expected to be minor. Emissions from construction would have, at most, a minor transient impact on air quality, which would remain well below the applicable ambient air quality standards. Therefore, the potential impacts to air quality associated with construction under the Proposed Action would be minor and temporary (lasting for a period of 12 months).

The operation of the Project Site is not anticipated to have any adverse impacts to air quality or GHG emissions, as only minor maintenance would be expected to occur, which would not constitute a major source of air pollutants. Conversely, overall pollutant emissions from the TVA power system would decrease during operations as the emissions-free power generated by the solar facility would offset power that would otherwise be generated, at least in part, by the combustion of fossil fuels. The solar facility would be part of the cleaner, lower-emitting generating portfolio described in the TVA 2019 IRP and would contribute to the approximately 44 percent reduction in CO_2 emissions. While the reductions in air pollutants and CO_2 emissions attributable to the solar facility would be relatively minor, they would be a component of TVA's projected significant overall reductions, the associated beneficial impacts to air quality, and the reduced impacts from climate change.

Similarly, minor, temporary generation of air pollutants or GHGs would be anticipated within the Project Transmission Line Upgrades and Access Road Improvements. These activities would be temporary and negligible since it would occur along the existing ROW that is regularly maintained and experiences operations and maintenance traffic. Adherence to BMPs would also be followed for upgrades along the existing ROW to further minimize impacts to air quality.

Lastly, agricultural practices, which currently raise dust and combustion byproducts, would be discontinued at the Project Site. Therefore, operations could ultimately result in a minor beneficial impact to local air quality.

3.10 Public Health and Safety

This section describes an overview of existing public health and safety within the Project Area 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 OSHA standards.

Affected Environment

The discussion of safety includes consideration for any activities, occurrences, or operations that have the potential to affect the safety, well-being, or health of members of the public. A safe environment is one in which there is no, or optimally reduced, potential for death, serious bodily injury or illness, or property damage. The primary goal is to identify and prevent potential accidents or impacts on the general public. Public health and safety during construction, demolition, and renovation activities is generally associated with construction traffic, as well as the safety of personnel within or adjacent to the construction zones. Operational safety may refer to the actual use of the facility or built-out proposed project, or training or testing activities and potential risks to inhabitants or users of adjacent or nearby land and water parcels. Safety measures are often implemented through designated safety zones, warning areas, or other types of designations. Environmental health and safety risks to children are defined as those that are attributable to products or substances a child is likely to come into contact with or ingest, such as air, food, water, soil, and products that children use or to which they are exposed. Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks requires federal agencies to "make it a high priority to identify and assess environmental health and safety risks that may disproportionately affect children and shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks."

The Project Site is currently private property, and is surrounded by agricultural, rural-residential, and undeveloped land uses. Public emergency services in the area include urgent care clinics, hospitals, law enforcement services, and fire protection services. The Fast Pace Health Urgent Care located on Nashville Road, Franklin, approximately 3 miles northwest of the Project Site (10 minutes), is the closest urgent care center to the Project Site. The Medical Center at Franklin on Brookhaven Road, also in Franklin, approximately 3.5 miles northwest of the Project Site (12 minutes), is the closest hospital to the Project Site. Law enforcement services in Simpson County is provided by the Simpson County Sheriff's Department in Franklin, approximately 5 miles northwest of the Project Site (15 minutes). Fire protection services are provided by Simpson County Fire Department in the Franklin, approximately 4 miles northwest of the Project Site (15 minutes). The Kentucky Energy and Environment Cabinet – Department of Environmental Protection has the responsibility and authority to coordinate with state and local agencies in the event of a release of hazardous materials.

Environmental Consequences

No Action Alternative

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

Proposed Action Alternative

During construction, workers on the Project Site would have an increased safety risk. However, because construction work has known hazards, the standard practice is for contractors to establish and maintain health and safety plans in compliance with OSHA regulations. Health and safety plans emphasize BMPs for site safety management to

minimize potential risks to workers. Examples of BMPs include employee safety orientations; establishment of work procedures and programs for site activities; use of equipment guards, emergency shutdown procedures, lockout procedures, site housekeeping, and personal protective equipment; regular safety inspections; and plans and procedures to identify and resolve hazards. Potential public health and safety hazards could result from increased traffic on roadways due to construction of the Project. Residential and other human use areas along roadways used by construction traffic to access the Project Site would experience increased commercial and industrial traffic. Awareness of these residences and establishment of traffic procedures to minimize potential safety concerns would be addressed in the health and safety plans followed by construction contractor(s).

Fuel for vehicles would be kept on site in storage tanks during construction of Project Site. An SPCC plan would be implemented to minimize the potential of a spill and to instruct on-site workers on how to contain and clean up any potential spills. The perimeter of the Project Site would be securely fenced during construction and for the duration of operation, 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. Emergency response for the Project Site would be provided by the local, regional, and state law enforcement, fire, and emergency responders, as described in the prior section. No public health or safety hazards would be anticipated as a result of operations. Overall, impacts to public health and safety in association with implementation of the Proposed Action would be considered temporary and minor.

Similarly, increased safety risk during construction would be anticipated within the Project Transmission Line Upgrades and Access Road Improvements. These activities would be temporary and negligible since it would occur along the existing ROW that is regularly maintained and experiences operations and maintenance traffic. TVA's Safety Standard Programs and Processes would be strictly adhered to during the proposed actions to decrease potential for safety risk.

3.11 Solid Waste and Hazardous Waste

This section describes an overview of existing waste management within the Project Area and the potential impacts of managing wastes generated by the No Action and Proposed Action Alternatives. Components of waste management that are analyzed include solid and hazardous waste and materials.

Affected Environment

"Hazardous materials" and "hazardous waste" are substances that, 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.

Solid waste consists of a broad range of materials that include refuse, sanitary wastes, contaminated material, scrap metals, nonhazardous wastewater treatment sludge, nonhazardous air pollution control wastes, various nonhazardous industrial waste, and other materials (solid, liquid, or contained gaseous substances). Solid wastes are generally managed through recycling and local landfills. Collection and disposal of solid waste within the City of Franklin is conducted by Scott Waste Services, as they are the exclusive residential garbage collection service for the locality. Scott Waste Services also specializes in commercial waste collection for Simpson County.

A Phase I Environmental Site Assessment for the Project Site was performed consistent with the procedures included in ASTM E1527-13, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (provided in Appendix E). The purpose of the ESA is to assist in developing information to identify Recognized Environmental Conditions (RECs) in connection with the Project Site through user-provided information, a regulatory database review, historical and physical records review, interviews, including local government inquiries, as applicable, and a visual noninvasive reconnaissance of the Project Site and adjoining properties. RECs were not identified in the ESA. Therefore, additional investigation was not warranted. While neither the Project Site nor adjoining properties were identified in the regulatory database information reviewed, information provided by the Kentucky Department for Environmental Protection (KDEP) in response to a Freedom of Information Act (FOIA) request indicated the presence of apparently four (4) on-site oil wells in 1985 in the northern portion of the northwestern portion of the Project Site.

Current status of the reported wells was not identified in regulatory file information received from KDEP. The owner of the parcel in question was subsequently interviewed, and stated that the well information was accurate, but that the wells were subsequently abandoned and are no longer present/intact (at least to the extent of typical agricultural activity/plowing operations). Based on the owner interview, neither the KDEP file information related to historical oil wells on the site, nor the historical presence of the wells on the site, is considered a REC. With respect to the historical presence of oil wells in the northern portion of the Project Site, or the potential remaining presence of subsurface well components below agricultural plow depths, based on typical solar equipment/infrastructure installation methods, impacts to the Project Site in relation to the historical oil wells is not anticipated.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, the Project Site would not be constructed; therefore, no Project-related impacts on waste management would result.

Proposed Action Alternative

Under the Proposed Action, storage and use of liquid materials in the form of petroleum-based oils and fuels, and generation of liquid and solid wastes in the form of used oil, construction debris, packing materials, and general construction waste would occur. During construction of the Project Site, materials would be stored on site in storage tanks, vessels, or other appropriate containers specifically designed for the characteristics of these materials. The storage facilities would include secondary containment in case of tank or vessel failure. Construction- and decommissioning-related materials stored on-site would primarily be liquids such as used oil, diesel fuel, gasoline, hydraulic fluid, and other lubricants associated with construction equipment. Safety Data Sheets for all applicable materials present on site would be made readily available to on-site personnel. Fueling of some

construction vehicles would occur within the construction areas. Other mobile equipment would return to the on-site laydown areas for refueling. Special procedures would be identified to minimize the potential for fuel spills, and spill control kits would be carried on all refueling vehicles for activities such as refueling, vehicle or equipment maintenance procedures, waste removal, and tank clean-out. A fuel truck may be stored on site for approximately 12 months during construction of the Project. The total volume of the on-site tanks is not anticipated to exceed 1,320 gallons, the threshold above which an SPCC plan may be required (40 CFR part 112). The Project Site would fall under USEPA's SPCC requirements of "oil-filled operational equipment" and a Tier I Qualified Facility; therefore, no double-walled protection would be required, and the SPCC plan would not have to be certified by a Professional Engineer (USEPA 2006, 2011). The SPCC plan would be prepared prior to construction to prevent oil discharges during facility operations. During operations, bulk chemicals would be stored in storage tanks; other chemicals would be stored in returnable delivery containers. Chemical storage areas would be designed to contain leaks and spills. The transport, storage, handling, and use of chemicals would be conducted in accordance with applicable federal, state, and local laws, ordinances, regulations, and standards. While the various transformers would contain oil, there would be no separate oil or hydraulic fluid stored on-site related to transformers. The quantities of these materials stored on-site would be evaluated to identify the required usage and to maintain sufficient inventories to meet use rates without stockpiling excess chemicals.

Horus Renewables 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.

Similarly, increased waste generation during construction would be anticipated within the Project Transmission Line Upgrades and Access Road Improvements. Construction waste and debris would be placed in roll-off dumpsters and disposed of at a permitted off-site construction and demolition landfill. Management of construction waste generated would in accordance with applicable federal and state laws and regulations and procedures outlined in TVA's current Environmental Procedures and applicable BMPs. Therefore, minor impacts from generation of solid waste and no impact from hazardous waste generation are anticipated. BMPs would be used to prevent the introduction of soil or any other pollutants into nearby waterbodies.

3.12 Socioeconomics and Environmental Justice

This section describes an overview of existing socioeconomic conditions within the Project Site and the potential impacts to socioeconomic conditions and environmental justice that would be associated with the No Action and Proposed Action Alternatives. Components of socioeconomic resources that are presented include population, employment, and income. It should be noted that no socioeconomics and environmental justice assessment was required along the Proposed Transmission Line Upgrades and Access Road Improvements within Kentucky and Tennessee. Given the scope of the Proposed Transmission Line Upgrades and Access Road Improvements, there would be no discernable impact to demographic and community characteristics as the surrounding workforce and regional economy are not expected to change as a result of the upgrades along the existing ROW.

3.12.1 Socioeconomics

Affected Environment

The population of Simpson County, as reported in the 2019 U.S. Census Population, is 18,572, with a median age of 39.5, and a median household income of $48,632. Simpson County's population has grown steadily, but slowly since 2000, with an annual growth rate of less than one percent. Current projections indicate that Simpson County would continue to grow in the future, but at an even smaller rate. In 2018, households in Simpson County had a median annual income of $48,311, which is less than the median annual income of $61,937 across the entire U.S. This is in comparison to a median income of $44,989 in 2017, which represents a 7.38% annual growth. Simpson County had a total employment in 2019 of about 8,526 jobs, with the current unemployment rate at 4.4%. Per the Data USA information on Simpson County, the largest industries in the county are Manufacturing (2,270 people), Retail Trade (1,025 people), and Health Care & Social Assistance (893 people), and the highest paying industries are Professional, Scientific, & Technical Services ($53,036), Utilities ($50,700), and Real Estate & Rental & Leasing ($46,806). The table below illustrates the breakdown of primary jobs held by residents of Simpson County.

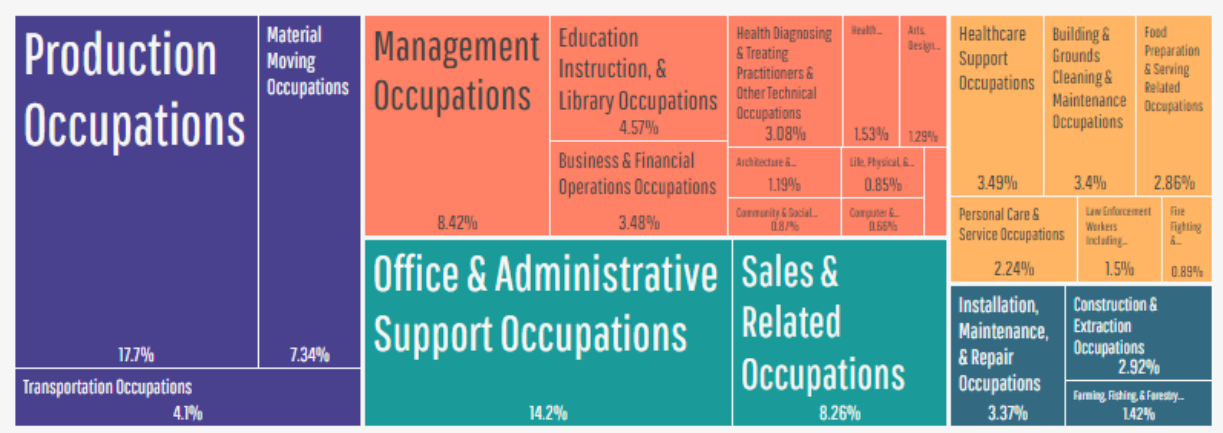

Figure 3.18 Employment by Occupations in Simpson County

In addition, the most common employment sectors for those who live in Simpson County are Manufacturing (2,270 people), Retail Trade (1,025 people), and Health Care & Social Assistance (893 people). The chart below illustrates the breakdown of employment by industries for residents of Simpson County.

Figure 3.19 Employment by Industries in Simpson County

The per capita income for Simpson County in 2019 was $24,458, which is less than the per capita income for the Commonwealth of Kentucky of $28,178 and also behind the national average of $34,103.

Table 3.22 Per Capita Personal Income Data

Project Area	Low-Income Populations
Simpson County	$24,458
Commonwealth of Kentucky	$28,178
U.S.	$34,103

Environmental Consequences

No Action Alternative

Under the No Action Alternative, the Project Site would not be constructed; therefore, no Project-related impacts on socioeconomics would result. Existing land use would be expected to remain farmland and existing socioeconomic conditions would be expected to remain as they are at present. However, no short-term beneficial socioeconomic impacts from the Project Site construction and operations would occur.

Proposed Action Alternative

Under the Proposed Action Alternative, the Project Site would be constructed and operated. Horus Renewables anticipates capital construction costs of $80 million for the Project Site. The Project Site is estimated to provide approximately 100 full-time jobs during construction for over a 12 to 18-month period. 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 Simpson County 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, many of the construction workforce would likely be sought locally or within the region. The direct impact to the economy associated with construction of the Project Site 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 Site could have minor beneficial indirect impacts to population and short-term employment and income levels in Simpson County.

In addition, several local technicians and maintenances employees would be hired for the Project Site's regular operation and maintenance for the life of the Project, which is expected for a minimum of 15 years per the PPA. Following the expiration of the 15-year PPA with TVA, Horus Renewables would reassess the Project operation and determine whether to enter into a new PPA or other arrangement which could extend the life of the project. The

Project would impact the local economy through the construction of the facility and also provide ongoing beneficial impacts from local and state taxes over the life of the Project. Grounds maintenance and some other operation and maintenance activities may be conducted by local contractors. Therefore, operations of the Project would have a small positive impact on employment and population in Simpson County.

Overall, socioeconomic impacts for the operation of the Project Site would be positive and long-term, while small 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 Simpson 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.

3.12.1 Environmental Justice

Affected Environment

Executive Order 12898 (59 CFR 7629) directs federal agencies to identify and address, as appropriate, potential disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. In identifying minority and low-income populations, the following CEQ definitions or minority individuals, minority populations, and low-income populations were used:

- Minority Individuals: Individuals who identify themselves as members of the following population groups: American Indian or Alaskan Native, Asian, Native Hawaiian or Other Pacific Islander, Black, Hispanic, or two or more races.
- Minority Populations: Minority populations are identified where: 1) the minority population of an affected area exceeds 50 percent or 2) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate units of geographic analysis.
- Low-Income Populations: Low-Income Populations in an affected area are identified with the annual statistical poverty thresholds from the Census Bureau's Current Population Reports on Income and Poverty.

Per the CEQ guidance, the U.S. Census data is typically used to determine minority and low-income population percentages in the affected area of a project in order to conduct a quantitative assessment of potential environmental justice impacts. The Project Area that would be affected by the Proposed Action is located within Simpson County in Kentucky.

Table 3.23 Minority Population Data

Project Area	Minority Individuals	Minority Populations	Low-Income Populations
Simpson County	Black/African:9.6% American Indian/Alaskan Native: 0.4% Asian: 0.8% Two or More Races: 2.1% Hispanic/Latino: 3.6%	13%	12.5%
Commonwealth of Kentucky	Black/African:8.5% American Indian/Alaskan Native: 0.3% Asian: 1.6%	12.5%	16.3%

	Native Hawaiian/Pacific: 0.1% Two or More Races: 2.0% Hispanic/Latino: 3.9%		
U.S.	Black/African:13.4% American Indian/Alaskan Native: 1.3% Asian: 5.9% Native Hawaiian/Pacific: 0.2% Two or More Races: 2.8% Hispanic/Latino: 18.5%	23.7%	10.5%

Minorities constitute 13% of the total population in Simpson County compared to 12.5% for the Commonwealth of Kentucky and 23.7% for the U.S. as of the 2019 U.S. Census of Population (Table 3.26). The estimated portion of the population of Simpson County that had income below the poverty level in 2019 was 12.5% which is lower than the state average of 16.3%, but higher than the U.S. average of 10.5%. Per Data USA information, the most common racial or ethnic group living below the poverty line in Simpson County, is reported to be White, followed by Black and Hispanic populations.

Environmental Consequences

No Action Alternative

Under the No Action Alternative, there would be no changes to the Project Site attributable to the Proposed Action and, therefore, no disproportionately high and adverse direct or indirect impacts on minority or low-income populations.

Proposed Action Alternative

Based on the analyses presented in Section 3.12.1, including the results of the USEPA EJSCREEN analyses, minority populations are present in the Project Area at higher rates than the state, but lower compared to nationwide. The Project Site has an estimated poverty rate that is higher than the nationwide rates, but lower compared to the state. The overall impacts of the Project, as described in other sections in this chapter, most of which would occur during the 12-18-month construction period, would be minor, and off-site impacts would be negligible. As such, no disproportionately high or adverse direct or indirect impacts on low-income populations due to human health or environmental effects are expected to result from the Proposed Action. Rather, the Project is expected to have beneficial effects to the local economy that would potentially benefit low-income populations. Horus Renewables anticipates capital construction costs of $80 million for the Project Site. The Project Site is estimated to provide approximately 100 full-time jobs during construction for over a 12 to 18-month period. In addition, several local technicians and maintenances employees would be hired for the Project Site's regular operation and maintenance for the life of the Project, which is expected to extend for 30 to 40 years once construction is complete. The Project would impact the local economy through the construction of the facility and also provide ongoing beneficial impacts from local and state taxes over the life of the Project. Based on the analysis presented in above section, residents of the census tracts containing the Project Area are considered both a minority population and low-income communities. However, based on the analysis of impacts for the resource areas presented in this EA, no significant adverse health impacts on member of the public or significant adverse environmental impacts on the physical environmental are anticipated.

3.13 Cumulative Impacts

Cumulative impacts occur when the effects of an action are added to or interact with other effects in a particular place and within a particular time. The combined incremental effects of human activity can pose a serious threat to the environment (EPA, 1999). The effects may be insignificant, but the impacts accumulate over time and can result in the degradation of environmental resources. The CEQ regulations for implementing the procedural provisions of the NEPA of 1969, as amended (42 USC 321 et seq.) define cumulative impact as: "…the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such as other actions" (40 CFR 1508.7). The CEQ developed the "Considering Cumulative Effects under the National Environmental Policy Act", handbook to provide a method in addressing cumulative effects.

Desktop research of potential past, present, and future actions in the Simpson County was conducted. Resources examined included local and regional news sources, Simpson County government website records such as planning commission meetings, minutes, and public notices. The following state or locally funded project has been publicly announced in the vicinity of the Project Area with the potential to contribute to cumulative impacts associated with the Proposed Action:

In March of 2021, Matalco Kentucky, a newly formed venture of Matalco Inc., a Canada-based producer of aluminum products for the extrusion and forging manufacturing industries, announced its plans to locate its new factory in Simpson County, Kentucky. The new facility will be located in the 461,000-square-foot facility on 107 acres on 300 Brown Road in Franklin (located approximately 5 miles northwest of the Project Site). The estimated $53.5 million investment is expected to create 60 full-time jobs in the coming years.

To encourage the capital investment and job growth in the Franklin community, the Kentucky Economic Development Finance Authority (KEDFA) in January preliminarily approved a 10-year incentive agreement with Matalco Kentucky under the Kentucky Business Investment program. The performance-based agreement can provide up to $1 million in tax incentives based on the company's investment of $53.5 million and annual targets of creation and maintenance of 60 Kentucky-resident, full-time jobs across 10 years, and paying an average hourly wage of $25 including benefits across those jobs.

The cumulative impact of the effects of the Proposed Action when added to ongoing and future actions in the general area surrounding the project would be insignificant.

3.14 Unavoidable Adverse Environmental Impacts

The Proposed Action could cause some unavoidable adverse environmental effects (see Table 2-1). 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. Temporary increases in traffic would be minimized or mitigated by instituting staggered work shifts during daylight hours. 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 soil stabilization and vegetation management measures. The Project would change land uses on the Project Site from

primarily agricultural to solar uses, where these practices are not presently occurring; however, renewable energy uses, including solar power, are permitted uses in this portion of Simpson County through the issuance of a CUP.

The Draft of this EA was issued for public review and comment for a minimum 30-day period from June 15 through July 15, 2021.

3.15 Relationship of Short-Term Uses and Long-Term Productivity

In this context, long-term impacts to site productivity would be those that last beyond the life of the Project. The Proposed Action would adversely affect current short-term uses of the Project Site by converting it from agricultural land to a solar power generating facility. The effects on long-term productivity would be minimal as existing land uses could be readily restored on the Project Site following the decommissioning and removal of the solar facility.

3.16 Irreversible and Irretrievable Commitments of Resources

An irreversible or irretrievable commitment of resources would occur when resources would be consumed, committed, or lost because of the Project. The commitment of a resource would be considered irretrievable when 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 Alternative would involve irreversible commitment of fuel and resource labor required for the construction, maintenance, and operation of the Project. Because removal of the solar arrays and associated on-site infrastructure could be accomplished rather easily, and the Project would not irreversibly alter the site, the Project Site could be returned to its original condition or used for other productive purposes once it is decommissioned. Most of the solar facility components could also be recycled after the facility is decommissioned.

CHAPTER 4 – ENVIRONMENTAL ASSESSMENT RECIPIENTS

4.1 Federal Agencies

U.S. Fish and Wildlife Service

4.2 Federally Recognized Tribes

Chickasaw Nation
Choctaw Nation of Oklahoma
Delaware Nation of Oklahoma
Eastern Band of Cherokee Indians
Eastern Shawnee Tribe of Oklahoma
Miami Tribe of Oklahoma
Muscogee Creek Nation
Osage Nation
Peoria Tribe of Indians of Oklahoma
Quapaw Tribe of Indians
Santee Sioux Nation of Nebraska
Seneca-Cayuga Nation

4.3 State Agencies

Kentucky Department of Fish and Wildlife
Kentucky Heritage Council
Kentucky Office of State Archaeology
Tennessee Department of Environment and Conservation
Tennessee Historical Commission
Tennessee Wildlife Resources Agency

4.4 Individuals and Organizations

Alphabetically list individuals and organizations here.

CHAPTER 5 – LIST OF PREPARERS

5.1 NEPA Project Management

Name/Education	Experience	Project Role
J. Taylor Cates M.S. Environmental Science; B.S. Biochemistry	5 years in environmental planning and policy and NEPA compliance.	TVA NEPA Compliance and Project Management
Woo Smith B.A. Political Science and Environmental Studies	9 years in environmental planning and NEPA compliance	Terracon NEPA compliance, document preparation, and project management

5.2 Other Contributors

Name/Education	Experience	Project Role
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 Science, B.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

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Appendix A – Consultation Correspondence

Appendix B – Geotechnical/Karst Reports

Appendix C – Natural Resources Reports

Appendix D – Cultural Resources Reports

Appendix E – Phase I Environmental Site Assessment Report

Appendix F – Glare Memo

Appendix G – Noise Sound Level Assessment Report

Appendix H – Transportation Effect & Route Evaluation Study