

Document Type: EA-
Administrative Record
Index Field: Draft Environmental
Assessment
Project Name: Silicon Ranch
Corporation Haywood Solar
Facility
Project Number: 2015-3

PURCHASE OF POWER GENERATED AT
BROWNSVILLE, TENNESSEE SOLAR FACILITY
Haywood County, Tennessee

**FINAL
ENVIRONMENTAL ASSESSMENT**

Prepared for:
TENNESSEE VALLEY AUTHORITY
Knoxville, Tennessee

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March 2017

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CHAPTER 1 – PURPOSE AND NEED FOR ACTION

The Tennessee Valley Authority (TVA) proposes to enter into a power purchase agreement (PPA) with Haywood Solar, LLC to purchase the electric power generated by Haywood Solar, LLC's proposed solar photovoltaic (PV) facility in Brownsville, Haywood County, Tennessee (TN) (Figure 1). Haywood Solar, LLC is affiliated with Silicon Ranch Corporation (SRC), the developer of the proposed solar facility. The proposed Haywood Solar Facility would have a direct current (DC) generating capacity of 3.9 megawatts (MW). The proposed solar facility would occupy 27.6 acres of a 73.4-acre property owned by SRC. The facility would be connected to the Brownsville Energy Authority distribution network at the Dupree Substation, which would transmit the power to the TVA network. The PPA would be executed through TVA's Renewable Standard Offer (RSO) program, under which TVA agrees to purchase qualifying renewable energy at set prices for a 20-year period.

In its 2011 Integrated Resource Plan (IRP; TVA 2011) TVA established the goal of increasing its renewable energy generating capacity by 1,500 to 2,500 MW by 2020. TVA established the RSO program as one of the means of meeting this goal. Under the RSO program, TVA purchases energy at established terms and conditions (the "standard offer") from operators of qualifying renewable energy-generating facilities. Qualifying facilities must be new, located within the TVA service area, and must generate electricity from specific technologies or fuels. Solar PV generation is one of the qualifying technologies. SRC has met the qualifications for the RSO program, and TVA must decide whether to execute the PPA.

TVA's 2015 IRP (TVA 2015) recommends the continued expansion of renewable energy-generating capacity, including the addition of between 175 and 800 MW of solar capacity within its jurisdiction by 2023. The proposed action would help meet this need for additional solar capacity.

TVA has prepared this environmental assessment (EA) under the National Environmental Policy Act (NEPA) and TVA's NEPA procedures in order to assess the potential impacts of its proposed action (the purchase of power under the PPA) and the associated impacts of the construction and operation of the proposed solar facility by SRC.

Public Notice/Public Involvement

The proposed solar farm project was presented at four public meetings in the city of Brownsville in 2015 and 2016. On October 22, 2015 the project was first presented to the public and a property annexation packet was presented regarding the sale of the property from the previous owner to SRC for development into a clean energy project and rezoning of the property for industrial use by SRC. On January 28, 2016, the project was presented at a Municipal/Regional Planning Commission meeting in regards to amending the City of Brownsville municipal zoning ordinance to include provisions for solar farms and presenting the ordinance to the Board of Mayor. On February 9, 2016, the City of Brownsville held a board meeting where the project was discussed with the public in regards to zoning ordinances. The project was again presented at a March 8, 2016 City board meeting. A public hearing was held to present an ordinance to amend the current zoning ordinance to include solar farms. The rezoning of the property and proposed energy project has been supported by local public officials and the community and no comments opposing them were received during the review. On January 12, 2016 ordinance #919 and resolution #885 were passed by the City of Brownsville annexing the entirety of the

site and zoning it as General Industrial (G-I).

Necessary Permits or Licenses

Based on the scope of the anticipated construction activities described below in Chapter 2, the proposed Haywood Solar Facility would likely require a National Pollutant Discharge Elimination System (NPDES) construction general permit issued by the Tennessee Department of Environment and Conservation (TDEC), depending on the area of land disturbed during construction of the solar facility. This permit would require the development of a stormwater pollution prevention plan and implementation of the defined pollution prevention measures.

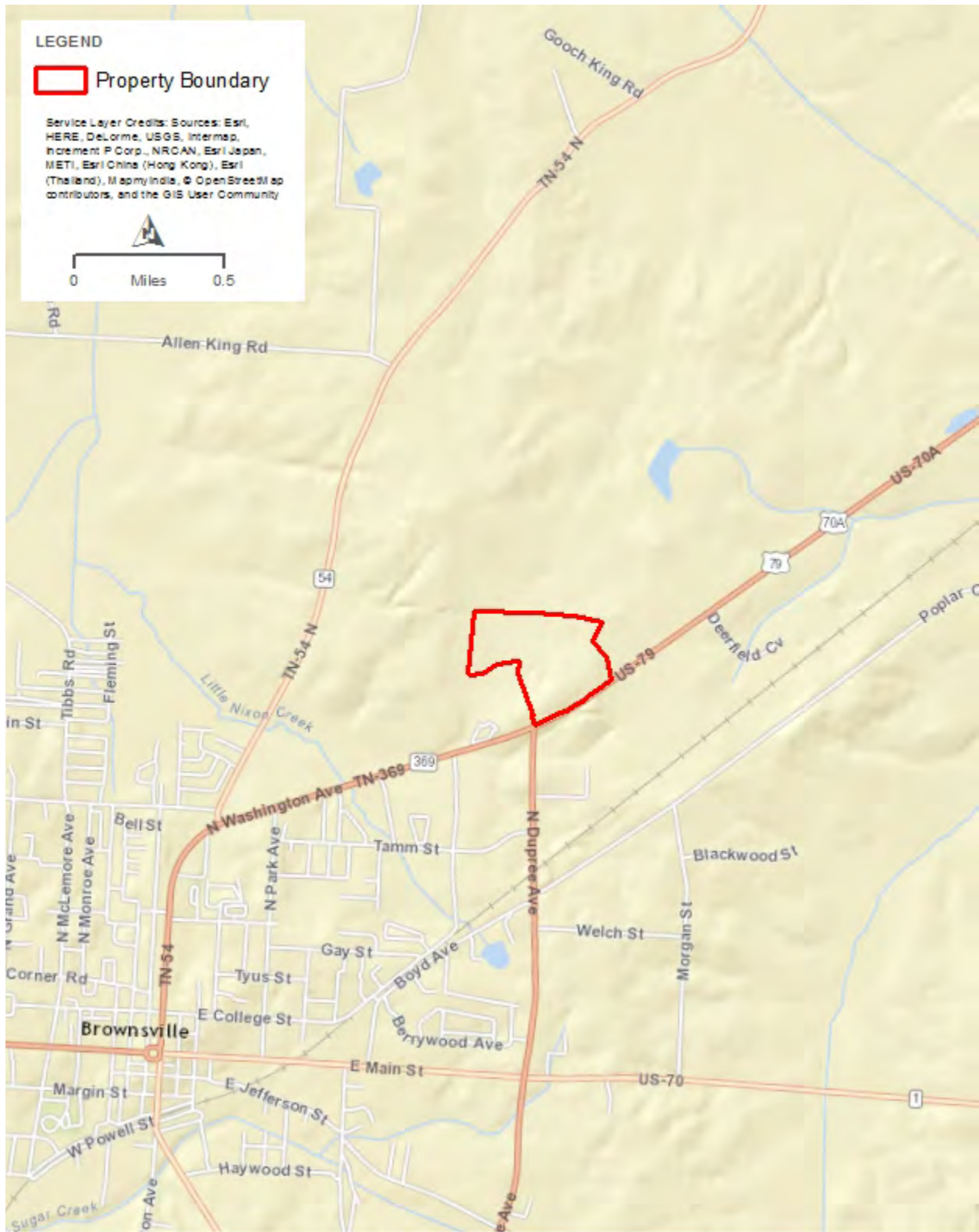


Figure 1. Location of proposed solar facility near Brownsville, Tennessee.

CHAPTER 2 - ALTERNATIVES

Description of Alternatives

This EA evaluates two alternatives: the No Action Alternative and the Proposed Action Alternative. These are described in more detail below.

Alternative A – The No Action Alternative

The No Action Alternative provides for a baseline of conditions against which the impacts of the Proposed Action Alternative can be measured. Under this alternative, TVA would not purchase power from the solar facility and the solar facility would not be constructed and operated by SRC. TVA would continue to rely on other sources of generation described in the 2015 IRP (TVA 2015) to ensure an adequate energy supply and to meet its goals for increased renewable and low-GHG emitting generation.

Environmental conditions in the project area would remain unchanged in the immediate future. SRC would continue to maintain the property for future development and would likely lease farmable portions of the property for continued agricultural use.

Alternative B – Proposed Action Alternative

Under the Proposed Action Alternative, TVA would enter into a 20-year PPA with Haywood Solar, LLC and SRC would construct and operate the 3.9-MW facility. The facility would be located on a 73.4-acre property, purchased by SRC and located on the north side of US Highway 79 (US Hwy 79/North Washington Avenue) near the intersection of US Hwy 79 and County Road 76 (Figure 1). The property is currently used as farmland and contains a forested area in the northwestern portion of the property (Figure 2).

The Haywood Solar Facility would occupy approximately 27.6 acres of the 73.4-acre property. The site is a relatively flat agricultural area and only minor grading with limited earthwork would occur. No buildings are located on the site that would require removal. A 16-foot wide access road would be constructed from US Hwy 79 and run northwest into the central portion of the site (Figure 3).

Approximately 34,800 113-watt First Solar modules would be installed on ground-mounted single-axis tilt metal racks, or trackers, oriented north to south in parallel rows. The trackers would be supported by piles typically 10 feet long and driven about 6 feet into the ground. The tracker mechanisms use electric motors to pivot the solar modules to track the path of the sun during the day from east to west for optimized energy production. Buried electrical cables would connect the rows to one DC to alternating current (AC) power inverter. The inverter would be connected by a buried cable to a pad-mounted 3,060-kilovolt amps (kVA) transformer. The exact location of the transformer within the 27.6-acre site is not known at this time. Trenches for buried cables will be backfilled and the ground surface returned to its original grade. A buried cable would run from the transformer to a riser pole located in the southern corner of the site less than 200 feet west of US Hwy 79 near the intersection of Dupree Street. A disconnect switch, recloser, and metering would be located at that connection point. An overhead line would run east from the riser pole across US Hwy 79 to connect to the Brownsville Energy Authority's existing 12.5-kV power line parallel to the south side of US Hwy 79. The existing power line connects to the Brownsville Energy Authority 161 kV Dupree Substation located on the west side of Dupree Street approximately 0.3 mile south of the solar facility's proposed connection point. The Brownsville Energy Authority receives power from TVA at a substation

south of the city.

The proposed site layout was designed to avoid forested areas and shading from trees on the solar modules. The forested area in the northwestern portion of the property would not be disturbed. Tree removal is not anticipated for the placement of solar modules or site construction. Some tree trimming may be required along the eastern side of the forested area and on two isolated, mature trees near the proposed access road.

Once construction is completed, the facility site would be revegetated with low-growing grasses. A small storage shed (connex box) would be placed on the site and the site would be enclosed by a 7-foot-tall chain link and barbed wire security fence. No night lighting is anticipated, and no water supply or sewer disposal facilities or services would be required.

Construction would require 4 to 6 months with between 50 and 100 people working on site for variable durations. Once the facility is completed, there would be no on-site operators and periodic maintenance would be carried out by workers based outside the project area. Maintenance activities would include mowing the facilities to prevent vegetation from growing tall enough to shade the solar modules or otherwise interfere with their operation. Small areas of the facility may require limited use of herbicides to maintain vegetation. Maintenance would not include panel washing because the rainfall in this region is usually sufficient to keep surfaces of the panels clean and maintain their energy production at adequate levels. The wooded area in the western portion of the project site outside of the proposed fenced-in PV facility would remain intact, and the agricultural fields outside the fenced-in area would be mowed and allowed to go fallow over time.

Following the expiration of the 20-year PPA with TVA, SRC would assess whether to cease operation at the project site or attempt to enter into a new power purchase contract or other arrangement. If TVA or another entity is willing to enter into such an agreement, the facility would continue operating. If no commercial arrangement is possible, then the facility would be decommissioned and dismantled and the site restored. In general, the majority of decommissioned equipment and materials would be recycled. Materials that cannot be recycled would be disposed of at an approved facility.

Identification of Mitigation Measures

SRC would implement appropriate best management practices (BMPs), including those required by permits, during construction and operation of the facility. Tree trimming would occur during winter months (between October 15 and April 1) to avoid impacts to roosting northern long-eared bats and Indiana bats. Trees and shrubs would be planted along the eastern property boundary to shield the adjacent residence from the proposed solar facility. These plantings would address concerns of visual impacts from the homeowner and mitigate for visual impacts to the property.

The Preferred Alternative

TVA's preferred alternative is Alternative B – Proposed Action Alternative. Under this alternative, TVA would enter into the PPA with Haywood Solar, LLC; SRC would then construct and operate the proposed solar facility.

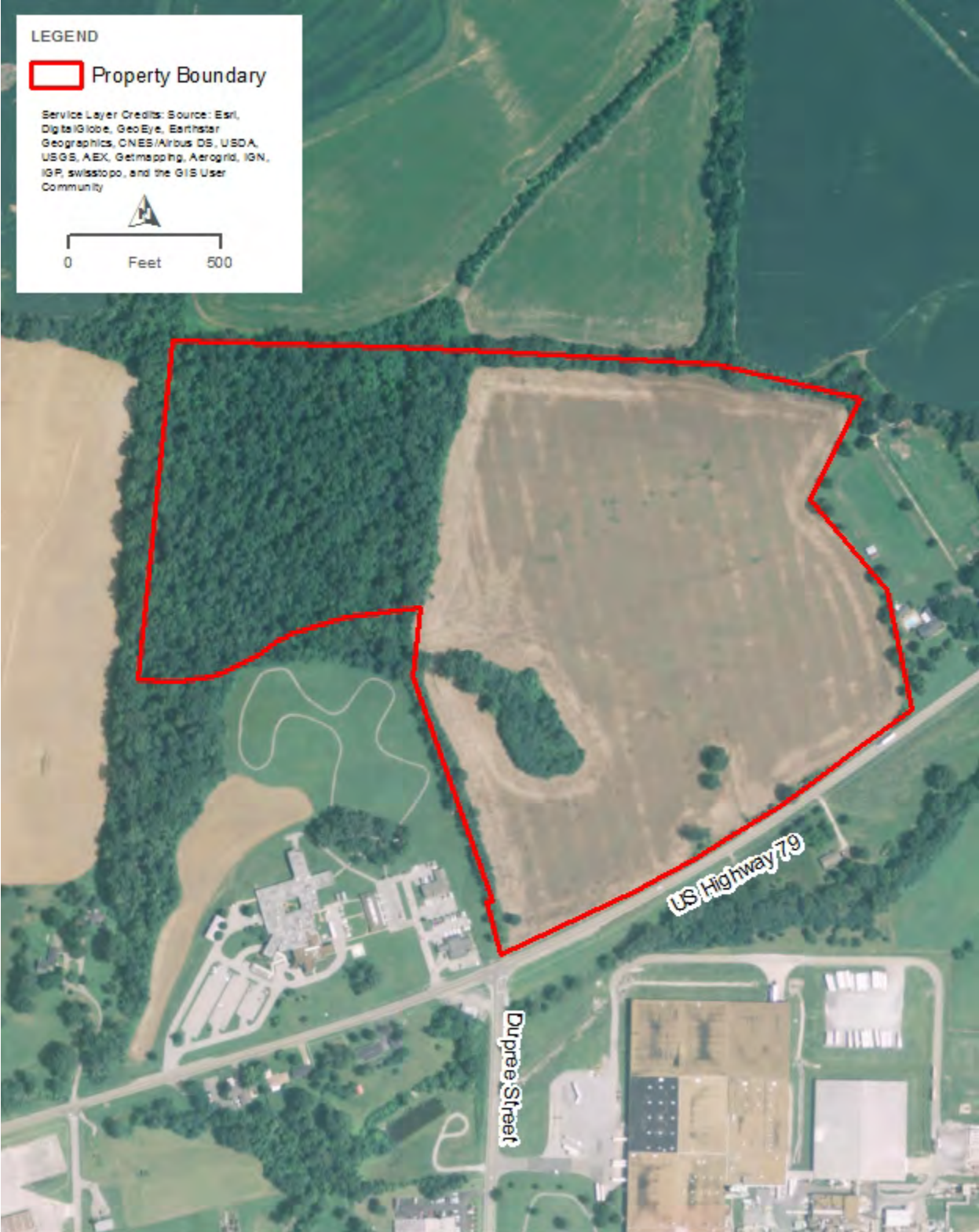


Figure 2. Aerial photograph of proposed solar facility site near Brownsville, Tennessee.

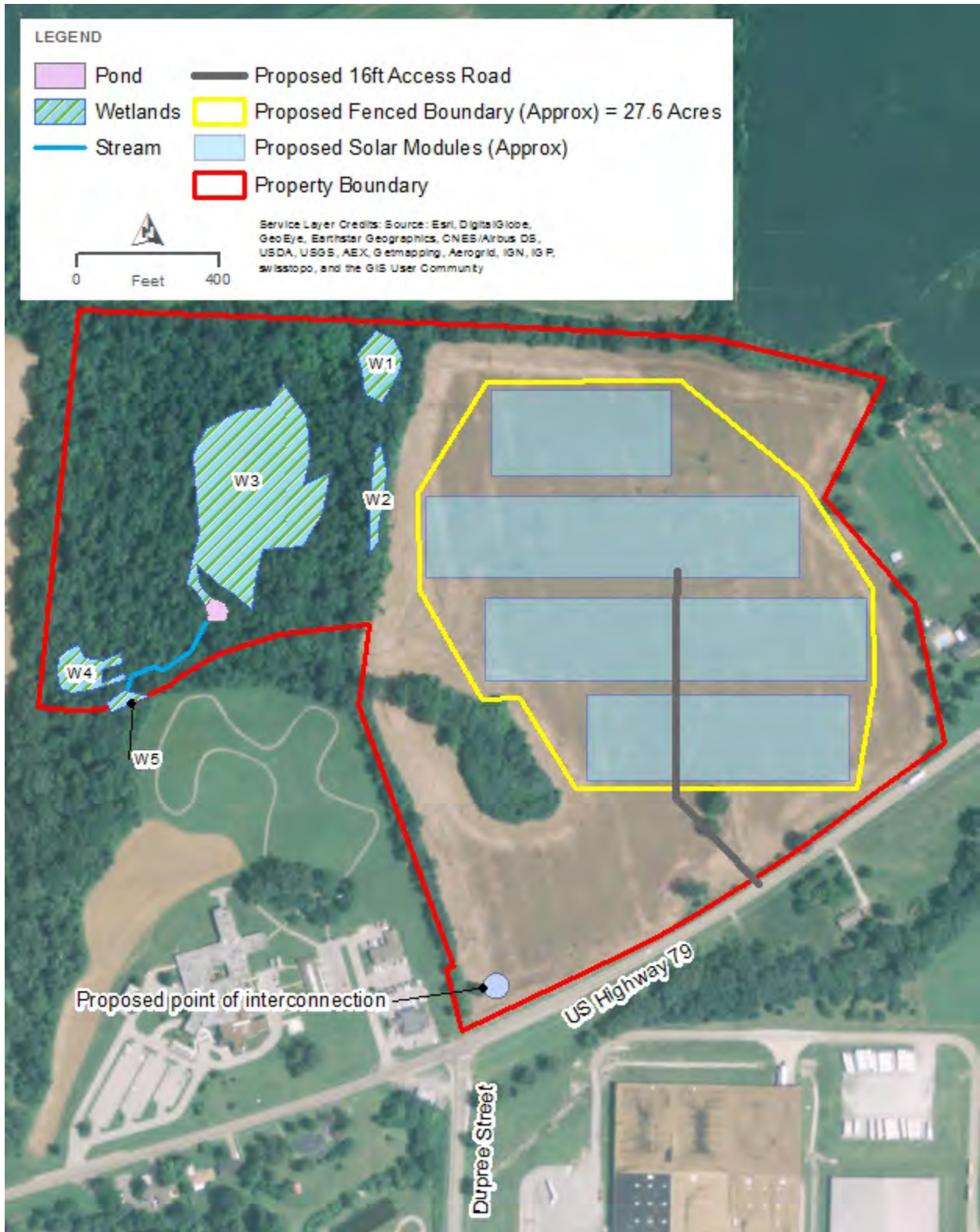


Figure 3. Proposed Haywood Solar Facility layout.

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the environmental resources that could be affected by the two alternatives and the effects of the alternatives on those resources. Through scoping of the proposed action, TVA has determined that some environmental resources would not be affected. The proposed facility is all on private land and there would be no effects on public recreation facilities or activities. The proposed action is consistent with Executive Order (EO) 11990 Protection of Wetlands and EO 11988, Floodplain Management. Other environmental resources that could be affected are described below.

Air Quality and Greenhouse Gas Emissions

Affected Environment – Haywood County is in attainment with the National Ambient Air Quality Standards for criteria pollutants established under the Clean Air Act. The system-wide emissions from TVA’s electrical generating facilities are described in TVA’s 2015 Integrated Resource Plan Environmental Impact Statement (TVA 2015). TVA has reduced its emissions of criteria pollutants and greenhouse gases through the installation of emission controls at fossil-fueled plants, idling and retirement of coal-fired generating units, increased use of low-emission generating facilities, and increased energy efficiency and demand reduction efforts.

Environmental Consequences – Under the No Action Alternative, the proposed solar facility would not be constructed and no project-related impacts on air quality or climate change would occur. TVA would continue to rely on other generation sources to meet the needs of its customers and its goal of reducing its greenhouse gas (GHG) emissions.

Under the Proposed Action Alternative, minor impacts to air quality would occur. Site grading and other construction activities have the potential to generate fugitive dust (particulate matter or PM), which would be minimized by the use of BMPs such that off-site impacts of the fugitive dust would be negligible. The fossil-fueled construction equipment would emit PM, nitrogen oxides, and other pollutants; the total amount of these emissions would be small and would result in negligible impacts. The construction equipment would also emit GHGs (particularly carbon dioxide or CO₂); the impacts of these would also be negligible. The operation of the solar facility would result in a very small reduction in TVA’s GHG emission rate because the CO₂-free power generated by the solar facility would displace power that would otherwise be generated in part by fossil fuels. This would result in a minor beneficial impact to air quality (TVA 2015).

Water Resources

Affected Environment – Site elevations are highest along the southern portion of the property near US Hwy 79. The site slopes toward the northwestern, forested portion of the property, which contains a tributary to Little Nixon Creek. A depression, surrounded by hardwoods, is located in the south central portion of the property.

No Wild or Scenic Rivers or streams listed on the National Rivers Inventory occur in or adjacent to the proposed solar facility. Little Nixon Creek (12-Digit Hydrologic Unit Code 080102050403) located approximately 0.7 mile southeast of the site, is part of the South Fork Forked Deer Watershed, and is impaired (303[d] listed) due to *Escherichia coli* (abbreviated as *E. coli*), total

phosphorus, siltation/sedimentation, and physical substrate habitat alterations (Tennessee Department of Environment & Conservation [TDEC] 2016).

A wetland delineation and waterbody survey was conducted by HDR, Inc. biologists on December 28 and 29, 2015, to identify wetlands within the project area. Water resources on the site are located in the western, forested section of the property. These water features consist of five wetlands, a pond, and a small perennial stream (Stream 1), which is a tributary to Little Nixon Creek (Figure 4).

Wetland 1 and 2 are 0.39 acre and 0.21 acre, respectively. These wetlands are isolated depressions, although the proximity and elevation characteristics indicate potential connections with each other and Wetland 3 after a significant rainfall. Wetland 3 is the largest wetland at 3.46 acres. Wetland 3 connects directly to Pond 1 and Stream 1, which ultimately connects with Little Nixon Creek. Wetland 4 is 0.35 acre and has several ephemeral streams which connect it to Stream 1. Stream 1 runs through Wetland 5 which is 0.8 acre.

Pond 1 is a small pond of unknown depth. The pond's water is supplied by runoff and Wetland 3. A berm surrounds the northern and eastern sections of the pond, separating it from Wetland 3 and from direct runoff from the open fields to the east.

Environmental Consequences – Under the No Action Alternative, the proposed solar facility would not be constructed and no project-related impacts to water resources would occur.

Under the Proposed Action Alternative, no direct impacts to wetlands or water resources would occur. All wetlands and water features will be avoided by developing the eastern portion of the property as a solar facility (Figure 3); therefore, the proposed project complies with Executive Order (EO) 11990. Indirect, temporary impacts to water resources could occur from the runoff of sediment-laden stormwater from the solar facility, particularly to Wetlands 1 and 2. During construction, BMPs would be implemented for erosion control and site stabilization as described in the stormwater pollution prevention plan. Erosion control measures include the installation of sediment barriers (silt fence), water filtration devices (ditch checks), and prompt stabilization and revegetation of graded areas. With implementation of these measures, impacts to surface waters and aquatic life would be insignificant during construction and no long-term adverse impacts are anticipated. Because of the relatively shallow depth of trenching, no impacts to groundwater are anticipated during or after construction.

Haywood Solar Facility



Figure 4. Waters of the US within the project site.

Floodplains

Existing Environment – Executive Order (EO) 11988 on floodplain management requires federal agencies to avoid to the extent possible adverse impacts to floodplains. The Federal Emergency Management Agency (FEMA) produces maps which show the likelihood of an area flooding. These maps are used to determine eligibility for the National Flood Insurance Program. As shown on Flood Insurance Rate Map (FIRM) panel 47075C0251D, effective April 16, 2008, the property does not contain any mapped floodplains. The closest floodplain is located southwest of the site along Little Nixon Creek (Figure 5; FEMA 2015). It is possible that minor, very localized flooding could be associated with the wetlands in the western portion of the property; however, localized flooding is not expected to Wetland 2 which has the potential to overflow into the fenced area of the project.

Environmental Consequences – Under the No Action Alternative, the proposed solar facility would not be constructed and no project-related impacts on floodplains would occur.

Under the Proposed Action Alternative, no portion of the proposed solar facility will be within a floodplain (Figure 5) and there would be no effect on floodplains. The proposed action would comply with EO 11988.

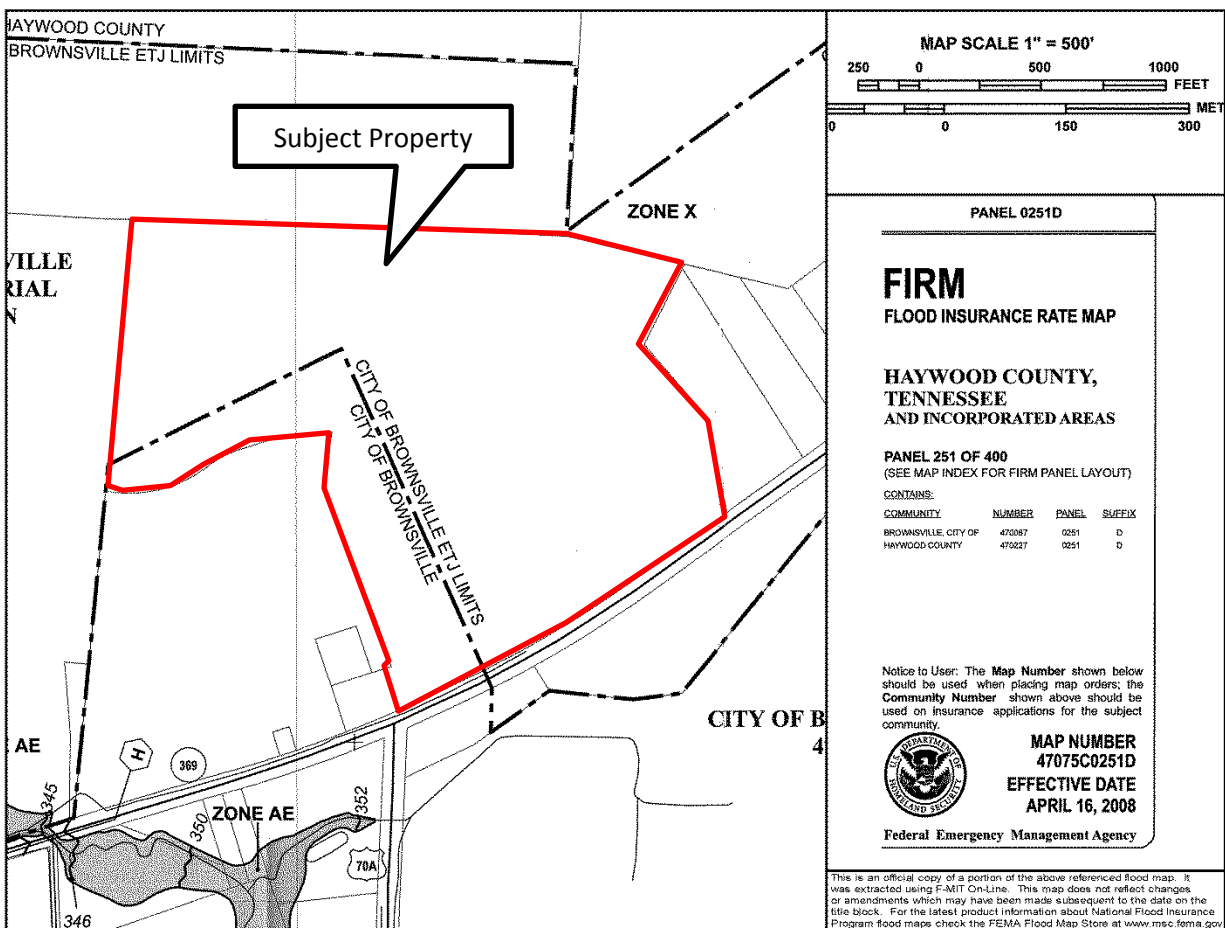


Figure 5. FEMA FIRM panel excerpt of project site.

Vegetation and Wildlife

Existing Environment – The proposed solar facility is located in the East Gulf Coastal Plain physiographic region of the Coastal Plain (National Park Service 2016). This region is characterized by rolling hills forested with hardwoods and pines.

The project area is mostly open cropland, with indications of hay and soybean agricultural harvesting. The majority of the site is composed of herbaceous species including ryegrass (*Lolium*), wiregrass (*Aristida stricta*), and soy bean (*Glycine max*). However, the northwestern portion of the property is forested and contains red maple (*Acer rubrum*), American sweetgum (*Liquidambar styraciflua*), hackberry (*Celtis laevigata*), and cherrybark oak (*Quercus pagoda*). Shrubs and herbs consist of Chinese privet (*Ligustrum sinense*), Japanese honeysuckle (*Lonicera japonica*), and greenbriar (*Smilax rotundifolia*) with Muscadine grape (*Vitis rotundifolia*) and poison ivy (*Toxicodendron radicans*). Chinese privet and Japanese honeysuckle are considered non-native, invasive species. A small 2.5-acre forested area is located in the southwest portion of the open cropland. It appears that this woodland was once connected to the larger forested area found on the project site and shares the same species and characteristics. While no nests or migratory birds listed under the Migratory Bird Treaty Act or Bald and Golden Eagle Protection Act were identified during the site visit, habitat is present for a variety of migratory birds and migratory bird species may nest on site or migrate through the project area. Migration patterns will vary based on species and surveys conducted during other parts of the year may reveal a greater diversity of avian species. No mammals were identified during the field survey, although deer hoof prints, likely white-tailed deer, were present. The habitats on the project site are low in plant and animal diversity, and are relatively common in the surrounding areas. No unusual or rare plant or wildlife communities are present.

Environmental Consequences – Under the No Action Alternative, the proposed solar facility would not be constructed and no project-related impacts to vegetation and wildlife would occur.

Under the Proposed Action Alternative, the forested areas would remain undisturbed. Multiple rows of PV solar modules on metal racks would be installed within the agricultural fields, avoiding forested areas. Some tree trimming may be required along the eastern side of the forested area and to two isolated, mature trees near the proposed access road. Construction activities, including minimal grading, would have adverse impacts on plant and animal species in the fields; however, these species are common in the region and overall impacts would be insignificant. Following the completion of construction, the site would be revegetated with grasses and maintained by periodic mowing and selective use of herbicides. Some of the animals presently occupying the fields would likely return once the site is revegetated, although the presence of the solar arrays would likely make the site less suitable for some grassland species. Operation of the solar facility would not result in any additional adverse impacts to vegetation or wildlife.

Endangered and Threatened Species

Existing Environment – Two animals listed under the Endangered Species Act (ESA) are identified on the U.S. Fish and Wildlife Service's (USFWS) Information for Planning and Conservation (IPaC) report for the project area and several additional plants and animals are considered to be of conservation concern by the Tennessee Natural Heritage Program within Haywood County (Table 1). No plants or aquatic species listed under the ESA are known to occur in project area and no federally listed aquatic species are known or likely to occur in the streams draining the proposed solar site. Prickly hornwort (*Ceratophyllum echinatum*) is an

aquatic plant that is listed as a species of special concern in Haywood County by TDEC and can be found in slow moving streams such as Stream 1 (Figure 4); this species was not observed during the site visit. Swainson's warbler (*Limnothlypis swainsonii*) is listed as in need of management by TDEC and prefers rich, damp, deciduous forests (TDEC 2016).

The forested areas on the 73.4-acre tract provide suitable roosting and foraging habitat for the Indiana bat and northern long-eared bat. The portion of the project site outside of the proposed PV facility, particularly the wooded areas, provides suitable habitat for foraging. The solar facility site does not provide suitable habitat for other state-listed species.

Table 1. Endangered and threatened species in the Tennessee Heritage Database from Haywood County, Tennessee.

Common Name	Scientific name	Federal status	TN State status/rank	Potential habitat
<u>Bird</u>				
Bewick's wren	<i>Thryomanes bewickii</i>	-	E	Not likely present
Cerulean warbler	<i>Dendroica cerulea</i>	-	D	Not likely present
Swainson's warbler	<i>Limnothlypis swainsonii</i>	-	D	Not likely present
<u>Fish</u>				
Piebald Madtom	<i>Noturus gladiator</i>	-	D	No
Blue sucker	<i>Cycleptus elongatus</i>	-	T	No
Naked sand darter	<i>Ammocrypta beani</i>	-	D	No
<u>Plants</u>				
Prickly hornwort	<i>Ceratophyllum echinatum</i>	-	S	Habitat possible
Cedar elm	<i>Ulmus crassifolia</i>	-	S	Not likely present
Prairie false-foxglove	<i>Agalinis heterophylla</i>	-	E	Not likely present
Reniform sedge	<i>Carex reniformis</i>	-	S	Not likely present
<u>Mammals</u>				
Northern long-eared bat	<i>Myotis septentrionalis</i>	LT	Rare, Not State Listed	Habitat possible

Common Name	Scientific name	Federal status	TN State status/rank	Potential habitat
Indiana bat	<i>Myotis sodalis</i>	LE	E	Habitat possible
Southeastern shrew	<i>Sorex longirostris</i>	-	D	Not likely present
Eastern woodrat	<i>Neotoma floridana illinoensis</i>	-	D	Not likely present
Rafinesque's big-eared bat	<i>Corynorhinus rafinesquii</i>	-	D	Not likely present
<u>Mollusks</u>				
Southern rainbow	<i>Villosa vibex</i>	-	Rare, Not State Listed	No
Southern hickorynut	<i>Obovaria jacksoniana</i>	-	Rare, Not State Listed	No
Fatmucket	<i>Lampsilis siliquoidea</i>	-	Rare, Not State Listed	No
Tapered pondhorn	<i>Uniomerus declivis</i>		Rare, Not State Listed	No

Sources: TDEC Heritage database, accessed February 2, 2017: http://environment-online.state.tn.us:8080/pls/enf_reports/f?p=9014:3
 TVA Heritage database, accessed December 29, 2016: https://www.tva.gov/file_source/TVA/Site%20Content/Environment/Environmental%20Stewardship/Land%20Management/tva_animal_alpha_dec08.pdf

Status Abbreviations: LE – Listed Endangered; LT – Listed Threatened; E – Listed Endangered; S – Listed Special Concern, T – Threatened, D – Deemed in need of management

Environmental Consequences – Under the No Action Alternative, the proposed solar facility would not be constructed and no project-related impacts to federally or state-listed endangered or threatened species or other species of conservation concern would occur.

Under the Proposed Action Alternative, no federally or state-listed plants or aquatic species would be affected because suitable habitat for those species is not present. During the winter, the long-eared bat and Indiana bat hibernate in caves and mines which have large entrances, constant temperatures, and high humidity. No caves or mines are located in or around the project area. A low potential for summer roost and foraging habitat for the northern long-eared bat and Indiana bat is present at the project site, particularly in forested areas in the northwestern portion of the property. No trees would be removed and impacts to these bats would be further avoided by trimming trees between October 15 and April 1, outside the bat's summer roosting season. Other trees in the surrounding area with potential to provide bat habitat would not be disturbed. Prickly Hornwort was not found on site and suitable habitat for the other species listed in Table 1 does not occur on the project site. The proposed action would not affect threatened and endangered species or other species of conservation concern.

Land Use

Existing Environment – Approximately 13.5 acres of the western portion of the site is located within the City of Brownsville limits, while the remainder of the site is located in an unincorporated area of Haywood County, which has zoning regulations in place and requires local inspections to conform to building codes. On January 12, 2016 ordinance #919 and resolution #885 were passed by the City of Brownsville annexing the entirety of the site and zoning it as General Industrial (G-I). The project site is bordered on the east and north by farmland and woodlots. Medical offices, a pharmacy, and the Haywood Park Community Hospital (currently closed) are located to the west. Two occupied houses border the property; one is located to the east and the other to the southeast on the opposite side of US Hwy 79. A large industrial facility (Teknor Apex) borders the property to the south across US Hwy 79. A Brownsville Utility substation (Dupree Substation) is located on Dupree Street approximately 0.3 mile south of the site.

Environmental Consequences – Under the No Action Alternative, the proposed solar facility would not be built and the land uses of the site would not change.

Under the Proposed Action Alternative, the development of the solar facility would result in the conversion of the site from farmland to rural industrial. This would have little effect on the future land use of adjacent tracts and would not conflict with zoning regulations. Overall impacts to land use would be insignificant.

Soils and Prime Farmland

Existing Environment – Six soil types occur on the property; four of these types are classified as prime farmland (Table 2). Memphis silt loam (MeB2) is classified as prime farmland and is the predominant soil type on the property. The MeB2 soils consist of 32.6 acres or 44.4 percent of the site and have a hydric rating of 0.

Five other soil types make up the remaining percentage of the property. The Adler silt loam (Ad), 0 to 2 percent slopes occurs on 19.4 acres, representing 26.4 percent of the property. This soil is classified as prime farmland and is not considered to be hydric. The Calloway silt loam (Ca), 0 to 1 percent slopes occurs on 16.1 acres, representing 22.0 percent of the property. This soil is classified as prime farmland with a hydric rating of 9. The remaining three soil types in the project area comprise approximately 7.2 percent of the project site; Loring silt loam (LoB2), is prime farmland but not hydric and occupies 1.2 percent of the project site; Loring and Memphis soils (LPD), is not prime farmland and is not hydric, occupies 5.7 percent of the project site; and Routon silt loam (Ro), is prime farmland if drained with a hydric rating of 100, and occupies 0.2 percent of the project site.

The total amount of prime farmland within the project site is 69.0 acres, or approximately 94.0 percent (Table 2).

Table 2. Soils on the proposed solar farm

Soil Type	Rating	Area (acres)	Proportion of project site (%)
Alder silt loam (Ad)	Prime farmland	19.4	26.4
Calloway silt loam (Ca)	Prime farmland	16.1	22.0
Loring silt loam (LoB2)	Prime farmland	0.9	1.2
Loring & Memphis (LPD)	Not prime farmland	4.2	5.7
Routon silt loam (Ro)	Prime, if drained	0.2	0.2
Memphis silt loam (MeB2)	Prime farmland	32.6	44.4
Total Prime Farmland		69.0	94.0
Total Not Prime Farmland		4.4	5.9

Source: U.S. Department of Agriculture (USDA) Natural Resources Conservation Service Web Soil Survey, Accessed December 2016: <http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>

The Farmland Protection Policy Act (FPPA) requires federal agencies to take into account the adverse effects of their actions on prime or unique farmlands in order to minimize conversion of farmland to nonagricultural uses. Prime farmland is land that is the most suitable for economically producing sustained high yields of food, feed, fiber, forage, and oilseed crops.

Environmental Consequences – Under the No Action Alternative, there would be no project-related impacts to soils on or in the immediate vicinity of the proposed solar facility.

A total of 69.0 acres of the 73.4-acre project site is classified as prime farmland; and under the Proposed Action Alternative, 27.6 acres (37.6 percent) of the 73.4-acre project site would be affected by construction and operation, including the placement of solar panels, access roads, and site grading thereby removing the area from farm use. This area corresponds to the area within the fence line. The remaining project area outside of the fence line consists of mature tree stands and would remain undisturbed.

Appropriate erosion control measures would be used to control erosion and limit sediment/soil from leaving the site. Due to the limited amount of grading and earthwork, the majority of existing soils will remain in-situ. None of the soils within the project area are classified as highly erosive or have other characteristics that would require special construction techniques or other non-routine measures.

In accordance with FPPA evaluation procedures, USDA Farmland Conversion Impact Rating Form AD-1006 was completed by HDR in coordination with Natural Resources Conservation Service personnel. This form assigns a numerical rating between 0 and 260 based on the area of prime farmland to be disturbed, the total area of farmland in the affected county, and other criteria. The rating for the 73.4-acre project site is 91, below the threshold score of 160 indicating potential adverse impacts to prime farmland and the need for evaluation of alternative sites. Based on this rating, the impacts to prime farmland from developing the project site would be insignificant and overall effects on soils, including prime farmland, as a result of the construction and operation of the solar facility would be considered insignificant.

Visual Resources

Existing Environment – The project site is in a rural area with actively farmed agricultural land to the north and north east, bisected by tree lines, dirt roads, and occasional single family homes. The surrounding terrain is comprised of gently rolling hills and several slight wetland and stream depressions amidst maintained cropland. Visual resources in the project area include the open fields, forested area in the western portion of the property, and scattered trees along US Hwy 79.

US Hwy 79 is a two-lane roadway with a 45 miles per hour (mph) speed limit that leads southwest into downtown Brownsville, approximately 2 miles from the western property boundary. Industrial, medical, commercial, and residential properties are located to the south and west of the project site, closer to the city of Brownsville. Teknor Apex operates a plastic fabrication plant to the south of the project site, across US Hwy 79. A residence with a pool in the backyard is located adjacent to the eastern property boundary within line of site from the project site. Five other residences are located east of the property along US Hwy 79, but are not adjacent to the proposed solar facility. A residence is also located to the south, facing toward the project site on US Hwy 79. Haywood Park Community Hospital (closed), medical offices, and a pharmacy are located to the west of the property.

Scenic attractiveness (a measure of human perceptions of landscape beauty and sense of place) of the area is common and scenic integrity (a measure of the degree of intactness or wholeness of landscape character) is moderate within the immediate 2 mile radius of the site. Land uses that influence the measures of scenic attractiveness and integrity include the industrial area to the south, downtown Brownsville to the southwest, and agricultural fields to the north and east.

Environmental Consequences – Under the No Action Alternative, the proposed solar facility would not be built and there would be no project-related changes to the visual character of the area.

Under the Proposed Action Alternative, the construction and operation of the solar facility would result in visual impacts from the grading of the site, and the installation of the PV panels and associated equipment, fencing, and the electrical interconnection. The character of the site would change from farmland to multiple parallel rows of PV panels supported by low metal racks. The PV arrays will be single-axis tilt mounts, so they will actively move during the day to track the sun and provide power at an increased efficiency. The appearance will change throughout the day depending on the viewing angle be partially visible from the residence east of the project site when looking west.

Forested areas of the property would remain intact, while some trees may be trimmed to avoid shading the solar arrays. Tree lines along the property boundaries would also remain intact. A tree line along the northern property boundary would screen the adjacent undeveloped land from the solar facility. The adjacent residence to the east of the site has mature trees that will partially buffer the view of the solar field. The property owner has expressed concern about views of the solar facility from the residence, particularly from the backyard pool. The majority of their views would be of the east ends of the rows of low metal rack structures. SRC will plant additional trees and shrubs along sections of the fence line to shield the property from the proposed solar facility. The former hospital, medical offices, and pharmacy to the west would be screened from the proposed solar field by an existing tree line. The proposed solar field would

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also be partially visible from Teknor Apex, the industrial property to the south of the proposed site as well as the residence between Teknor Apex and the project area.

The solar field slopes downhill from US Hwy 79 and after site grading, the proposed solar facility would be nearly completely visible from US Hwy 79; scattered trees and shrubs will provide partial screening. This screening would be minimal during winter months after leaf fall. Driving the speed limit on US Hwy 79 (45 mph), a traveler could see the solar panels north of the highway for approximately 25 seconds. Overall visual impacts of the proposed solar facility would be insignificant.

Noise

Existing Environment –The proposed solar facility is at the urban/rural interface adjacent to a federal highway on the northeast side of Brownsville. The major sources of noise would be traffic on the highway and other nearby roads, tractors and other farm equipment, private planes, mowers, wind, and farm animals. Besides truck traffic, no discernable industrial noise from the Teknor Apex factory was noted during the on-site visit. Noise levels in rural areas typically range from 45 to 55 dBA (A-weighted decibels, a measure of noise level). Noise is generally described as unwanted sound, which can be based either on objective effects (hearing loss, damage to structures, etc.) or subjective judgments (such as community annoyance). Sound is usually represented on a logarithmic scale with a unit called the decibel (dB). A day-night average sound level of 55 dBA is commonly used as a threshold level for noise levels which could result in adverse impacts, and prolonged exposure to levels above 65 dBA is considered unsuitable for residential areas.

Few sensitive noise receptors occur close to the project area. A few residences are located to the east and south of the project site. Medical offices and a pharmacy are located to the west of the project site; the Haywood Park Community Hospital would be a sensitive receptor but is currently closed.

Environmental Consequences – Under the No Action Alternative, no noise would be produced by the construction or operation of the proposed solar facility and there would be no project-related changes to noise levels in the area.

Under the Proposed Action Alternative, construction activities, such as site grading, tree trimming, and installation of PV panel support posts, would generate noise. No noise would be generated by the operation of the solar facility. Maximum noise levels produced by the construction equipment are in the range of 80 to 85 dBA at a distance of 50 feet from the equipment. Nearby residents could experience elevated noise levels caused by construction equipment, but construction noise would be of very short duration, during normal work hours on weekdays, and likely not exceed the 65 dBA noise level at nearby houses for prolonged periods.

The nearest occupied house is approximately 150 feet from the facility's eastern boundary. Elevated noise levels from construction equipment could be perceptible above background noise but would be of very short duration, during normal work hours on weekdays and would likely not exceed the 65 dBA noise level. Periodic noise would also be produced by maintenance activities, primarily mowing. This noise would be similar to existing noises near the project site. Overall noise impacts resulting from the Proposed Action Alternative would be insignificant.

Cultural Resources

Existing Environment – Cultural resources include prehistoric and historic archaeological sites, buildings, groups of buildings (districts), structures, and objects, as well as locations of important historic events. Cultural resources that are listed or considered eligible for listing on the National Register of Historic Places (NRHP) maintained by the National Park Service are called historic properties. To be eligible for the NRHP, cultural resources must be at least 50 years of age or of exceptional importance and embody one of four criteria, in accordance to 36 CFR 60.

As a federal agency, TVA is required by the National Historic Preservation Act of 1966 (NHPA), as amended (16 USC 470) and the NEPA of 1969, as amended (42 USC 4321) to evaluate the potential adverse effects of their undertakings on historic properties and take measures to avoid, minimize, or mitigate any effects. Throughout this process, TVA must consult with the appropriate State Historic Preservation Officer (SHPO), federally recognized American Indian tribes, and any other party with an interest in the undertaking.

Two areas of potential effects (APEs) were defined to identify cultural resources that may be affected by the proposed solar facility (Futch and Reynolds 2016). The direct effects APE for evaluating the impacts on archaeological resources encompasses the 49-acre area that SRC considered for the proposed solar facility. The indirect effects APE for evaluating viewshed effects to historic architectural resources (buildings, districts, objects, and modified landscapes) includes the 49-acre area and a surrounding ½-mile radius. In addition, the 49-acre area and a surrounding 1-mile radius were researched to identify previously recorded cultural resources. This research determined that no archaeological resources and five architectural resources of unevaluated NRHP eligibility were previously recorded within the 1-mile radius. None of these previously recorded resources were revisited during field identification due to being outside of the indirect effects APE.

An archaeological survey of the direct effects APE was conducted in December 2015 and an architectural resources survey of the indirect effects APE was conducted in January 2016. During the archaeological survey a total of 221 shovel test pits (STPs) were excavated within the APE. None of the STPs recovered cultural material. Locus 1, a redeposited, early to mid-twentieth century house site, was identified during ground surface inspection. Evidence of historical occupation was found in the location of a structure shown on 1938 and 1955 maps but absent on a 1970 map (TNDOT 1938, 1955; USGS 1970), Locus 1 was reasoned to be the remnants of this structure, redeposited into a nearby drainage after demolition. While the occupants of the structure could likely be researched, the extant remnants will likely not provide greater insights into twentieth-century lifeways in Haywood County. As a redeposited site, Locus 1 lacks integrity and is recommended not eligible for listing on the NRHP. No further management of this resource is warranted.

During the architectural resources survey for aboveground resources 15 residential structures and 1 cemetery were documented (Resources 1-16 in Futch and Reynolds (2016)). The mid-nineteenth to late twentieth-century Barclay-Clinton Family Cemetery (Resource 16) has approximately 12 marked graves, the majority of which are greater than 50 years old. The cemetery does not have elaborate grave markers or a designed landscape plan, and background research did not reveal associations with significant events, long-term trends, or persons of outstanding historical importance. The cemetery is not architecturally significant and is not associated with an architecturally significant church that would be NRHP-eligible

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and is not a reconstructed or commemorative property; therefore the cemetery is recommended ineligible for the NRHP. No further management of this resource is warranted.

All of the residential structures (Resources 1–15) were built in the early to mid-twentieth century except one built in the late nineteenth century. Based on background research, the residences in the indirect effects APE were built by individual property owners, consist of varying house types, and do not represent a viable historic district. Fourteen of these resources (Resources 2–15) also do not embody criteria for listing individually on the NRHP and are recommended not eligible. Resource 1 retains sufficient integrity to be eligible for listing individually on the NRHP and is considered a historic property.

Resource 1, historically known as Rosaliene, is a circa-1886, multiple cross-gable, two-story house with handmade, load-bearing brick walls and a continuous brick foundation. The house has two exterior brick chimneys and a symmetrical façade featuring a single, raised panel, wood front door with a transom and sidelights and wood-frame, double-hung, 9-over-1 windows with arched brick crowns. The double-height, gable-roof front porch with a balcony is flanked by double-height, shed-roof, wood column-supported porches with balconies and wood balustrades. An extant, circa-1886 detached kitchen was joined to the rear elevation by single story hyphen in 1954, and a circa-1945, single crib barn is situated west of the house. Rosaliene resides on 6.7 of its original 300 acres and is set among agricultural fields and other residences, approximately 0.40 mile northeast of the project site on US Hwy 79.

Based on the cultural resources survey, TVA determined that Resource 1 (Rosaliene) is eligible for inclusion in the NRHP under Criterion C, and that the remaining 15 architectural resources identified in the APE are ineligible. TVA also determined that the APE contains no NRHP-eligible archaeological sites. TVA consulted with the Tennessee SHPO, who agreed with these determinations, and with federally-recognized Indian tribes, none of whom objected or indicated the presence of NRHP-eligible resources of interest.

Environmental Consequences – Under the No Action Alternative, there would be no project-related impacts to cultural resources.

Under the Proposed Action Alternative, Resource 1 and its associated 6.7-acre property would not be affected by the proposed solar facility due to limited visibility and an approximate 600-meter (0.37 mile) buffer between the resource and the solar facility site. Therefore, there will be no adverse effect on historic properties as a result of the proposed project.

In accordance with Section 106 of the NHPA, TVA has consulted with the Tennessee SHPO and with federally recognized Indian tribes on this finding (Appendix). In a reply dated June 22, 2016, the Tennessee SHPO concurred with TVA's determination that no historic properties would be affected. The Chickasaw Nation concurred in a reply dated June 23, 2016 and the Eastern Shawnee Tribe concurred via email on July 6, 2016.

Socioeconomics and Environmental Justice

Existing Environment – The proposed solar facility is located in a rural area near the city of Brownsville, Haywood County, Tennessee. The 2010 U.S. Census Bureau (Census) total population is 656 in a 1-mile radius of the project site, 10,292 for Brownsville, 18,787 for Haywood County, and 6,346,105 for the state (Census 2010, EJScreen). Minorities make up 62 percent within a 1-mile radius, 69.1 percent of the city population, 54.1 percent of the

county, and 20.9 percent of the state population based on the 2010 census. The proportion of the population classified as living below the poverty level in 2014 was 65 percent within 1 mile of the project site, 26.8 percent for Brownsville, 22.5 percent for the county and 16.7 percent for the state (Census 2014, EJScreen). Estimated city, county, and state per capita incomes based on 2014 inflation-adjusted dollars were \$18,984, \$19,027, and \$25,227, respectively (Census 2014).

Environmental Consequences – Under the No Action Alternative, there would be no project-related or disproportionate impacts on the socioeconomics or low-income or minority populations in the project area.

Under the Proposed Action Alternative, 50 to 100 workers would be employed for 4 to 6 months to construct the proposed solar facility. Many of these workers would be based in the local area and would have a small beneficial impact on the local economy. Advertisements would be placed in local newspapers and a job fair would be held in the community to gather résumés and conduct interviews with the most qualified candidates. The most qualified candidates would be hired to construct the facility. No workers would be needed for the normal day-to-day operation of the solar facility. Periodic maintenance activities, primarily mowing, would be done by local workers and would not result in an increase in employment. Property tax payments to Houston and to Haywood County for the facility would increase due to the increased value of the site once the facility is completed.

Executive Order 12898 on Environmental Justice directs federal agencies to consider the impacts of their actions on minority and low-income populations and to avoid disproportionate impacts to those populations. The proportion of minority and low income populations near the proposed solar facility is greater than the proportions for the county and state. The overall impacts of the solar facility, most of which would occur during the short construction period, would be minor and off-site impacts (i.e., to surrounding properties) would be negligible. Consequently, there would be no disproportionately adverse impacts to minority and low-income populations.

Solid and Hazardous Wastes

Existing Environment – An ASTM standard E1527-13 Phase I Environmental Site Assessment (ESA) was performed on the site on July 13, 2015 (Tioga 2015)). The Phase I ESA did not identify the presence, former use or spillage of hazardous substances or petroleum products. The ESA revealed evidence of two recognized environmental conditions (RECs) on or near the project site:

- The project area has been farmed since 1947. Based on the length of time this site has been farmed, it is likely that this site has been affected by current and historical use of herbicides and/or pesticides.
- Teknor Apex Tennessee Company at 791 Dupree St is located approximately 720 feet south of the project site. A Closure Plan Report dated February 29, 2012 stated that contamination occurred inside the aboveground storage tanks enclosure. Contaminated soil was excavated and removed from the site. There was no evidence of groundwater contamination in this report.

Environmental Consequences – Under the No Action Alternative, no project-related impacts associated with solid and hazardous waste would occur.

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Under the Action Alternative, solid wastes would be generated during construction of the solar facility. Facility-related wastes generated during all phases of the proposed project would include oily rags, worn or broken metal and machine parts, defective or broken electrical materials, other scrap metal and plastic, broken down module boxes, empty containers, paper, glass, and other miscellaneous solid wastes including the typical refuse generated by workers. These materials would be disposed by means of contracted refuse collection and recycling services. Waste collection and disposal would be in accordance with applicable regulatory requirements to minimize health and safety effects. Decommissioned equipment and materials, including PV panels, racks, and transformers would be recycled. Materials that cannot be recycled would be disposed of at an approved facility.

Hazardous materials are not likely to be encountered during construction of the proposed solar facility. The Teknor Apex facility is downslope from the proposed site and is also separated by US Hwy 79. The amount of herbicides and/or pesticides applied to the site, if any, is unknown. However, the application of herbicides and/or pesticides would likely affect the soil surface and/or runoff into surrounding swales or depressions.

No hazardous waste would be generated during the construction and operation of the facility. SRC would implement procedures to minimize fuel spills during construction and operation of the facility. Waste generated during operation would be minimal and would mainly result from replacement of equipment. All nonhazardous wastes will be disposed of in an approved, operating landfill. Bulk chemicals would be stored in storage tanks or in returnable delivery containers. The transport, storage, handling, and use of all chemicals would be conducted in accordance with applicable laws, ordinances, regulations, and standards. Oils on site will be used in the transformer for equipment operation and less than 1,320 gallons of oil will be generated on site; therefore no spill prevention, control, and countermeasure (SPCC) plan is required. Upon expiration of the 20-year PPA or an amended or alternative PPA for the sale of power after the 20-year period, SRC would develop a decommissioning plan to document the recycling and/or disposal of solar facility components in accordance with applicable regulations. Impacts from the generation of hazardous waste during the construction and operation of the proposed facility would be insignificant.

Cumulative Impacts

As described above, the construction and operation of the solar facility under the Proposed Action Alternative would not affect some environmental resources and would have only minor adverse impacts to other resources such as vegetation and wildlife, prime farmland, and visual resources. Two planned local projects are in the vicinity of the project area. The first is the proposed expansion of the Teknor Apex facility south of US Hwy 79, across the highway from the proposed Haywood Solar Facility. Teknor Apex plans to build a 200,000-square-foot distribution facility in the Brownsville-Haywood County Industrial Park that will allow Teknor Apex to grow the manufacturing units within its existing plant. The exact construction timing is not known, but it is anticipated to commence in 2017 (City of Brownsville 2017a). This expansion project is less than 1 mile from the proposed solar site; therefore it may impact local transportation and socioeconomics, but due to existing conditions and proposed construction timing, it is not likely to contribute to cumulative impacts associated with the proposed solar site. The second project is the Brownsville Downtown Enhancement Project Phase 2 and 3 (TDOT PIN 116773.01) estimated to start in February 2017 and be completed in November 2017 (City of Brownsville 2017b). This project would include improvements along both sides of East Main Street from Jackson Avenue to North Park Avenue and along Bradford Avenue, approximately 2 miles from the proposed solar site. This project should be completed or close to completion

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when construction of the proposed Haywood Solar Facility commences; therefore it is unlikely to contribute to cumulative impacts related to the proposed solar site. Based on the low level of anticipated impacts to the resources described above, and the lack of cumulative impacts from proposed local projects in the vicinity of the project area, TVA has determined that the proposed action would not result in any adverse cumulative impacts.

CHAPTER 4 – SUPPORTING INFORMATION

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United States Geological Survey (USGS). 1970 Bells, TN Quadrangle. 7.5 Minute Series
Topographic Map.

Appendix

Insert Section 106 consultation