

Document Type: EA-Administrative Record
Index Field: Final Environmental
Assessment
Project Name: Vonore Battery Energy
Storage and Associated
Substation
Project Number: 2021-22

**VONORE BATTERY ENERGY STORAGE SYSTEM AND
ASSOCIATED SUBSTATION**
Monroe and Blount Counties, Tennessee

FINAL ENVIRONMENTAL ASSESSMENT

TENNESSEE VALLEY AUTHORITY
Knoxville, Tennessee

January 2022

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Table of Contents

CHAPTER 1 – PURPOSE AND NEED FOR ACTION.....	1
1.1 Description of the Proposed Action.....	1
1.2 Introduction and Background.....	1
1.3 Purpose and Need	8
1.4 Decision to be Made	8
1.5 Scoping and Public Involvement.....	8
1.6 Related Environmental Reviews	9
1.7 Permits, Licenses, and Approvals.....	9
1.8 Affected Environment and Environmental Consequences	9
CHAPTER 2 - ALTERNATIVES.....	11
2.1 Alternatives Including the Proposed Action	11
2.1.1 Alternative A: The No Action Alternative - Do Not Construct the BESS facility, a new substation, or install the ADSS fiber upgrade	11
2.1.2 Alternative B – The Action Alternative - Construct the BESS facility, a new substation, and install the ADSS fiber upgrade	12
2.2 Comparison of Alternatives	12
2.3 Summary of Mitigation Measures	15
2.4 TVA’s Preferred Alternative	16
CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES.....	17
3.1 Land Use	17
3.1.1 Affected Environment	17
3.1.2 Environmental Consequences.....	18
3.2 Geology, Soils, and Prime Farmland	18
3.2.1 Affected Environment	18
3.2.1.1 Geology.....	18
3.2.1.2 Soils and Prime Farmland.....	18
3.2.2 Environmental Consequences.....	22
3.3 Air Quality.....	22
3.3.1 Affected Environment	22
3.3.2 Environmental Consequences.....	23
3.4 Climate Change	23
3.4.1 Affected Environment	23
3.4.2 Environmental Consequences.....	24
3.5 Water Resources	25
3.5.1 Affected Environment	25
3.5.1.1 Groundwater	25
3.5.1.2 Floodplains.....	25
3.5.1.3 Wetlands	25
3.5.1.4 Surface Water	29
3.5.2 Environmental Consequences.....	30
3.5.2.1 Groundwater	30
3.5.2.2 Floodplains.....	30
3.5.2.3 Wetlands	31
3.5.2.4 Surface Water	31
3.6 Biological Resources.....	32
3.6.1 Affected Environment	32

3.6.1.1	Vegetation	32
3.6.1.2	Aquatic Ecology	32
3.6.1.3	Terrestrial Wildlife	32
3.6.1.4	Threatened and Endangered Species (T&E) and their Critical Habitats	34
3.6.2	Environmental Consequences.....	38
3.6.2.1	Vegetation	38
3.6.2.2	Aquatic Ecology	38
3.6.2.3	Terrestrial Animal Wildlife	38
3.6.2.4	T&E and their Critical Habitats	39
3.7	Visual Resources	40
3.7.1	Affected Environment	40
3.7.2	Environmental Consequences.....	41
3.8	Noise	41
3.8.1	Affected Environment	41
3.8.2	Environmental Consequences.....	42
3.9	Cultural Resources.....	42
3.9.1	Affected Environment	42
3.9.2	Environmental Consequences.....	43
3.10	Socioeconomics and Environmental Justice.....	43
3.10.1	Affected Environment	43
3.10.2	Environmental Consequences.....	45
3.11	Transportation	45
3.11.1	Affected Environment	45
3.11.2	Environmental Consequences.....	46
3.12	Public Health and Safety.....	46
3.12.1	Affected Environment	46
3.12.2	Environmental Consequences.....	46
3.13	Solid and Hazardous Waste	46
3.13.1	Affected Environment	46
3.13.2	Environmental Consequences.....	47
3.14	Cumulative Impacts.....	47
CHAPTER 4 – LIST OF PREPARERS		51
4.1	NEPA Project Management	51
4.2	Other Contributors.....	51
CHAPTER 5 – LITERATURE CITED		55

List of Attachments

Attachment A – Communication Specification Diagram	61
Attachment B - Responses to Public Comments	62
Attachment C – Prime Farmland Forms for U.S. Department of Agriculture-Natural Resources Conservation Service Consultation.....	65
Attachment D - TVA Bat Strategy Project Screening Forms for the Vonore Battery Energy Storage System and Associated Substation.....	67

List of Tables

Table 2-1.	Summary and Comparison of Alternatives by Resource	12
Table 3-1.	Soils within the Proposed Project Areas	19
Table 3-2.	Wetlands within the Proposed Project Areas in Monroe and Blount Counties, Tennessee	26
Table 3-3.	Federally and State-Listed Aquatic Animal Species in the Vicinity of the Vonore Battery Energy Storage System Proposed project area ¹	35
Table 3-4.	Federally and State-listed Terrestrial Animal Species in the Vicinity of the Vonore Battery Energy Storage System Proposed project area ¹	36
Table 3-5.	Population, Demographics, Income, and Employment in the Host State, County and Locality	44

List of Figures

Figure 1-1.	Proposed Project Areas located in Monroe and Blount Counties, Tennessee	2
Figure 1-2.	Proposed Battery Energy Storage System and Associated Substation in Monroe County, Tennessee	3
Figure 1-3.	Proposed Battery Energy Storage System and Associated Substation Configurations Located in Monroe County, Tennessee	4
Figure 1-4.	Proposed Battery Energy Storage System Associated Substation Configuration Located in Monroe County, Tennessee	5
Figure 1-5.	Proposed Battery Energy Storage System Associated Substation Interconnection Configuration Located in Monroe County, Tennessee	6
Figure 1-6.	Proposed ADSS Fiber Line Installation Located in Blount County, Tennessee	7
Figure 3-1.	Soils Map for the Proposed Battery Energy Storage System and Associated Substation Project located in Monroe County, Tennessee	20
Figure 3-2.	Soils Map for TVA's Existing Transmission Line Right-of-way for the Proposed ADSS Fiber Line Project located in Blount County, Tennessee	21
Figure 3-3.	Wetlands and Surface Waters Map for the Proposed Battery Energy Storage System and Associated Substation located in Monroe County, Tennessee	27
Figure 3-4.	Wetlands and Surface Waters Map for the Proposed ADSS fiber Line Located in Blount County, Tennessee	28

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List of Abbreviations

Aa	Map Unit Symbol for Soil Name Alcoa loam
AADT	Annual Average Daily Traffic Count
ADSS	All Dielectric Self-Supporting
APE	Area of Potential Effect
APHIS	Animal and Plant Health Inspection Service
ARAP	Aquatic Resource Alteration Permit
BESS	Battery Energy Storage System
BMP	Best Management Practices
CAA	Clean Air Act
CCVT	Capacitor Controlled Voltage Transformer
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CO₂	Carbon Dioxide
CWA	Clean Water Act
dB	Symbol for Decibel
DmB	Map Unit Symbol for Soil Name Dunmore silt loam, 2-5% slopes
EA	Environmental Assessment
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
FIRM	Flood Insurance Rate Map
Ft asl	Feet above sea level
GHG	Greenhouse Gases
Ha	Map Unit Symbol for Soil Name Hamblen loam
HAP	Hazardous Air Pollutants
HUC	Hydrologic Unit Code
IPaC	Information for Planning and Consultation
IRP	Integrated Resource Plan
Li-ion	Lithium-ion
Lf	Linear feet
kV	Symbol for kilovolt (1 kV equals 1,000 volts)
MW	Symbol for Megawatt (1 MW equals 1,000 watts)

MWhr	Megawatt per hour
NAAQS	National Ambient Air Quality Standards
NHPA	National Historic Preservation Act
NO₂	Nitrogen Dioxide
NOX	Nitrogen Oxide
NPS	National Park Service
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
OSHA	U.S. Occupational Safety and Health Administration
PCB	Polychlorinated Biphenyl
PM	Particulate Matter
PPM	Parts per Million
RCRA	Resource Conservation and Recovery Act
ROW	Right-of-way, a corridor containing a transmission line
RT&E	Rare, Threatened, and Endangered Species
SCADA-RTU	Supervisory Control and Data Acquisition remote terminal unit
SHPO	State Historic Preservation Officer
SO₂	Sulphur Dioxide
SWPPP	Stormwater Pollution Prevention Plan
TDEC	Tennessee Department of Environment and Conservation
TDOT	Tennessee Department of Transportation
TRAM	Tennessee Rapid Assessment Method
TRDA	Tellico Reservoir Development Agency
TVA	Tennessee Valley Authority
VOC	Volatile Organic Compound
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Service
WOTUS	Waters of the U.S.

CHAPTER 1 – PURPOSE AND NEED FOR ACTION

1.1 Description of the Proposed Action

The Tennessee Valley Authority (TVA) proposes to construct a Battery Energy Storage System (BESS) as a pilot study project. The proposed BESS would be capable of generating 20 megawatts (MW) with a storage capacity of 40 MW hours (MWhrs) and would be located west of State Highway 72 in Vonore, Tennessee in Monroe County (Figure 1-1). The proposed 15-acre pilot study site would require an approximate 10-acre slab-on-grade pad for the BESS, its attendant features, and an associated new Vonore BESS 69-kilovolt (kV) Substation. The BESS would be comprised of twelve containers to house the lithium-ion (Li-ion) batteries. Each container would be 40-feet-long by 10-feet-wide and 8-feet in height. Proposed BESS attendant features would include 6 inverters, 3 transformers, at least 12 power quality meters, and other necessary operational features (Figures 1-2, 1-3, and 1-4). The proposed onsite 69-kV substation would consist of a transformer, one breaker, 2 revenue type meters, a Supervisory Control and Data Acquisition remote terminal unit (SCADA RTU), relays, alarms, capacitor-controlled voltage transformer (CCVT), switch house, and other equipment (Figure 1-3). Access to the proposed BESS would be directly from Highway 72 near transmission line Structure 109. To connect the BESS and associated substation to TVA's transmission system, a loop connection point would be installed on the existing Loudon-Tellico Reservoir Development Agency (TRDA) 69-kV Transmission Line. Direct transfer trip and transfer trip work would occur at the TVA Loudon 161-kV Substation (Figure 1-5 and Attachment A).

Additionally, TVA would install roughly 0.4-mile of new all dielectric self-supporting (ADSS) fiber cable from Structures 53 to 55 on the Fort Loudon to Alcoa No. 1 161-kV transmission line (L5184), roughly one mile east of the town of Friendsville, in Blount County, Tennessee (Figure 1-4). New poles between Structures 53 to 55 would be installed, and the ADSS fiber line would be placed on overhead poles by bucket trucks. TVA would utilize temporary access roads, existing access roads, and/or driveways within existing rights-of-way (ROW) for the installation of the ADSS fiber cables.

The scheduled in-service date for this project would be fall of 2023 or as soon as possible after that date.

1.2 Introduction and Background

TVA's 2019 Integrated Resource Plan (IRP) is a long-term plan that provides general direction on how TVA can best meet future demand for power (TVA 2019a and 2019b). It generally describes how TVA will continue to provide low-cost, reliable and clean electricity; support environmental stewardship; and foster economic development in the Tennessee Valley for the next 20 years. Various IRPs have been issued through a number of years. The 2019 IRP identified the demonstration of battery storage as a near-term implementation action that would allow TVA to evaluate how such storage can be integrated into its power operations. The 2019 IRP set an energy storage goal to add up to 2,400 MW of storage by 2028 and up to 5,300 MW by 2038. To assist in achieving the energy storage goal set forth in the 2019 IRP, TVA is looking to add renewable energy capacity and solutions to its generating and transmission asset portfolio. As low carbon resources such as wind, solar, and nuclear, become a more significant portion of TVA's generation portfolio, the BESS pilot project would inform how TVA can best take advantage of battery storage technology to enhance the functionality and resiliency of the power

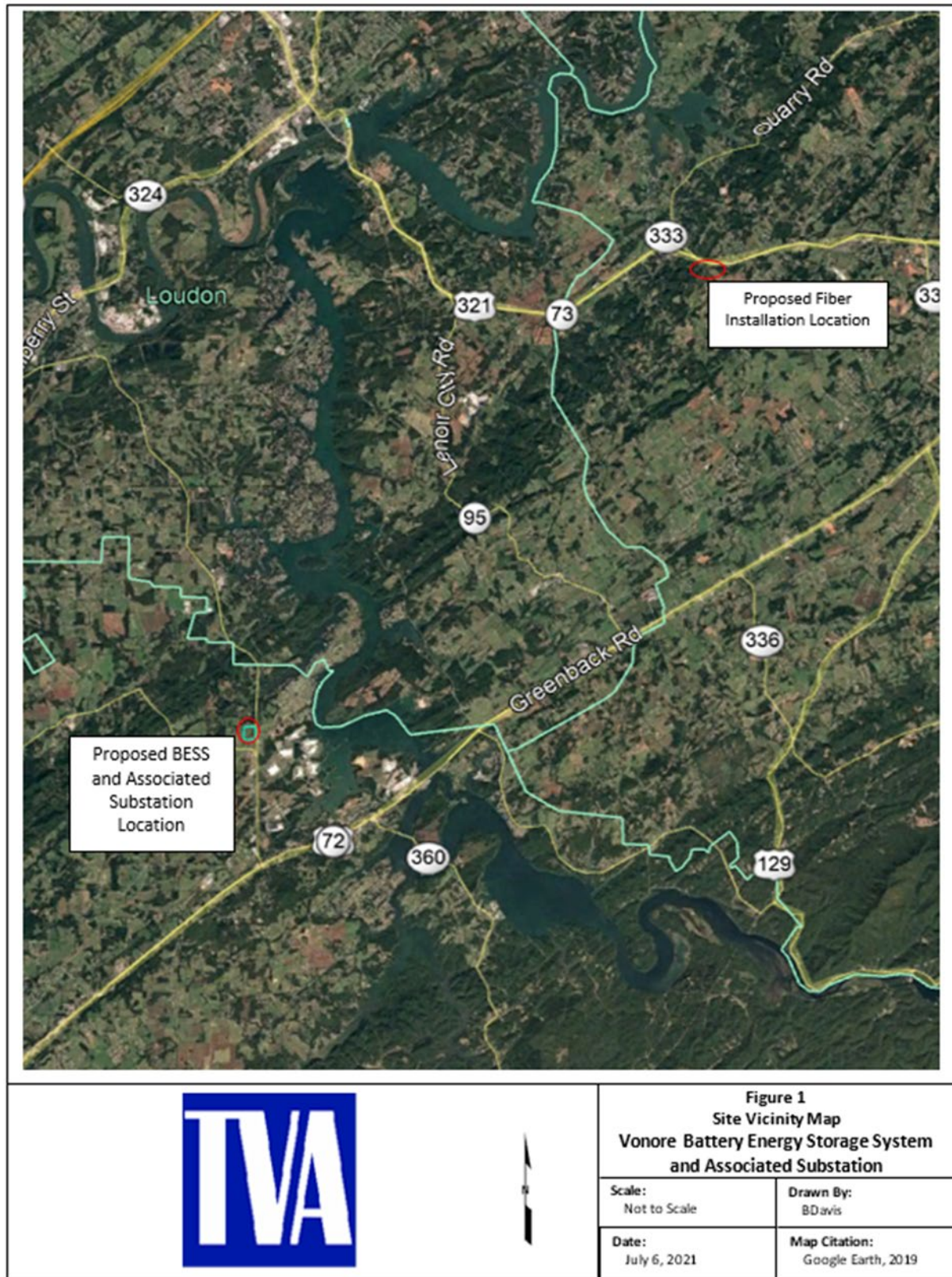


Figure 1-1. Proposed Project Areas located in Monroe and Blount Counties, Tennessee

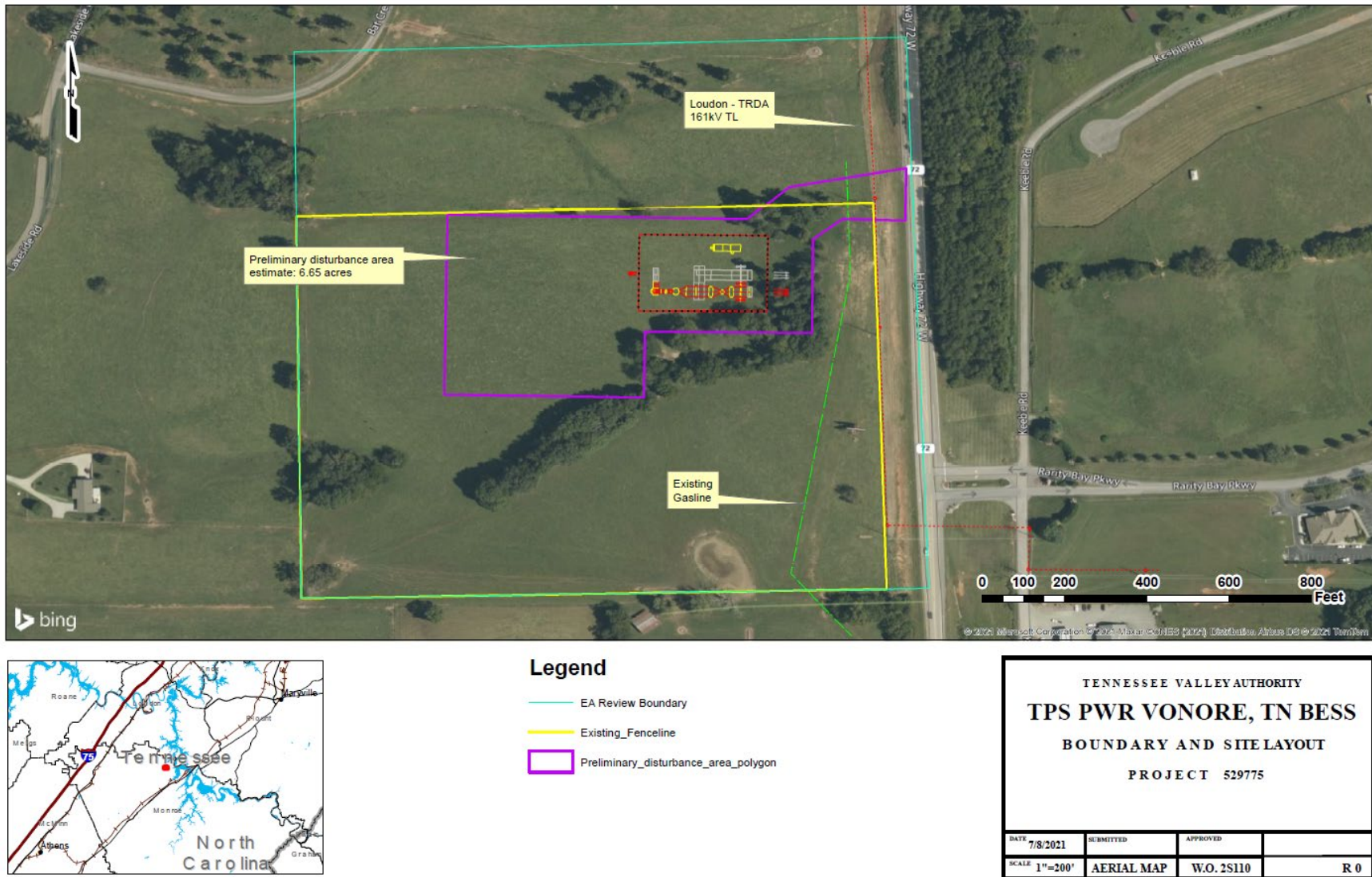


Figure 1-2. Proposed Battery Energy Storage System and Associated Substation in Monroe County, Tennessee

Figure 1-3. Proposed Battery Energy Storage System and Associated Substation Configurations Located in Monroe County, Tennessee



Chapter 1 – Purpose and Need for Action

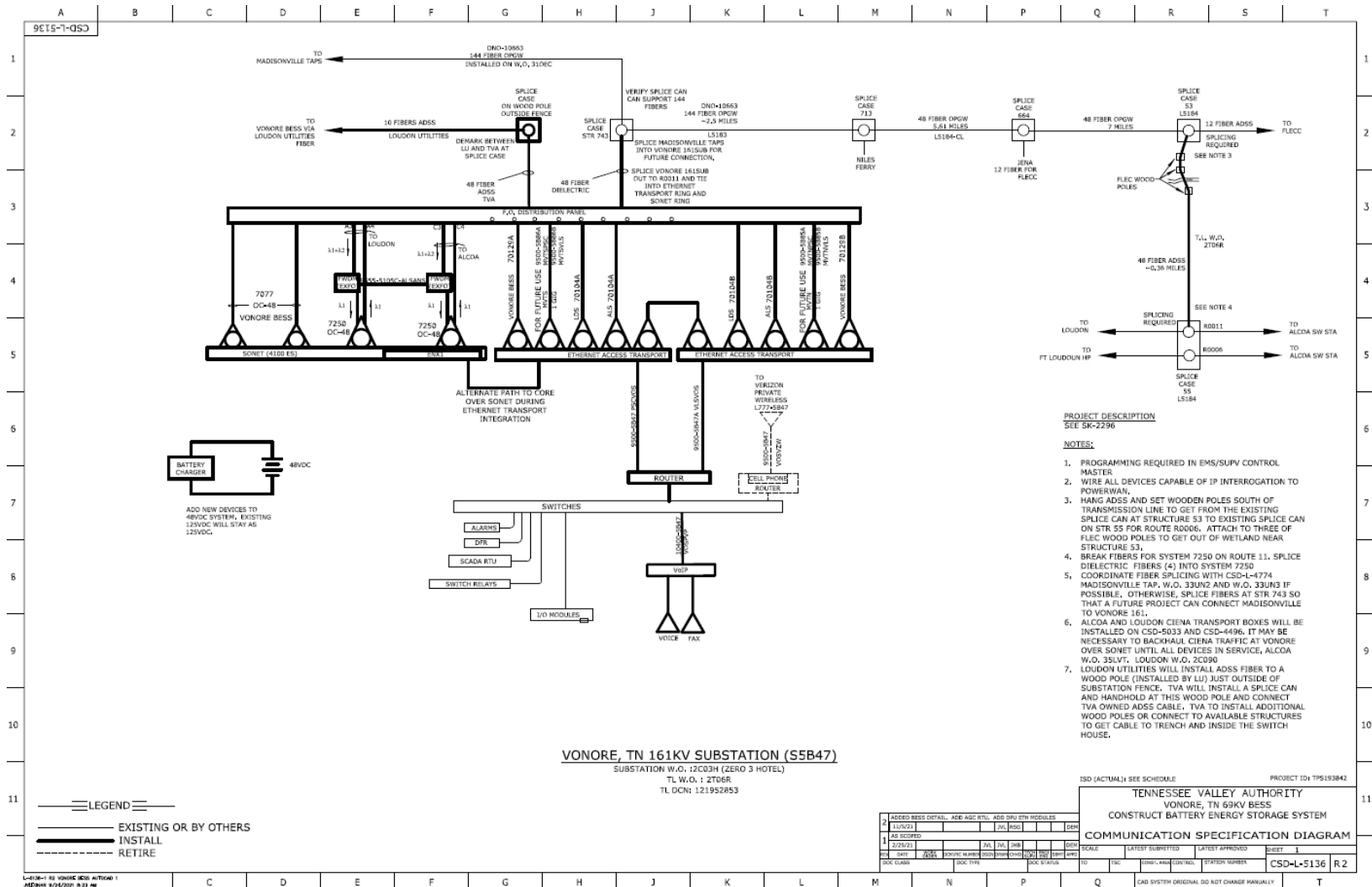
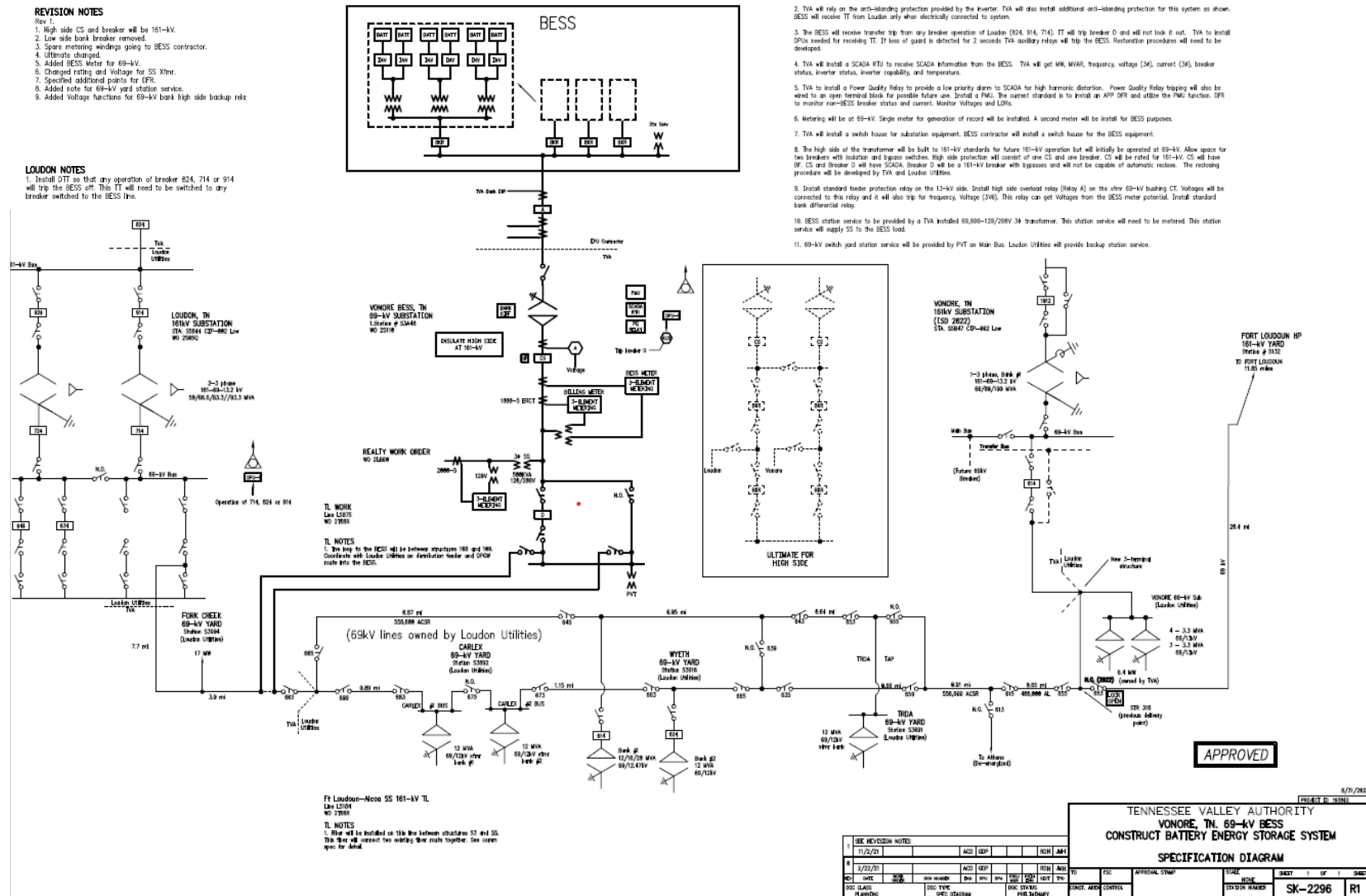


Figure 1-4. Proposed Battery Energy Storage System Associated Substation Configuration Located in Monroe County, Tennessee

Figure 1-5. Proposed Battery Energy Storage System Associated Substation Interconnection Configuration Located in Monroe County, Tennessee



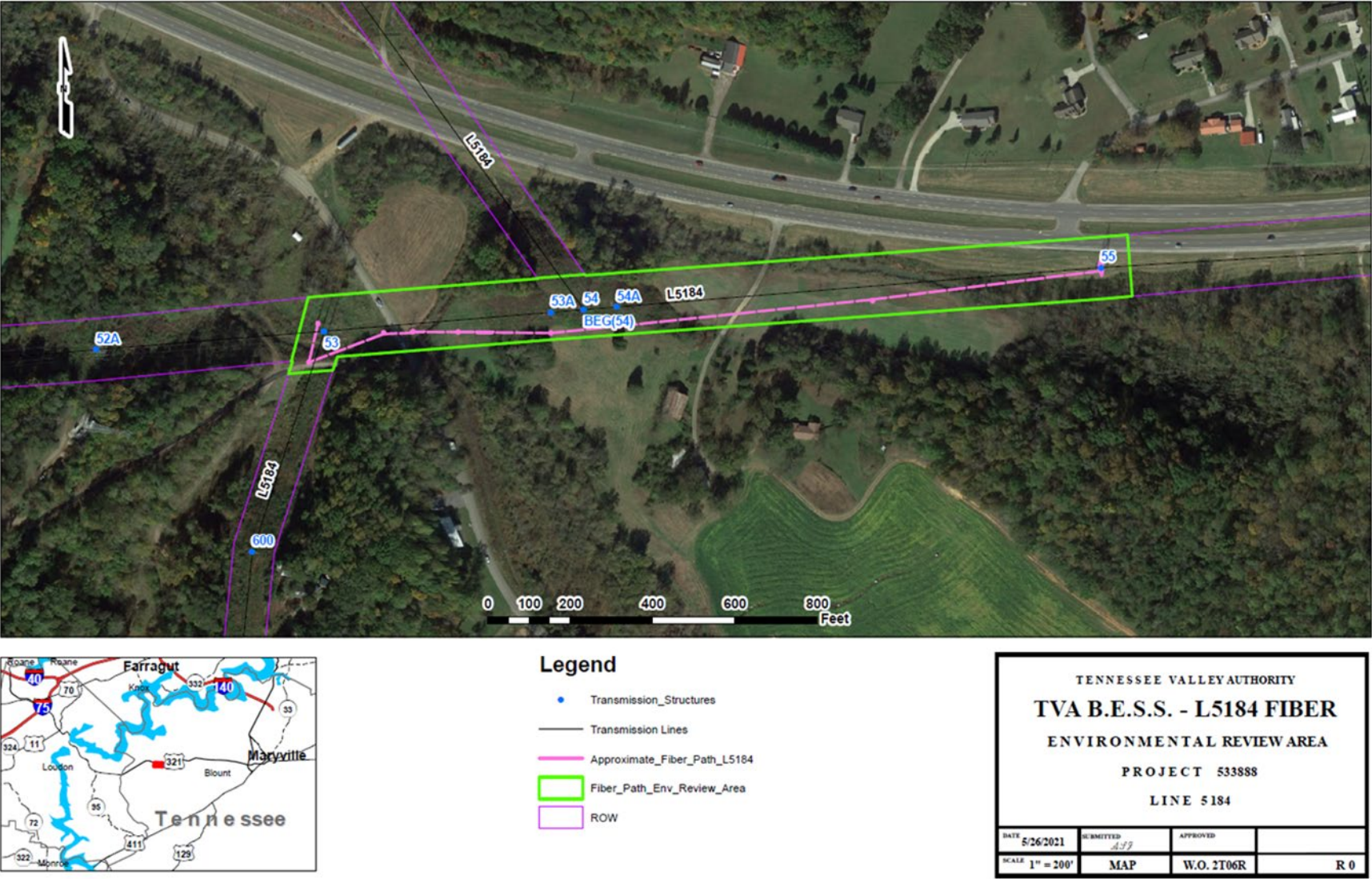


Figure 1-6. Proposed ADSS Fiber Line Installation Located in Blount County, Tennessee

system. The implementation and installation of the BESS pilot project would also provide the surrounding area increased power reliability, while allowing TVA to learn how to best leverage battery storage for the grid of the future. TVA anticipates multiple energy storage projects across the Valley would be needed to integrate renewables into the TVA generation and transmission system.

1.3 Purpose and Need

The proposed BESS project would maximize learning about battery storage projects; would target specific grid needs; access grid resiliency and flexibility applications; and focus on Li-ion chemistry. A pilot project would also assist in developing and demonstrating processes and procedures to help with future TVA energy storage projects. Additionally, the proposed BESS pilot project would inform how TVA can incorporate battery storage technology to enhance the functionality and resiliency of its power system. The main case study for the pilot project would be the study of Li-ion batteries, their uses, and the storage of energy. However, the proposed BESS pilot project would also reduce the uncertainty and increase the reliability of renewable energy generation in the event of cloud cover (solar energy) and changing wind speeds (wind energy). The batteries would also store excess renewable energy to be used during times of peak customer demand. In addition, other uses would be investigated including using the batteries as an alternative to building new transmission lines, and emergency power after storms or other transmission issues. The proposed BESS pilot project would also assist in identifying and developing processes and procedures to ensure these resources are integrated into TVA's generation and transmission system. Finally, the installation of the BESS would provide the surrounding area increased power reliability, once the case study has been completed.

In addition, TVA needs to maximize existing infrastructure, and reduce new-build infrastructure costs and effects, to effectively carry out the purpose of the BESS pilot project. Further, TVA needs to maximize the potential benefits of battery storage based on unique, local power needs, highlighted by the selection criteria that yielded the proposed BESS pilot project location.

1.4 Decision to be Made

The primary decision to be made by TVA is whether to implement and construct the BESS pilot study project and associated substation at the Vonore, Tennessee location, as well as the associated ADSS fiber cable upgrade in Blount County, Tennessee.

1.5 Scoping and Public Involvement

TVA released the Draft EA on October 18, 2021, for a 30-day public review and comment period. Copies of the Draft EA were emailed to agencies and organizations who indicated an interest in the project. TVA notified federally recognized Native American Tribes, elected officials, and other stakeholders that the Draft EA was available for review and comment. An electronic version of the document was posted on the TVA website where comments could also be submitted online. A public notice was also published in the Sweetwater Advocate & Democrat and the Maryville Daily Times, both are local newspapers, soliciting comments from other agencies, the general public, and any organizations.

The comment period closed on November 17, 2021. TVA received seven sets of comments from the U.S. Environmental Protection Agency (USEPA), the Tennessee Department of Environment and Conservation (TDEC), a firm, and four residents. TVA

carefully reviewed the comments that were received. Comments were categorized by author and summarized when appropriate for this document. The comments and TVA's responses are included as Attachment B.

1.6 Related Environmental Reviews

One environmental review document was identified that is related to the proposed action under review and is incorporated by reference as appropriate.

2019 Integrated Resource Plan (TVA 2019a) and the associated EIS (TVA 2019b).

These documents provide direction on how TVA can best deliver clean, reliable and affordable energy in the Valley over the next 20 years, and the associated EIS looks at the natural, cultural and socioeconomic impacts associated with the IRP. TVA's IRP is based upon a "scenario" planning approach that provides an understanding of how future decisions would play out in future scenarios. The 2019 IRP identified energy storage goals to add up to 2,400 MW of storage by 2028 and up to 5,300 MW by 2038. Additionally, it recognized the need for the demonstration of battery storage to evaluate how such storage can be integrated into its power operations.

1.7 Permits, Licenses, and Approvals

All necessary permits, permit modifications, licenses, and approvals required would be obtained for anticipated activities within the proposed BESS pilot study site and the associated ADSS fiber line installation corridor. The list below identifies regulations, programs, permits, approvals, or other authorizations from federal or state authorities that may be required prior to commencement of construction:

- An Aquatic Resource Alteration Permit (ARAP), which serves as a 401 Water Quality Certification in Tennessee, and 404 permit from the U.S. Army Corps of Engineers (USACE) would be required for temporary stream crossings and other activities that would involve discharges of dredged or fill materials into Waters of the U.S. (WOTUS) or Waters of the State of Tennessee.
- The development and approval of a Stormwater Pollution Prevention Plan (SWPPP) is a component of this permit. Construction best management practices (BMPs) to minimize impacts to water quality would be outlined in the SWPPP.
- Certain permits may be required from Tennessee Department of Environment and Conservation's (TDEC) Division of Air Pollution Control, which administers the Clean Air Act (CAA) related programs in Tennessee.
- A Tennessee Department of Transportation (TDOT) Highway Entrance Permit (TN Code 54-5-301) would be required before construction of an access or entrance to Highway 72. The permit would allow reasonable access while promoting safe and efficient movement of people and goods on a state highway.
- Local government agencies or offices may require approval of light industrial uses in compliance with certain regulations, zoning laws, or other applicable ordinances.

1.8 Affected Environment and Environmental Consequences

TVA reviewed the proposed project for potential environmental impacts related to the construction, operation and maintenance of the proposed BESS, associated substation, and the ADSS fiber line upgrade. The early internal review process looked at both

alternatives (Action and No Action) and identified all resources present within the project area. Minor, insignificant effects are anticipated for the following resources:

- | | | |
|---|---|---|
| • <i>Land Use</i> | • <i>Wetlands</i> | • <i>Visual Resources</i> |
| • <i>Noise</i> | • <i>Floodplains</i> | • <i>Transportation</i> |
| • <i>Air Quality and Climate Change</i> | • <i>Surface Water</i> | • <i>Public Health & Safety</i> |
| • <i>Groundwater</i> | • <i>Vegetation</i> | • <i>Solid/Hazardous Waste</i> |
| • <i>Aquatic Ecology</i> | • <i>Wildlife</i> | • <i>Cultural Resources</i> |
| • <i>Rare, Threatened and Endangered Species, and their Critical Habitats</i> | • <i>Socioeconomics and Environmental Justice</i> | • <i>Geology, Soils, and Prime Farmland</i> |

Given the nature of the project, the following resources are not found in the proposed BESS pilot study site or the ADSS fiber line installation project area and/or would not be impacted by the project alternatives. These include:

- Navigation – The proposed Action Alternative would not directly or indirectly affect commercial navigation. Because potential effects were found to be absent, this resource has not been brought forward for further evaluation.
- Recreation, Parks, and Natural Areas – The proposed Action Alternative would not directly or indirectly affect recreation, parks, or natural areas. Because potential effects were found to be absent, this resource has not been brought forward for further evaluation.

TVA's action would satisfy the requirements of Executive Order (EO) 11988 (Floodplain Management), EO 11990 (Protection of Wetlands), EO 12372 (Intergovernmental Review), EO 12898 (Environmental Justice), EO 12977 (Interagency Security Committee), EO 13112 as amended by 13751 (Invasive Species), and applicable laws including the Farmland Protection Policy Act, the NHPA of 1966, the Endangered Species Act (ESA) of 1973, as amended, the CAA, and the Clean Water Act. Necessary permits and licenses are discussed above.

CHAPTER 2 - ALTERNATIVES

2.1 Alternatives Including the Proposed Action

As described in Chapter 1, the scope of the potential alternatives is informed by the purpose and need of the proposed action, namely, the need to demonstrate the effectiveness of a BESS. A description of the proposed action is provided below in Section 2.1.2.

This chapter has four major sections:

1. A description of alternatives
2. A comparison of anticipated environmental effects by alternative
3. Identification of mitigation measures
4. Identification of the preferred alternative.

TVA evaluated numerous alternative locations across the Tennessee Valley with unique energy needs that could support a BESS pilot project. Locations were considered in areas where the benefits of battery storage could be maximized, and new-build infrastructure costs could be minimized. The initial Valley screening process identified the general area surrounding the Tellico West Industrial Park in Vonore, Tennessee, satisfied all the necessary criteria. The greatest benefit of the proposed Vonore project area for TVA is the “transmission capital deferral.” In other words, by utilizing the proposed area for the BESS facility TVA will be able to delay, or postpone indefinitely, the need to construct several miles of new transmission lines and substations needed to address the potential load growth within the Tellico Reservoir Development Agency (TRDA)/Tellico Industrial Park.

TVA also evaluated four potential alternative locations within the Vonore area, that were eliminated from further consideration: During initial scoping, TVA first considered the Tellico Industrial Park area due to its proximity to the Wyeth, TN 69-kV Metering Station and the available TRDA property on the south side of the station. TVA initially considered connecting the pilot BESS to Loudon Utilities Board’s (LUB) existing 69-kV line on the east side of Highway 72. Placing the battery site adjacent to the Wyeth, TN 69-kV Metering Station would have allowed other possibilities in terms of connecting with LUB. However, LUB does not own the metering station property and conversations with the property owner identified potential issues for the BESS with the property owners long-term use plans for the land. Therefore, this property was then dismissed as a reasonable alternative site location. Three additional site locations within the area were also considered, but were eliminated due to engineering, environmental, and/or constructability constraints.

TVA therefore, determined that there are two alternatives that appropriately satisfy the proposed project’s Purpose and Need: The No Action Alternative and the Action Alternative.

2.1.1 Alternative A: The No Action Alternative - Do Not Construct the BESS facility, a new substation, or install the ADSS fiber upgrade

Under the No Action alternative, TVA would not construct the BESS pilot project facility and proposed substation at the Vonore location in Monroe County. In addition, the ADSS fiber line would not be installed in Blount County. As a result, TVA would not be able to demonstrate the BESS technology. TVA would also not be able to evaluate how to

incorporate battery storage technology to reduce the uncertainty and increase the reliability of renewable energy generation. Additionally, under the No Action Alternative, the proposed project surrounding area would not be provided with an increased power reliability.

TVA has committed in the 2019 IRP to implementing a demonstration BESS project and set goals for adding energy storage to the TVA transmission system to offset the uncertainty of solar and wind energy that could be needed during peak customer demand or as an emergency power sources. Consequently, this alternative would not satisfy the project purpose and need and, therefore, is not considered a viable or reasonable alternative. It does, however, provide a benchmark for comparing the environmental impacts of implementation of the Action Alternative.

2.1.2 Alternative B – The Action Alternative - Construct the BESS facility, a new substation, and install the ADSS fiber upgrade

Under the proposed Action Alternative, TVA would implement and construct a BESS pilot study project, capable of generating 20 MW with a storage capacity of 40 MWhr, at a property located to the west of State Highway 72 in Vonore within Monroe County, Tennessee (Figures 1-1 and 1-2). Approximately 10 to 15 acres of land would be required for the BESS pilot project, including an associated new 161-kV substation consisting of a transformer, breakers, power quality meters, a SCADA RTU, relays, alarms, a CCVTs, switch house, and other equipment (Figure 1-3). A loop connection point would be installed on the existing Loudon-TRDA 69-kV transmission line. Direct transfer trip and transfer trip work would occur at the TVA Loudon 161-kV Substation. Access to the BESS would be directly from State Highway 72 near Loudon-TRDA 69-kV transmission line Structure 109.

In addition, TVA is proposing to install roughly 0.4-mile of new ADSS fiber cable from Structures 53 to 55 on the Fort Loudon to Alcoa No. 1 161-kV transmission line (L5184) (Figures 1-1 and 1-4). Temporary access roads, existing access roads, and/or driveways would be utilized during the installation of the ADSS fiber cables on existing overhead transmission lines and would be within existing ROW.

2.2 Comparison of Alternatives

The environmental impacts of each alternative under consideration are summarized in Table 2-1. These summaries are derived from the information and analyses provided in the Affected Environment and Environmental Consequences sections for each resource in Chapter 3.

Table 2-1. Summary and Comparison of Alternatives by Resource

Resource Area	Impacts from Implementing the No Action Alternative	Impacts from Implementing the Action Alternative
Land Use	No direct or indirect effects to land use are anticipated.	<p>Minor direct adverse impacts. Land use on the project site would change from undeveloped and agricultural to industrial. The surrounding area, however, is largely agricultural, undeveloped, and residential, which would not change. No indirect impacts.</p> <p>No direct or indirect effects on land use would occur with the proposed fiber line installation.</p>

Resource Area	Impacts from Implementing the No Action Alternative	Impacts from Implementing the Action Alternative
Geology, Soils, and Prime Farmland	No effects to geologic resources and prime farmland are expected.	<p>Minor adverse impacts related to geology and soils would occur as a result of the site grading and construction. The minor loss of prime farmland within the BESS and new substation footprint (less than one acre) is negligible when compared to the amount of land designated as prime farmland within the surrounding region. Therefore, impacts to prime farmland would be minor.</p> <p>Negligible impacts would occur as a result of the ADSS fiber line upgrade.</p>
Air Quality	No effects to air quality are anticipated.	<p>Fugitive dust produced from construction activities would be temporary and controlled by BMPs.</p> <p>Infrequent use of diesel engines would have <i>de minimis</i> impacts and not lead to exceedance or violation of any applicable air quality standard. Therefore, impacts to air quality would be minor and would not result in significant impacts.</p>
Climate Change	No effects to climate change are anticipated.	<p>Clearing of approximately one-acre of trees would result in a minor loss of carbon sequestration capacity.</p> <p>The infrequent use of diesel engines would have <i>de minimis</i> impacts and not lead to exceedance or violation of any applicable air quality standard due to emissions. Therefore, the construction and maintenance-related activities would result in temporary and insignificant effects.</p> <p>Energy would be stored for long-term usage which would result in a beneficial effect on climate change.</p>
Water Resources	No effects to water resources quality or quantity are expected.	<p>Groundwater: Impacts to groundwater quality or quantity are anticipated to be insignificant.</p> <p>Floodplains: With the implementation of standard BMPs and mitigation measures, no significant impact on floodplains would occur.</p> <p>Wetlands: No wetlands occur within the proposed BESS and substation site. Wetlands within the proposed ADSS fiber upgrade corridor are anticipated to be avoided by the proposed project activities. There would be no significant direct, indirect, and cumulative impacts.</p> <p>Surface Water: Any impacts to streams in the project areas would be expected to be minor, temporary impacts with the proper implementation of standard BMPs.</p>

Resource Area	Impacts from Implementing the No Action Alternative	Impacts from Implementing the Action Alternative
Biological Resources	Local biological resources would not be affected.	<p>Vegetation: Minor direct and indirect adverse impacts associated with grading and conversion from natural grass-herbaceous vegetation to an industrial site. Temporary, minor adverse effects to vegetation are expected during the installation of the ADSS fiber line.</p> <p>Aquatic: With the implementation of BMPs, effects to aquatic life in the local surface waters are expected to be temporary and insignificant.</p> <p>Wildlife: Wildlife inhabiting onsite forest, early successional, and edge habitats within the proposed BESS and substation site would be displaced. Temporary displacement of wildlife during the installation of the ADSS fiber line is anticipated. Because there are sufficient adjacent local habitats, any effects to wildlife are expected to be insignificant.</p> <p>Rare, Endangered, and Threatened Species: With appropriate implementation of BMPs and procedures that are designed to avoid and minimize impacts to federally or state-listed species during site preparation, construction, and on-going maintenance activities, and adherence to guidelines in the programmatic biological assessment for bats (TVA 2017), the proposed TVA action is expected to have only minor effects on federally or state-listed species.</p>
Visual Resources	Aesthetic character of the area is expected to remain unchanged.	<p>During construction and maintenance activities, minor temporary impacts on visual resources would occur due to the alteration of the existing viewshed. The proposed BESS and substation would present a minor, long-term visual effect.</p> <p>Negligible impacts would occur as a result of the ADSS fiber line upgrade.</p>
Noise	No noise impacts from construction or operation would occur because the proposed project would not be constructed.	Minor temporary noise impacts would be experienced during construction. Negligible adverse impacts from noise associated with operations would occur.
Archaeological and Historic Resources	No adverse effects to archaeological or historic resources are anticipated.	No effects to archaeological or historic resources would occur with the BESS facility, and associated substation, or the fiber line installation.
Socioeconomics and Environmental Justice	No change in local demographics, socioeconomic conditions, community services, or environmental justice populations.	Minor beneficial socioeconomic impacts during construction and operation. No long-term impacts to community services are anticipated and there would be no disproportionate impacts to low-income or minority communities in the area.
Transportation	No changes to transportation would occur.	Minor, temporary adverse impacts during the construction phase are expected.

Resource Area	Impacts from Implementing the No Action Alternative	Impacts from Implementing the Action Alternative
Public Health and Safety	No change in public health and safety.	Minor, temporary adverse impacts during the construction phase are expected.
Solid and Hazardous Waste	No change in solid and hazardous waste.	With the implementation of BMPs and adhering to waste disposal requirements, no impacts associated with solid and/or hazardous waste are anticipated.

2.3 Summary of Mitigation Measures

TVA employs standard practices when constructing, operating, and maintaining transmission lines, structures, and the associated ROW and access roads. These can be found on TVA's transmission website (TVA 2021a). Some of the more specific routine measures which would be applied to avoid, minimize or reduce the potential for adverse environmental effects during the construction, operation, and maintenance of the proposed Vonore BESS, transmission lines ADSS fiber and upgrades, and access roads are as follows:

- TVA would utilize standard BMPs, as described in the BMP manual (TVA 2017), to minimize erosion during construction, operation, and maintenance activities.
- To minimize the introduction and spread of invasive species in the ROW, access roads and adjacent areas, TVA would follow standard operating procedures consistent with EO 13112 as amended by 13751 (Invasive Species) for revegetating with noninvasive plant species as defined in the BMP manual (TVA 2017).
- Ephemeral streams that could be affected by the proposed construction would be protected by implementing standard BMPs as identified in the BMP manual (TVA 2017).
- Perennial and intermittent streams would be protected by the implementation of standard stream protection (Category A) as defined in the BMP manual (TVA 2017).
- During vegetation clearing activities, marketable timber would be salvaged where feasible; otherwise, woody debris and other vegetation would be piled and burned, chipped, or taken off site. In some instances, vegetation may be windrowed along the edge of the project site to serve as sediment barriers. Implementation of *TVA ROW Clearing Specifications*, *Environmental Quality Protection Specifications for Transmission Line Construction*, *Transmission Construction Guidelines Near Streams*, and *Environmental Quality Protection Specifications for Transmission Substation or Communications Construction* (TVA 2021a), and the BMP manual (TVA 2017) provide further guidance for clearing and construction activities.
- During construction of access roads, culverts and other drainage devices, fences, and gates would be installed as necessary. Culverts installed in any perennial streams would be removed following construction. However, in ephemeral streams, the culverts would be left or removed, depending on the wishes of the landowner or

any permit conditions that might apply. If desired by the property owner, TVA would restore new temporary access roads to previous conditions.

- To minimize adverse impacts on natural and beneficial floodplain values, the following standard mitigation measures would be implemented:
 - BMPs would be used during construction activities
 - Construction would adhere to the TVA subclass review criteria for transmission line location in floodplains
 - Road construction or improvements would be done in such a manner that upstream flood elevations would not be increased by more than one foot
- Pesticide/herbicide use as part of construction or maintenance activities would comply with the TDEC General Permit for Application of Pesticides, which also requires a pesticide discharge management plan. In areas requiring chemical treatment, only U.S. Environmental Protection Agency (USEPA)-registered and TVA approved herbicides would be used in accordance with label directions designed in part to restrict applications near receiving waters and to prevent unacceptable aquatic impacts.

The following non-routine measures would be applied during the construction, operation, and maintenance of the proposed Vonore BESS, transmission lines, and access roads to reduce the potential for adverse environmental effects.

- Monroe County, Tennessee is currently under APHIS quarantine, as such, any soil, baled hay or straw, plants and sod with roots and soil attached, soil-moving equipment or other “Regulated Articles” as defined by USDA should be in compliance with APHIS Quarantine Regulations.
- Vegetative screening that would not impact security and operational requirements would be placed along the perimeter of the BESS and associated substation facility that is visible by the public to minimize visual effects.

2.4 TVA’s Preferred Alternative

TVA’s preferred alternative is Alternative B-the Action Alternative. This alternative would meet the purpose and need of the project.

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

The existing condition of environmental resources that could be affected by the proposed Action Alternative during construction, operation, or maintenance of the proposed Vonore BESS, the installation of ADSS fiber on existing transmission lines, and access roads is described in this chapter. The descriptions below of the potentially affected environment are based on field surveys conducted between March and October 2021, on published and unpublished reports, and on personal communications with resource experts. This information establishes the baseline conditions against which TVA decision makers and the public can compare the potential effects of implementing the alternatives under consideration.

The potential effects of adopting and implementing the No Action Alternative and Alternative B on the various resources were analyzed, and the findings are also documented in this chapter. Cumulative effects are discussed, as appropriate and necessary, in Section 3.12.

The analysis of potential effects to endangered and threatened species and their habitats included records of occurrence within a three-mile radius for terrestrial animals, a five-mile radius for plants, and within 10-digit hydrologic unit code¹ (HUC) watershed for aquatic animals. The analysis of potential effects to aquatic resources included the local watershed, but was focused on watercourses and wetlands within or immediately adjacent to the proposed Vonore BESS site, ROW and associated temporary access roads. The area of potential effect (APE) for architectural resources included all areas within a 0.5-mile radius from the proposed Vonore BESS site, the existing transmission line route, as well as any areas where the project would alter existing topography or vegetation in view of a historic resource. The APE with respect to archaeological resources included the proposed Vonore BESS site, the entire ROW width for the transmission line ADSS fiber installation and the associated temporary access roads.

3.1 Land Use

3.1.1 Affected Environment

The proposed BESS pilot study site is located in Monroe County and occupies approximately 37.6 acres. The project area is generally rolling topography with elevations ranging from 900 feet above sea level (ft asl) to 930 ft asl. Land use within and surrounding the project area consists of agricultural, residential, forested, undeveloped land, and the site is bounded on the east by State Highway 72. Specific project area landscape features consist of a fragmented forested habitat, a pond, ephemeral surface water drainage features, and early successional habitat (i.e. pasture and agricultural). Approximately 7.5 acres of forested habitat exist within the reviewed area, with approximately 1 acre of forested area within the BESS pilot study site footprint.

The associated ADSS fiber line installation project area is located in Blount County and is comprised of 0.4-mile of existing and maintained transmission line ROW. There are a variety of natural landscape features located along the ADSS fiber upgrade project area,

¹ The United States is divided and subdivided into hydrologic units by the U.S. Geological Survey. There are six levels of classification. A 10-digit HUC is the fifth (watershed) level of classification.

such as fragmented forest habitat, wetlands, streams, agricultural lands, and residential or otherwise disturbed areas.

3.1.2 Environmental Consequences

Under the proposed Action Alternative, site preparation would require 10 to 15 acres of the BESS and substation project area to be cleared and graded. Land use on the project site would change from undeveloped, agricultural land to industrial. The land use in the surrounding area is largely agricultural, undeveloped, and residential, which would not change. TVA would implement the commitments and appropriate BMPs identified in this EA during construction, operation, and maintenance activities thus minimizing and/or avoiding impacts on the natural and physical environment to the extent practicable. As such, the proposed Action Alternative would adversely affect the land use of a minimal amount of acreage; therefore, the effects are considered minor.

Land use within the ADSS fiber corridor would not change. Therefore, there would be no direct or indirect effects associated with the installation of the ADSS fiber line.

3.2 Geology, Soils, and Prime Farmland

3.2.1 Affected Environment

3.2.1.1 Geology

The proposed project area is located within the Valley and Ridge province of the Appalachian Mountain region. This province is characterized as a series of northeast-southwest trending synclines and anticlines composed of Early Paleozoic sedimentary rocks. The limestone and shale that make up much of the valley are most susceptible to erosion whereas, sandstone and conglomerates that form the ridges are more resistant (National Park Service [NPS] 2021). The geology of the proposed project area is siliceous dolomite and magnesian limestone of the Knox Group, including Newala Formation, Mascot Dolomite, Kingsport Formation, Longview Dolomite, Chepultepec Dolomite, and Copper Ridge (U.S. Geological Service [USGS] 2021). No caves were found within neither the Vonore proposed project area, nor the ADSS fiber corridor.

3.2.1.2 Soils and Prime Farmland

The 1981 Farmland Protection Policy Act (7 Code of Federal Regulations [CFR] Part 658) requires all federal agencies to evaluate impacts to prime and unique farmland prior to permanently converting to land use incompatible with agriculture. Prime farmland soils have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. These characteristics allow prime farmland soils to produce the highest yields with minimal expenditure of energy and economic resources. In general, prime farmlands have an adequate and dependable water supply, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks.

Prime farmland soils are permeable to water and air, not excessively erodible or saturated for extended periods, and are protected from frequent flooding.

All of the soil units within the proposed BESS and associated substation, as well as the ADSS fiber line installation project locations are typical of the soils found within rural Monroe and Blount Counties. Table 3-1 below identifies the soil types, acreage per type

within the project areas and counties, soils designated as prime farmland soils, and the respective acreage and percentage (USDA NRCS 2021).

Table 3-1. Soils within the Proposed Project Areas

Soil Name	Map Unit Symbol	Designated Prime Farmland Y/N	Approximate Acreage / (Percentage) in Review Area	Approximate Acreage / (Percentage) in County ¹
BESS and Associated Substation Project Area – Monroe County²				
Dewey silt loam, 6 -15% slopes	DeC	N	2.5 / (6.5%)	7,602.3 / (1.8%)
Dunmore silt loam, 2-5% slopes	DmB	Y	1.1 / (3%)	829.4 / (0.2%)
Dunmore silt loam, 5-12% slopes	DmC	N	4.7 / (12%)	6,161.3 / (1.5%)
Etowah silt loam, 6-12% slopes	EtC	N	3.5 / (9%)	1,946.5 / (0.5%)
Fullerton gravelly silt loam 5-12% slopes	FtC	N	9.2 / (24%)	7,011.0 / (1.7%)
Fullerton gravelly silt loam 15-25% slopes	FtD	N	16.3 / (43%)	8,432.8 / (2.0%)
Fullerton cherty silt loam 20-40% slopes	FtE	N	0.9 / (2.5%)	4,046.6 / (1.0%)
ADSS Fiber Line Installation Project Area – Blount County³				
Alcoa loam, eroded gently sloping phase	Aa	Y	0.4 / (6%)	318.4 / (0.1%)
Christian clay loam, severely eroded sloping phase	Ca	N	0.6 / (8%)	524.7 / (0.2%)
Hamblen loam	Ha	Y	1.3 / (17%)	1,165.1 / (0.4%)
Prader silt loam (Melvin)	Pc	N	3.2 / (42%)	1,569.9 / (0.6%)
Tellico loam, eroded moderately steep phase	To	N	2.0 / (27%)	1,708.3 / (0.6%)

Bold indicates soils designated as prime farmland

¹ Source: USDA NRCS 2021

² Total acres in Monroe Co – 471,949

³ Total acres in Blount Co – 268,547.3

As shown on Figure 3-1 and Table 3-1, the prime farmland soils documented within the proposed BESS and associated substation project areas consists of the Dunmore silt loam, 2-5% slopes (DmB). Of the 471,949 total acres in Monroe County, the DmB soil series comprises 829.4 acres (0.2%) of the soil makeup of the County. The project area contains 1.1 acres of DmB soil series, which equates to 0.001% of DmB within the county.

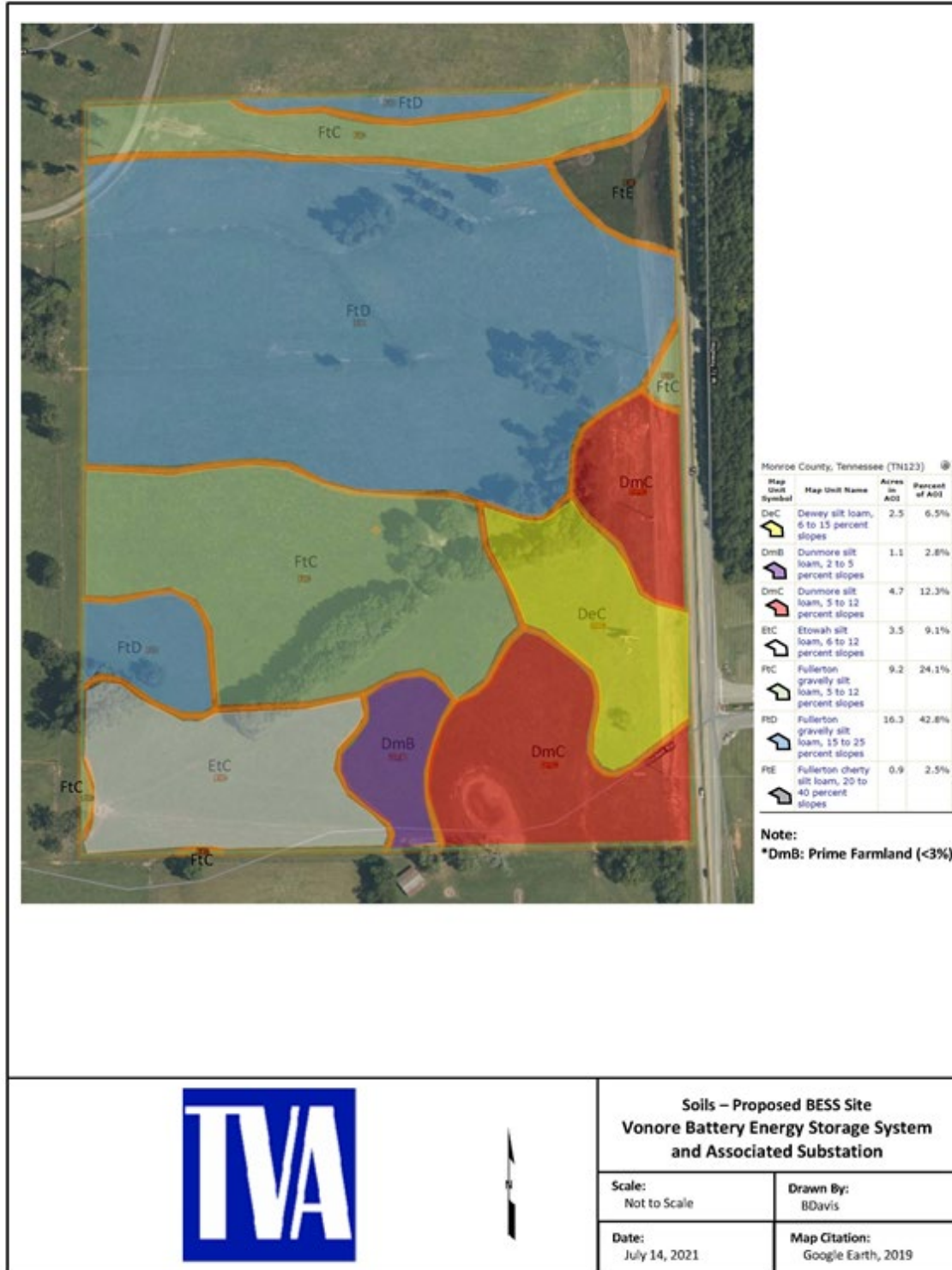


Figure 3-1. Soils Map for the Proposed Battery Energy Storage System and Associated Substation Project located in Monroe County, Tennessee

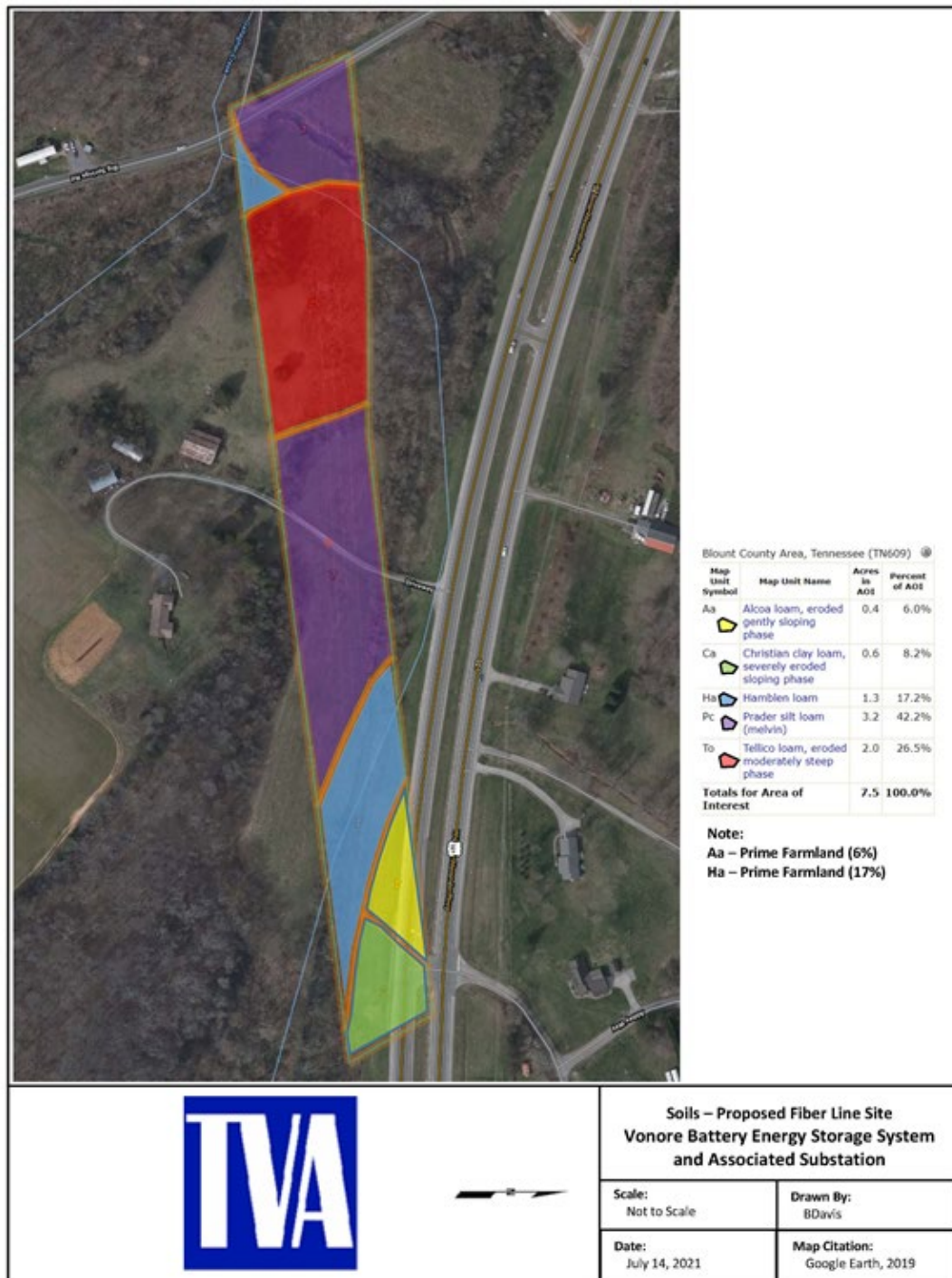


Figure 3-2. Soils Map for TVA's Existing Transmission Line Right-of-way for the Proposed ADSS Fiber Line Project located in Blount County, Tennessee

Alcoa loam, eroded gently sloping phase (Aa) and Hamblen loam (Ha) are designated as prime farmland soils within the proposed ADSS fiber line installation corridor (Figure 3-2 and Table 3-1). Of the 268,547.3 total acres in Blount County, the Aa and Ha soil series comprises 1,483.5 acres (0.5%) of the soil makeup of the County. The project area corridor contains 1.7 acres of Aa and Ha soil series, which equates to less than 0.006% within the county.

3.2.2 Environmental Consequences

Based on the USDA-NRCS soil mapping, there are approximately 1.1 acres of prime farmland soils within the BESS and associated substation project area limits of disturbance, and approximately 1.7 acres within the ADSS fiber line installation corridor, that have the potential to be permanently converted. TVA initiated coordination with the USDA-NRCS through submittal of the AD 1006 Farmland Conversion Impact Rating Forms. The USDA-NRCS uses a land evaluation and site assessment system to establish a farmland conversion impact rating score. This score is used as an indicator to determine if adverse impacts to farmland exceed the recommended allowable level. The higher the numerical score assigned, the more protection the farmland would receive. Project sites receiving a total score of less than 160 need not be given further consideration for protection and no additional sites need to be evaluated. The completed AD 1006 Form is provided in Attachment C. Under the proposed Action Alternative, minor adverse effects related to geology and soils would occur as a result of the onsite grading of the building pad, material borrow from across the proposed project area, trenching for the installation of underground cables, and the general overall construction of the proposed BESS and associated substation project area. The minor loss of prime farmland with the BESS and new substation footprint (less than one acre, with zero acres of statewide important or locally-important farmland) is negligible when compared to the amount of land designated as prime farmland within the surrounding region. Impacts to prime farmland would be adverse, but minor.

Negligible impacts to geology and soils would occur within the proposed ADSS fiber line installation corridor during the installation of the poles and the ADSS fiber lines. Although prime farmland soils were documented within the ADSS fiber line installation corridor, these areas would not be considered as prime farmland due to their location within a maintained TVA transmission ROW.

3.3 Air Quality

3.3.1 Affected Environment

Federal and state statutes, regulations and guidance protect ambient air quality. With authority granted by the CAA 42 U.S.C. 7401 et seq. as amended in 1977 and 1990, the USEPA established National Ambient Air Quality Standards (NAAQS) to protect human health and public welfare. The USEPA codified NAAQS in 40 CFR 50 for the following “criteria pollutants:” nitrogen dioxide (NO₂), carbon monoxide (CO), ozone, sulfur dioxide (SO₂), lead, particulate matter (PM) with an aerodynamic diameter equal to or less than 10 microns (PM₁₀), and PM with an aerodynamic diameter equal to or less than 2.5 microns (PM_{2.5}). The NAAQS reflect the relationship between pollutant concentrations and health and welfare effects. Primary standards protect human health, including the health of sensitive populations such as asthmatics, children, and the elderly. Secondary standards are designed to protect public welfare, including visibility, animals, crops, vegetation, and buildings. These standards reflect the latest scientific knowledge and have an adequate margin of safety intended to address uncertainties and provide a reasonable degree of

protection. The air quality in Blount and Monroe Counties meet the ambient air quality standards and is in attainment with respect to the criteria pollutants (USEPA 2021).

Other pollutants, such as hazardous air pollutants (HAPs) and greenhouse gases (GHGs) are also a consideration in air quality impacts analyses. Section 112(b) of the CAA lists HAPs, also known as toxic air pollutants or air toxics, because they present a threat of adverse human health effects or adverse environmental effects. Although there are no applicable ambient air quality standards for HAPs, their emissions are limited through permit thresholds and technology standards as required by the CAA.

3.3.2 Environmental Consequences

Air quality impacts associated with activities under the proposed Action Alternative include emissions from fossil fuel-fired equipment, fugitive dust from ground disturbances, and emissions from the burning of wood debris. Fossil fuel-fired equipment are a source of combustion emissions, including nitrogen oxides (NO_x), CO, volatile organic compounds (VOCs), SO₂, PM₁₀, PM_{2.5}, GHGs, and small amounts of HAPs. Gasoline and diesel engines used as a result of the Action Alternative would comply with the USEPA mobile source regulations in 40 CFR Part 85 for on-road engines and 40 CFR Part 89 for non-road engines. These regulations are designed to minimize emissions and require a maximum sulfur content in diesel fuel of 15 parts per million (ppm).

Fugitive dust is a source of respirable airborne PM, including PM₁₀ and PM_{2.5}, which could result from ground disturbances such as land clearing, grading, excavation, and travel on unpaved roads. The amount of dust generated is a function of the activity, silt and moisture content of the soil, wind speed, frequency of precipitation, vehicle traffic, vehicle types, and roadway characteristics. TVA and its contractors would comply with TDEC Air Pollution Control Rule 1200-3-8, which requires reasonable precautions to prevent PM from becoming airborne. Such reasonable precautions include, but are not limited to, grading of roads; clearing of land; and the use of water or chemicals for control of dust in construction operations on dirt roads and stockpiles as needed.

Many variables affect emissions from ground-level open burning emissions, including wind, ambient temperature, composition and moisture content of the debris burned, and compactness of the pile. In general, the relatively low temperatures associated with open burning increase emissions of NO_x, CO, VOCs, PM₁₀, PM_{2.5}, GHGs, and HAPs. TVA and its contractors would be subject to local burn permits and the requirements in TDEC Air Pollution Control Rule 1200-3-4, which provides open burning prohibitions, exceptions, and certification requirements.

With the use of BMPs and other required measures described above to reduce emissions associated with the Action Alternative, air quality impacts would be minimal, temporary, and localized; and would not be anticipated to result in any violation of applicable ambient air quality standards or impact regional air quality.

3.4 Climate Change

3.4.1 Affected Environment

The term “climate change” refers to any substantive change in the measures of climate such as, temperature, precipitation, or wind lasting an extended period (decades or longer) (USEPA 2016). The amount of warming projected by numerous studies is directly linked to the cumulative global emissions of GHGs. GHGs are gases that trap heat in the

atmosphere. They are non-toxic and non-hazardous at normal ambient concentrations. At this time, there are no applicable ambient air quality standards or emission limits for GHGs under the CAA. GHGs occur in the atmosphere both naturally and resulting from human activities, such as the burning of fossil fuels. GHG emissions due to human activity are the main cause of increased atmospheric concentration of GHGs since the industrial age and are the primary contributor to climate change. The principal GHGs are carbon dioxide (CO₂), methane, and nitrous oxide.

On January 20, 2021, President Biden issued Executive Order (EO) 13990 on Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis and on January 27, 2021, the EO 14008 on Tackling the Climate Crisis at Home and Abroad. Amongst other objectives, the EOs set an aspirational target to achieve a net-zero emission economy by 2050 and a carbon-free electricity sector by 2035. Although there have been a series of administrative changes, no clear GHG emission reduction requirements have been established at the federal level for TVA. However, during the May 6, 2021 TVA Board meeting, the “TVA Strategic Intent and Guiding Principles,” plan was adopted which focuses on energy supply and decarbonization initiatives (TVA 2021b). This document reiterates TVA’s carbon reduction results to date of a 63% reduction in mass emissions from 2005 to 2020. Additionally, it explains how TVA is executing a plan to 70% carbon reduction by 2030, has a path to approximately 80% carbon reduction by 2035, and aspires to achieve net-zero carbon emissions by 2050. Additional details can be found in TVA’s Strategic Intent and Guiding Principles document (TVA 2021b), Leadership and Innovation on the Path to Net-Zero (TVA 2021c), and the FY20 Sustainability Report (TVA 2021d)

3.4.2 Environmental Consequences

Concerning climate change, trees, like other green plants, are carbon sinks (natural or artificial reservoirs that accumulate and store carbon-containing compounds indefinitely) that use photosynthesis to convert CO₂ into sugar, cellulose, and other carbon-containing carbohydrates that they use for food and growth. Carbon sequestration is the process by which carbon sinks remove CO₂ from the atmosphere. Although forests do release some CO₂ from natural processes such as decay and respiration, a healthy forest typically stores carbon at a greater rate than it releases carbon. The proposed BESS and associated substation and the ADSS fiber line installation proposed project areas contain very little non-fragmented forested areas. The clearing of approximately one-acre of trees for the proposed Action Alternative would result in a minor loss of carbon sequestration capacity in the area since evergreen and deciduous forest habitat is common and well represented throughout the region and in the immediate vicinity of the proposed project area.

The infrequent use of diesel engines would have *de minimis* impacts and not lead to exceedance or violation of any applicable air quality standard due to emissions. Therefore, the construction and maintenance-related activities associated with the proposed Action Alternative would not result in significant impacts to climate change, as the effects would be temporary and insignificant.

Under the proposed Action Alternative, energy would be stored for long-term usage which would result in a beneficial effect on climate change. Additionally, the proposed Action Alternative would be in line with, and assist with the objectives set forth in the federal administrative changes and the goals set forth by TVA for carbon reduction.

3.5 Water Resources

3.5.1 Affected Environment

3.5.1.1 Groundwater

In the eastern part of Tennessee, the principal aquifers in the Valley and Ridge Province consist of carbonate rocks that are primarily Cambrian and Ordovician in age, with minor Silurian, Devonian, and Mississippian rocks also present (USGS 1995). Locally this system is referred to as the East Tennessee aquifer system and consists of soluble carbonate rocks and some easily eroded shales underlay the valleys while more erosion-resistant siltstone, sandstone, and some cherty dolomite underlie ridges (USGS 1986). Water quality in the carbonate aquifers of the Valley and Ridge Province is characterized as hard, with dissolved solids concentrations of 170 milligrams per liter or less. Due to the complex network of fractures, bedding planes, and solution openings in the carbonate rocks in areas with thin residuum overlying the substrate, water recharges rapidly and, water quality in these aquifers is susceptible to contamination by human activities (USGS 1995). Recharge occurs primarily along the flanks of the ridges and groundwater flow is generally from the ridges (higher groundwater levels) toward major streams and center of the valleys where groundwater levels are lower (USGS 1995).

3.5.1.2 Floodplains

A floodplain is the relatively level land area along a stream or river that is subject to periodic flooding. The area subject to a one-percent chance of flooding in any given year is normally called the 100-year floodplain. The area subject to a 0.2-percent chance of flooding in any given year is normally called the 500-year floodplain. It is necessary to evaluate development in the floodplain to ensure that the project is consistent with the requirements of EO 11988, Floodplain Management.

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.

3.5.1.3 Wetlands

Wetlands are those areas inundated or saturated by surface or groundwater such that vegetation adapted to saturated soil conditions are prevalent. Examples include bottomland forests, swamps, wet meadows, isolated depressions, and fringe wetland along the edges of watercourses and impoundments. Wetlands provide many societal benefits including toxin absorption and sediment retention for improved downstream water quality, storm water attenuation for flood control, shoreline buffering for erosion protection, and provision of fish and wildlife habitat for commercial, recreational, and conservation purposes. Therefore, a wetland assessment was performed to ascertain wetland presence, condition, and extent to which wetland functions may be provided on site.

Wetland delineations were performed according to the USACE standards, which require documentation of hydrophytic (wet-site) vegetation, hydric soil, and wetland hydrology

(Environmental Laboratory 1987; Lichvar et al. 2016; USACE 2012). Using the Tennessee Rapid Assessment Method (TRAM) wetlands were evaluated by their functions and classified into three categories: low, moderate quality, or exceptional resource value (TDEC 2015). Low quality wetlands are degraded aquatic resources which may exhibit low species diversity, minimal hydrologic input and connectivity, recent or on-going disturbance regimes, and/or predominance of non-native species. These wetlands provide low functionality and are considered of low value. Moderate quality wetlands provide functions at a greater value due to a lesser degree of degradation and/or due to their habitat, landscape position, or hydrologic input. Moderate quality wetlands are considered healthy water resources of value. Disturbance to hydrology, substrate and/or vegetation may be present to a degree at which valuable functional capacity is sustained and there is reasonable potential for restoration. Exceptional resource value wetlands offer high functions and values within a watershed or are of regional/statewide concern. These wetlands may exhibit little to no recent disturbance, provide substantial large scale stormwater storage, sediment retention, and toxin absorption, contain mature vegetation communities, or offer habitat to rare species. Conditions in superior quality wetlands often represent restoration goals for wetlands functioning at a lower capacity.

Field surveys were conducted in June 2021 within the proposed BESS and associated substation proposed project area and the existing transmission right-of-way area proposed for ADSS fiber cable installation. No wetlands were identified on the BESS and associated substation proposed project area (Figure 3-3).

The proposed ADSS fiber installation corridor, within the existing ROW, spans two wetland areas associated with unnamed tributaries to Gallagher Creek and Gallagher Creek itself (Figure 3-4 and Table 3-2).

Table 3-2. Wetlands within the Proposed Project Areas in Monroe and Blount Counties, Tennessee

Wetland Identifier	Type¹	TRAM² Category (score)	Wetland Acreage in Review Area Footprint
W001	PEM/PSS1E	Moderate (48)	0.06
W002	PEM/PSS1E	Low (38)	0.21
Total Acres			0.27

¹Classification codes as defined in Cowardin et al. (1979): PEM1=palustrine, emergent; PSS1E=persistent vegetation; E = seasonally flooded/saturated.

² TRAM = TVA Rapid Assessment Method



Figure 3-3. Wetlands and Surface Waters Map for the Proposed Battery Energy Storage System and Associated Substation located in Monroe County, Tennessee

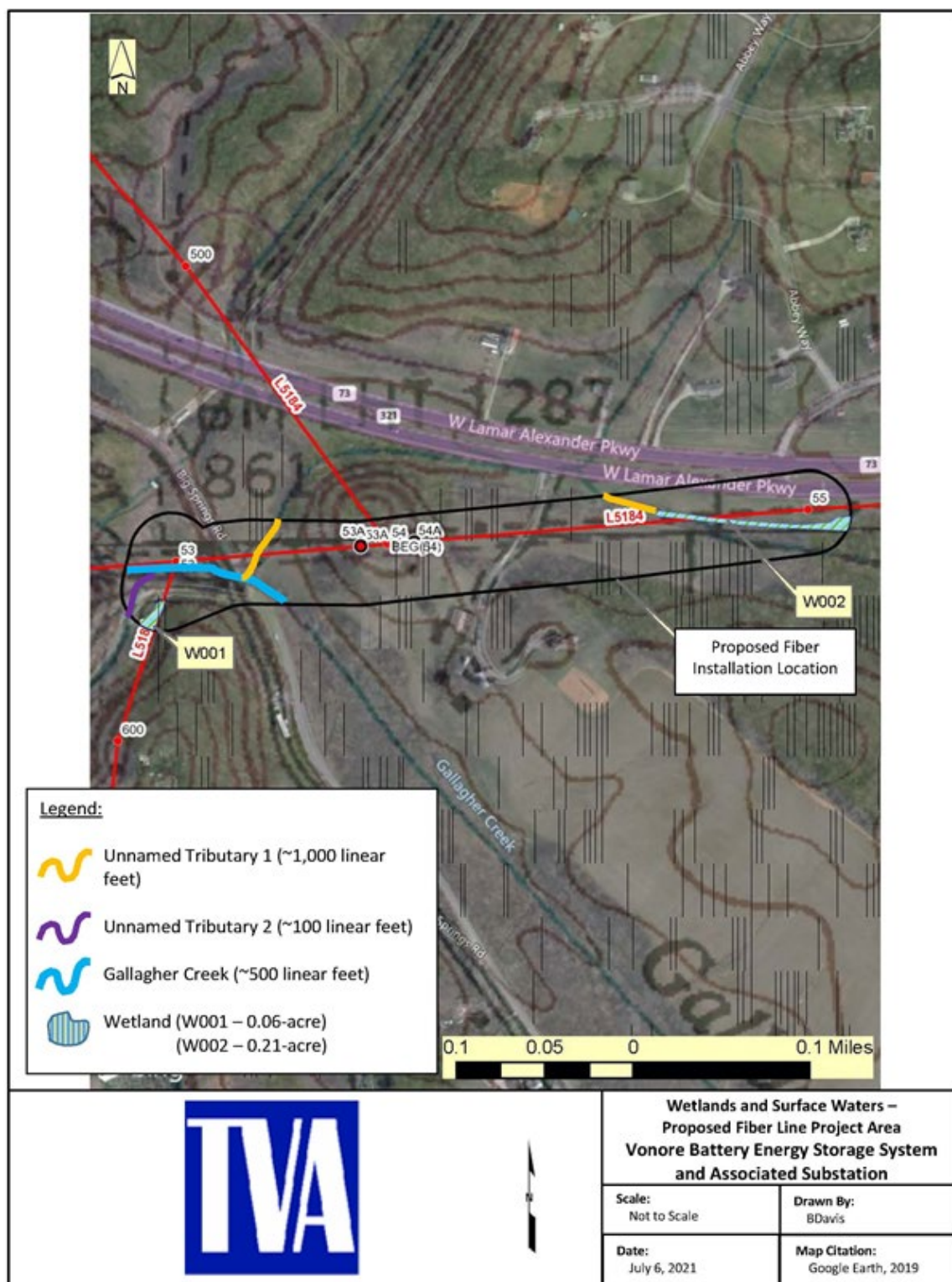


Figure 3-4. Wetlands and Surface Waters Map for the Proposed ADSS fiber Line Located in Blount County, Tennessee

W001 comprises 0.06 within the review area proposed for overhead ADSS fiber cable installation on existing right-of-way (Figure 3-4). This wetland feature consists of a wetland swale receiving hydrology from an upstream wetland floodplain area, connected upstream to an unnamed tributary of Gallagher Creek, and maintaining connectivity with the downstream channel as it approaches Gallagher Creek. The tributary channel associated with W001 is separated from Gallagher Creek by a culverted gravel road. W001 exhibited inundated and saturated soils, providing adequate wetland hydrology. Soils were grey and mottled near the surface, indicating hydric conditions. Dominant vegetation consisted of a diversity of wetland species, including soft pathrush (*Juncus effusus*), fox sedge (*Carex vulpinoidea*), green bulrush (*Scirpus atrovirens*), Frank's sedge (*Carex frankii*), cattails (*Typha latifolia*), tag alder (*Alnus serrulata*), and elderberry (*Sambucus nigra*). This wetland scored as moderate quality using TRAM due to its hydrologic influence and relative lack of disturbance.

W002 comprises 0.21 within the review area proposed for overhead ADSS fiber cable installation on existing right-of-way (Figure 3-4). Similar to W001, this wetland feature consists of a wetland swale receiving hydrology due to its floodplain location, connected upstream to an unnamed tributary of Gallagher Creek, but separated downstream by the tributary's banks. W002 exhibited drift deposits and drainage patterns, adequate for wetland hydrology. Soils were grey and mottled near the surface, indicating hydric conditions. Dominant vegetation consisted of soft pathrush, giant ragweed (*Ambrosia trifida*), tag alder, and elderberry, all of which are wetland species. This wetland scored as low quality using TRAM due to its small size and minor hydrologic influence within the surrounding landscape.

3.5.1.4 Surface Water

The BESS pilot study proposed project area is located within the Bat Creek watershed (Hydrologic Unit Code [HUC] 12-060102040503). Bat Creek, an intermittent stream, is located to the west of the proposed project area, and flows to the north into Tellico Lake. Both Tellico Lake and Bat Creek are located outside of the proposed project area. Roughly 935 linear feet (lf) of an ephemeral channel traverses the northern portion of the proposed project area, and an approximate 0.1-acre stock pond is located within the southern portion of the proposed project area (Figure 3-3).

The ADSS fiber line installation corridor is located within the Gallagher Creek watershed (HUC 12 – 060102010209). Approximately 500 lf of Gallagher Creek, a perennial stream, traverses the eastern portion of the corridor. Two unnamed tributaries to Gallagher Creek are also present within the proposed project corridor, and are identified as Unnamed Tributary 1 and Unnamed Tributary 2 (Figure 3-4). Both tributaries are identified on the topographic maps as intermittent channels; however, they appear to be perennial in nature. Roughly 1,000 lf of Unnamed Tributary 1 and approximately 100 lf of Unnamed Tributary 2 are present within the proposed ADSS fiber line installation corridor.

The federal Clean Water Act (CWA) requires all states to identify all waters where required pollution controls are not sufficient to attain or maintain applicable water quality standards and to establish priorities for the development of limits based on the severity of the pollution and the sensitivity of the established uses of those waters. States are required to submit reports to the USEPA. The term "303(d) list" refers to the list of impaired and threatened streams and water bodies identified by the state. Tellico Lake, which is located about 0.15-mile northwest of the BESS proposed project area, is listed as impaired for polychlorinated biphenyl (PCB) due to contaminated sediments. Bat Creek, located

approximately 0.15-mile west of the BESS proposed project area, is also listed as impaired due to *Escherichia coli* (E. coli). The primary designation for Bat Creek is for recreation (TDEC 2014). Tellico Lake is also designated for domestic water supply, industrial water supply, and navigation.

Gallagher Creek and Unnamed Tributaries 1 and 2, within the ADSS fiber line corridor, are listed as having no impairment, and are not listed on the 303(d) list. However, these streams are listed as in need of assessment (TDEC 2014).

3.5.2 Environmental Consequences

3.5.2.1 Groundwater

Under the proposed Action Alternative, onsite grading of the building pad, the borrowing of material from across the proposed project area, trenching for the installation of underground cables, and the general overall construction of the proposed BESS and associated substation project would result in ground disturbance at moderate depths. However, ground disturbances are not anticipated to be at depths that would intersect public groundwater supplies (typically 50 to 250 feet beneath the land surface (USGS 2016) or result in significant impacts to groundwater resources. Shallow aquifers could sustain minor impacts from changes in overland water flow and recharge caused by clearing, grading and construction within the proposed project area. Water infiltration, which is normally enhanced by vegetation, would be reduced until vegetation is re-established. In addition, near-surface soil compaction caused by heavy construction vehicles could reduce the ability of soil to absorb water. These minor impacts would be temporary and would not significantly affect groundwater resources. Furthermore, it is expected that TVA or its contractors would conduct operations involving chemical or fuel storage or resupply and equipment and vehicle servicing with care to avoid leakage, spillage, and subsequent groundwater contamination.

Negligible impacts to groundwater would occur within the proposed ADSS fiber line installation corridor during the installation of the poles and the ADSS fiber lines.

3.5.2.2 Floodplains

Under the proposed Action Alternative, based on a review of the Monroe County, Tennessee, Flood Insurance Rate Map Panel (FIRM) number 47123C0160D, effective February 3, 2010, and the topographic maps, the proposed BESS and associated substation proposed project area would be located outside both identified and unmapped 100-year floodplains. Therefore, the proposed Action Alternative would be consistent with EO 11988.

Based on the review of the Blount County, Tennessee, FIRM numbers 47009C0115C and 47009C0250C, both effective September 19, 2007, and topographic maps, the proposed ADSS fiber line would be installed on new poles between structures 53 and 55 on transmission line 5184, and would be located within the 100-year floodplain of Gallagher Creek. Consistent with EO 11988, utility poles are considered to be repetitive actions in the 100-year floodplain that should result in minor impacts (TVA 1981). To minimize adverse impacts, construction would adhere to the subclass review criteria for transmission line location in floodplains.

With implementation of standard BMPs during construction activities to minimize adverse impacts, and adherence to the subclass review criteria for transmission line location in

floodplains, the proposed Action Alternative would have no significant impact on floodplains and their natural and beneficial values.

3.5.2.3 Wetlands

Activities in wetlands are regulated by state and federal agencies to ensure no more than minimal impacts to the aquatic environment and no net loss of wetland resources. Under CWA §404, activities resulting in the discharge of dredge or fill material in jurisdictional wetlands, and any secondary wetland impacts, such as forested wetland clearing, must be authorized by the USACE through a Nationwide, Regional, or Individual Permit. CWA §401 mandates state water quality certification for projects requiring USACE approval and permitting. In Tennessee, an aquatic resource alteration permit (ARAP) authorized by the Tennessee Department of Conservation and Environment (TDEC) provides water quality certification under CWA §401. An ARAP is required for any alteration to the physical, chemical, or biological properties of any waters of the state, including wetland, pursuant to the Tennessee Water Quality Control Act (§69-3-108, 0400-40-07) and in alignment with Tennessee's anti-degradation policy (§69-3-108, 0400-40-04). Compliance with USACE and TDEC permitting is required for regulated activities within jurisdictional wetlands, which could include mitigation based on their review of TVA's proposed impacts. Lastly, EO 11990 requires federal agencies such as TVA to minimize wetland destruction, loss, or degradation, and preserve and enhance natural and beneficial wetland values, while carrying out agency responsibilities. Under the Action Alternative, the two wetlands located within the existing transmission line ROW where the ADSS fiber cable would be installed would be avoided. BMPs, including erosion control measures, would be installed to ensure sedimentation or other indirect wetland impacts do not affect these wetland features or other wetland features downstream of the construction sites. Therefore, with wetland avoidance and BMPs in place, no significant wetland impacts are anticipated to result from the proposed project activities.

3.5.2.4 Surface Water

Implementation of the proposed Action Alternative would result in construction activities that have the potential to temporarily affect surface water via stormwater runoff. Soil erosion and sedimentation can clog small streams and threaten aquatic life. Appropriate BMPs would be installed, and all proposed project activities would be conducted in a manner to ensure that 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 for the proposed BESS project site since more than one acre would be disturbed. This permit requires the development and implementation of a SWPPP which would identify specific BMPs to address construction-related activities that would be adopted to minimize stormwater impacts.

Impervious surfaces prevent rain from percolating through the soil and result in additional runoff of water and pollutants into storm drains, ditches, and streams. The proposed Action Alternative would increase impervious flows in the BESS and associated substation proposed project area. All flows would need to be properly treated with either implementation of the proper BMPs or to engineer a discharge drainage system that could handle any increased flows prior to discharge into the outfall(s).

No direct impacts to surface waters are anticipated. Any indirect impacts to surface waters within the proposed BESS and associated substation site and the ADSS fiber installation corridor would be expected to be minor, temporary impacts, with the proper implementation of standard BMPs.

3.6 Biological Resources

3.6.1 Affected Environment

3.6.1.1 Vegetation

Field surveys of the proposed BESS pilot study and the ADSS fiber line installation corridor proposed project areas were conducted in Spring and Summer 2021 and focused on documenting plant communities. Approximately 80 percent of the vegetation within the proposed project area, the BESS pilot study site, has been heavily disturbed by previous pastureland use. Within these areas, vegetation has been fundamentally altered such that site is dominated by non-native species and plants indicative of early successional habitat. These areas possess little conservation value and do not support natural plant communities. About 20 percent of the proposed project area currently supports deciduous forest. These small, fragmented forest blocks do support a greater percentage of native species than the adjacent fields, but plant community found there is common and well represented throughout the region.

3.6.1.2 Aquatic Ecology

As described in Section 3.4 above, surface waters within the BESS pilot study proposed project area include an ephemeral channel and a stock pond (Figure 3-3). Gallagher Creek and two unnamed tributaries are located within the ADSS fiber line installation corridor (Figure 3-4). No other surface waters are present within either of the Proposed project areas. Substrate of the streams could not be observed due to high flow and turbid water at the time of survey.

3.6.1.3 Terrestrial Wildlife

Habitat assessments for terrestrial animal species were conducted in the field in April and June 2021 for the proposed BESS pilot study project area. Landscape features within and surrounding the proposed project area consist of a variety of fragmented forested habitat, wetlands, stream crossings, ponds, early successional habitat (i.e., pasture and agricultural), and residential or otherwise disturbed areas. Approximately 1.5 acres of forested habitat exist within the review area. Approximately one acre of forested habitat within the project footprint is suitable for use by summer roosting bats and would be cleared for the proposed BESS pilot study project. Each of the varying community types offers suitable habitat for species common to the region, both seasonally and year-round.

Deciduous and mixed deciduous-evergreen forests occupy the forest habitat within the project footprint. Deciduous and mixed evergreen-deciduous forests within the project area contain a mixture of canopy species that includes: Virginia pine (*Pinus virginiana*), black locust (*Robinia pseudoacacia*), black cherry (*Prunus serotina*), hackberry (*Celtis occidentalis*), shagbark hickory (*Carya ovata*), sycamore (*Platanus occidentalis*), and white oak (*Quercus alba*). Eastern red-cedar (*Juniperus virginiana*) were common in the midstory throughout the project footprint. Deciduous and mixed forest types provide habitat for an array of terrestrial animal species. Birds typical of this habitat include Acadian flycatcher (*Empidonax virens*), downy woodpecker (*Picoides pubescens*), hairy woodpecker (*Picoides villosus*), eastern screech-owl (*Megascops asio*), tufted titmouse (*Baeolophus bicolor*), eastern wood-pewee (*Contopus virens*), indigo bunting (*Passerina cyanea*), white-breasted nuthatch (*Sitta carolinensis*), red-bellied woodpecker (*Melanerpes carolinus*), red-tailed hawk (*Buteo jamaicensis*), summer tanager (*Piranga rubra*), wood thrush (*Hylocichla mustelina*), blue jay (*Cyanocitta cristata*), chestnut-sided warbler (*Dendroica pensylvanica*), wild turkey (*Meleagris gallopavo*), and yellow-billed cuckoo (*Coccyzus americanus*)

(National Geographic 2002, Nicholson 1997). This area also provides foraging and roosting habitat for several species of bat, particularly in areas where the forest understory is partially open. Bat species likely found within this habitat include big brown bat (*Eptesicus fuscus*), silver-haired bat (*Lasionycteris noctivagans*), and tricolored bat (*Pipistrellus subflavus*). Eastern chipmunk (*Tamias striatus*), eastern woodrat (*Neotoma floridana*), gray fox (*Urocyon cinereoargenteus*), and woodland vole (*Microtus pinetorum*) are other mammals likely to occur within this habitat (Kays and Wilson 2002, Whitaker 1996). Eastern box turtle (*Terrapene carolina carolina*), five-lined skink (*Eumeces fasciatus*), broad-headed skink (*Eumeces laticeps*), smooth earth snake (*Virginia valeriae*), and timber rattlesnake (*Crotalus horridus*) are common reptiles of eastern deciduous forests (Conant and Collins 1998, Dorcas and Gibbons 2005, Scott and Redmond 2008). In forests with aquatic features, amphibians likely found in the area include northern slimy salamanders (*Plethodon glutinosus*), spotted salamanders (*Ambystoma maculatum*), Fowler's toad (*Bufo fowleri*), Cope's gray treefrog (*Hyla chrysoscelis*), and southern leopard frog (*Lithobates sphenoccephalus*) (Bailey et al. 2006, Petranks 1998).

Pastures and agricultural fields comprise approximately 80% percent of the project footprint. Common inhabitants of this type of habitat include killdeer (*Charadrius vociferus*), brown-headed cowbird (*Molothrus ater*), brown thrasher (*Toxostoma rufum*), American kestrel (*Falco sparverius*), common yellowthroat (*Geothlypis trichas*), eastern bluebird (*Sialia sialis*), white-eyed vireo (*Vireo griseus*), eastern kingbird (*Tyrannus tyrannus*), eastern meadowlark (*Sturnella magna*), field sparrow (*Spizella pusilla*), and grasshopper sparrow (*Ammodramus savannarum*) (National Geographic 2002, Nicholson 1997). Bobcat (*Lynx rufus*), coyote (*Canis latrans*), eastern cottontail (*Sylvilagus floridanus*), hispid cotton rat (*Sigmodon hispidus*), and red fox (*Vulpes vulpes*) are mammals typical of fields and cultivated land (Kays and Wilson 2002, Whitaker 1996). Amphibians such as eastern narrow-mouthed toad (*Gastrophryne carolinensis*) and reptiles including North American racer (*Coluber constrictor*), ring-necked snake (*Diadophis punctatus*), and eastern black kingsnake (*Lampropeltis getula*) are also known to occur in this habitat type (Bailey et al. 2006, Conant and Collins 1998, Dorcas and Gibbons 2005, Scott and Redmond 2008).

Developed areas and areas otherwise previously disturbed by human activity are home to a large number of common species. American robin (*Turdus migratorius*), American crow (*Corvus brachyrhynchos*), Carolina chickadee (*Poecile carolinensis*), European starling (*Sturnus vulgaris*), house finch (*Carpodacus mexicanus*), house sparrow (*Passer domesticus*), mourning dove (*Zenaida macroura*), Carolina wren (*Thryothorus ludovicianus*), northern cardinal (*Cardinalis cardinalis*), northern mockingbird (*Mimus polyglottos*), black vulture (*Coragyps atratus*), and turkey vulture (*Cathartes aura*) are birds commonly found along ROWs, road edges, and residential neighborhoods (National Geographic 2002, Nicholson 1997). Mammals found in this community type include eastern gray squirrel (*Sciurus carolinensis*), striped skunk (*Mephitis mephitis*), and raccoon (*Procyon lotor*) (Kays and Wilson 2002, Whitaker 1996). Road-side ditches provide potential habitat for amphibians including American toad (*Anaxyrus americanus*), and upland chorus frog (*Pseudacris feriarum*) (Bailey et al. 2006). Reptiles potentially present include red-bellied snake (*Storeria occipitomaculata*), gray rat snake (*Pantherophis spiloides*), and smooth earth snake (Conant and Collins 1998, Dorcas and Gibbons 2005, Scott and Redmond 2008).

Review of the TVA Regional Natural Heritage database was performed in July 2021 and indicated eight recorded caves within three miles of the project area. The nearest known cave is approximately 0.9 miles away and would not be impacted. No caves were identified

during field review in April or June 2021. No other unique or important terrestrial habitats were identified within the project area. Three bald eagle (*Haliaeetus leucocephalus*) nests and one colonial wading bird colony have been documented within three miles of the project area. None of these are within 660 ft of the project footprint and none were observed during field surveys.

3.6.1.4 Threatened and Endangered Species (T&E) and their Critical Habitats

The Endangered Species Act (ESA) requires federal agencies to conserve endangered and threatened species and to determine the effects of proposed actions on endangered and threatened species and Designated Critical Habitat. Endangered species are those determined to be in danger of extinction through all or a significant portion of their range. Threatened species are those determined likely to become endangered within the foreseeable future. Section 7 of the ESA requires federal agencies to consult with the USFWS when proposed actions may affect endangered or threatened species or Designated Critical Habitat.

3.6.1.4.1 T&E Plant Species

Review of the TVA Regional Natural Heritage database indicated that one state-listed plant species, spreading false-foxglove (*Aureolaria patula*) (special concern in Tennessee) and no federally listed plant species have been previously reported from within a five-mile vicinity of the proposed project area. No federally listed plants have been previously reported from Blount or Monroe counties, where the projects would be located. A desktop review of the proposed project areas indicated that no habitat for federally or state-listed plant species occurs in the areas where work would occur. No designated critical habitat for plants occurs in the proposed project areas.

3.6.1.4.2 T&E Aquatic Animal Species

The TVA Regional Natural Heritage Project database and the USFWS Information for Planning and Consultation (IPaC) database indicated that one federally listed endangered and three state-listed aquatic animals are currently known from within the 10-digit HUC watershed encompassing the proposed project areas (Table 3-3).

Table 3-3. Federally and State-Listed Aquatic Animal Species in the Vicinity of the Vonore Battery Energy Storage System Proposed project area ¹

Common Name	Scientific Name	Element Rank ²	Federal Status ³	State Status (rank ⁴)
Fish				
Blue Sucker	<i>Cycleptus elongatus</i>	H?		T (S2)
Flame Chub	<i>Hemitremia flammea</i>	Ex		D (S3)
Lake Sturgeon	<i>Acipenser fulvescens</i>	Ex		E (S1)
Mussels				
Dromedary Pearlymussel ⁵	<i>Dromus dromas</i>		E	E (S1)
Finerayed Pigtoe ⁵	<i>Fusconaia cuneolus</i>		E	E (S1)
Orangefoot Pimpleback	<i>Plethobasus copperianus</i>	H	E	E (S1)
Snails				
Anthony's Riversnail ⁵	<i>Athearnia anthonyi</i>			(S1)
Ornate Rocksnail	<i>Lithasia geniculata</i>	H		(S2)
Spiny Riversnail	<i>Io fluvialis</i>	H		(S2)

¹ Source: TVA Regional Natural Heritage database, queried 7/13/2021

² Heritage Element Occurrence Rank; Ex = extant record ≤25 years old; H=historical record ≥ 25 years old; H?=possibly historical

³ Status Codes: E = Listed Endangered; T = Listed Threatened; D = Deemed In Need of Management

⁴ State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable

⁵ Source: USFWS IPaC database, queried 7/13/2021

The blue sucker is currently state-listed as threatened in Tennessee. This species occurs in larger rivers of the Gulf Coastal drainages from the Mobile Basin to the Rio Grande. It is found in larger streams of the Yazoo, Big Black, and the lower Mississippi South drainages in the Mississippi River Basin (Ross et al. 2001). The blue sucker inhabits deep pools of large, free-flowing rivers with swift currents of up to 8.5 feet per second.

The flame chub is an inhabitant of springs/spring runs. Spawning occurs from late January through May. Populations have declined with the continued alteration of spring habitats (Etnier and Starnes 1993).

Lake sturgeon primary habitat is the bottoms of large, clean, freshwater rivers and lakes. Preferred substrates include firm sand, gravel, or rock. Lake sturgeons are found most often at depths of 16 to 32 feet, but larger fish occasionally have been taken at depths of up to 141 feet. In rivers, preferred habitat is deep mid-river areas and pools, where water depths vary between four and nine meters and food is abundant; gradients are generally less than one foot per mile.

The dromedary pearlymussel is known to occur in shoals and riffles. It is believed to be bradyctictic with no identified fish host (Parmalee and Bogan 1998).

The fine-rayed pigtoe occurs in the Tennessee River drainage from Clinch and Powell River in southwestern Virginia to Muscle Shoals, Alabama. Large adults can reach 0.5 feet in length. It usually inhabits ford and shoal areas of rivers with moderate gradient. The fine-rayed pigtoe is tachyctictic with several fish being shown under laboratory conditions to act as the glochidia host (Parmalee and Bogan 1998).

The orangefoot pimpleback is a mussel that may be found primarily in medium to large rivers. Individuals have been found at depths of 12 to 18 feet in sand and coarse gravel

substrate. It is considered to be tachytictic but the host fish for glochidia is currently unknown (Parmalee and Bogan 1998).

The Anthony's Riversnail prefers habitat in large rivers in cobble/boulder substrates (NatureServe 2021). This snail is only found in three separate populations in the Tennessee River, Sequatchie River, and Limestone Creek in Tennessee (USFWS 2011).

Ornate Rocksnail has been eliminated from much of its original range by pollution and construction of dams and reservoirs. This snail prefers sandy gravel, cannot adapt as well to dam tailwater situations.

The spiny riversnail inhabits shallow waters of shoals with a rapid to moderate current (NatureServe 2021). This species is the only species in the genus *Lo* and is endemic to the U.S.

3.6.1.4.3 T&E Terrestrial Animal Species

A review of the TVA Regional Natural Heritage database in July 2021 resulted in one state-listed species (hellbender (*Cryptobranchus alleganiensis*)) and one federally protected species (bald eagle (*Haliaeetus leucocephalus*)) within a three-mile radius of the proposed project area. Within Monroe and Blount counties, Tennessee, records exist for four federally listed species (rusty-patched bumble bee (*Bombus affinis*), Carolina northern flying squirrel (*Glaucomys sabrinus coloratus*), Indiana bat (*Myotis sodalis*), and northern long-eared bat (*Myotis septentrionalis*)). Though no known records exist, the USFWS has determined that the federally listed gray bat has the potential to occur in the proposed project area (Table 3-4).

Table 3-4. Federally and State-listed Terrestrial Animal Species in the Vicinity of the Vonore Battery Energy Storage System Proposed Project Areas¹

Common Name	Scientific Name	Federal Status ²	State Status ² (rank ³)
Mammals			
Indiana bat ⁴	<i>Myotis sodalis</i>	E	E(S1)
Northern long-eared bat ⁴	<i>Myotis septentrionalis</i>	T	-(S1S2)
Gray bat ⁵	<i>Myotis grisescens</i>	E	E(S2)
Carolina northern flying squirrel ⁴	<i>Glaucomys sabrinus coloratus</i>	E	E(S1S2)
Birds			
Bald eagle	<i>Haliaeetus leucocephalus</i>	DM	D(S3)
Amphibians			
Hellbender	<i>Cryptobranchus alleganiensis</i>	PS	E(S3)
Invertebrates			
Rusty-patched Bumble Bee ⁴	<i>Bombus affinis</i>	E	-(S1)
Spruce-fir moss spider ⁶	<i>Microhexura montivaga</i>	E	S1

¹ Source: TVA Regional Natural Heritage Database and USFWS Ecological Conservation Online System (<http://ecos.fws.gov/ecos/home.action>) extracted 3/23/2021

² Status Codes: D = Deemed in Need of Management; DM = Delisted and Monitored; E = Endangered; T = Threatened; PS = Partial Status.

³ State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable.

⁴ Federally listed species known from Monroe County, TN but not from within three miles of the proposed project area.

⁵ Federally endangered species that have not been documented within three miles of the proposed project area or from Monroe or Blount counties, TN; USFWS has determined this species has the ability to occur within the county.

⁶ Federally endangered species that has not been documented within three miles of the proposed project area or from Blount County, TN; USFWS has determined this species has the ability to occur within the county.

Rusty-patched bumble bees inhabit grasslands, prairies, woodlands, marshes, agricultural landscapes, and residential parks and gardens. They require both diverse, abundant flowers from April to September and undisturbed nesting sites nearby in order have sufficient food and overwintering sites for queens. They often build nests in abandoned, underground rodent cavities or large clumps of grass. The nearest record of this species was recorded in 1966 approximately 11.7 miles away and the species is thought to be extirpated from Monroe County.

Hellbenders favor clear, rocky creeks and rivers with water temperatures that are ideally less than or equal to 20°C, where there are large shelter rocks. Eggs are laid in nests in late summer or fall beneath these large, flat shelter rocks or submerged logs. The nearest record of this species was collected in 1964, approximately 2.3 miles away. This population was likely extirpated by the creation of Tellico Reservoir, but others may be present in higher elevation watersheds within Monroe County.

Bald eagles are protected under the Bald and Golden Eagle Protection Act. This species is associated with large mature trees capable of supporting their massive nests. These are usually found near large waterways where the eagles forage.

Carolina northern flying squirrels inhabit high-elevation (greater than 4,000 feet) coniferous and mixed forest. The nearest records of these species are approximately 20.4 miles away. Spruce-fir moss spiders inhabit rock outcrops in coniferous forests above 5,400 feet. This species has not been documented in Blount County, but the USFWS has determined that it may occur there.

Gray bats are associated with caves year-round, migrating between different roosts in winter and summer. This species emerges at dusk to forage for insects along waterways. Gray bat records are not known in Monroe County, however, the USFWS has determined that this species potentially occurs in the proposed project area. Nine cave records are known within three miles of the proposed action area but the nearest is approximately 0.9 miles away.

Indiana bats inhabit caves during winter and migrate to roost under exfoliating bark and within cavities of trees (typically greater than or equal to 5 inches in diameter) during summer. Foraging occurs along riparian areas and along the tops of trees, forested edges, and tree lines. Some habitat requirements overlap between Indiana bats and northern long-eared bats, which roost in caves or cave-like structures in winter, and utilize cave-like structures as well as live and dead trees (typically greater than or equal to 3 inches in diameter) with exfoliating bark and crevices in the summer. Northern long-eared bats are thought to forage primarily within forests below the canopy layer. At least 148 records of northern long-eared bat are known in Monroe County, the nearest occurring approximately 7.2 miles from the proposed action area. At least 71 Indiana bat records are known in Monroe County, the nearest occurring approximately 8.3 miles from the proposed project area. Nine cave records are known within three miles of the proposed action area but the nearest is approximately 0.9 miles away and would not be impacted. A small amount of forested foraging habitat for both species is present in the project action area. Additional foraging habitat exists over the Tellico Reservoir.

3.6.2 Environmental Consequences

3.6.2.1 Vegetation

The herbaceous fields on the parcel support primarily non-native species and have little to no conservation value. Neither the small stand of deciduous forest nor the open fields containing herbaceous vegetation support unique natural plant communities. Both of these habitat types are common and well represented throughout the region. Under the proposed Action Alternative, minor direct and indirect adverse impacts associated with grading and conversion from natural grass-herbaceous vegetation to an industrial site. Temporary, minor adverse effects to vegetation are expected during the installation of the ADSS fiber line.

3.6.2.2 Aquatic Ecology

Under proposed Action Alternative, TVA would proceed with the proposed action. To protect the streams and ephemeral channels found within the project footprint, any potential ground disturbance would be minimized and all work would be conducted in accordance to BMPs as outlined in TVA 2017. These BMPs are designed in part to minimize erosion and subsequent sedimentation. Therefore, with proper implementation of BMPs, no long-term impacts from the associated action are anticipated to water flow, stream channels, or stream banks. With the implementation of BMPs, effects to aquatic life in the local surface waters are expected to be temporary and insignificant.

Construction activities would not involve moving aquatic species or water from different locations, and equipment and materials used during construction would be clean and free of debris that could introduce exotic species and adversely affect aquatic habitat. Thus, the Action Alternative would not contribute to the spread of exotic or invasive aquatic species.

3.6.2.3 Terrestrial Animal Wildlife

Under the proposed Action Alternative, TVA would construct the BESS, the associated substation, and install 0.4 miles of new ADSS fiber line. This would require clearing roughly 1 acre of forest and an additional 14 acres of early-successional, herbaceous habitat (pastures, cultivated fields, residential areas).

In forested areas, direct effects to some individuals that may be immobile during the time of construction may occur, particularly if construction activities took place during breeding/nesting seasons. However, the actions are not likely to affect populations of species common to the area, as similar forested and herbaceous habitat exists in the surrounding landscape. Impacts to wildlife habitat would thus be limited to locations where the structures would be established. Ground disturbance would occur in these areas. Any wildlife (primarily common, habituated species) currently using these heavily disturbed areas may be displaced by increased levels of disturbance during construction actions, but it is expected that they would return to the project area upon completion of actions.

Several local species benefit from disturbance. American robin, Carolina chickadee, blue jay, eastern cottontail, eastern towhee, gray catbird, house finch, house sparrow, northern cardinal, northern mockingbird, raccoon, song sparrow, tufted tit-mouse, Virginia opossum, white-tailed deer are just a few of the species known to thrive in highly disturbed areas.

One colonial wading bird colony has been recorded within 3 miles, but no osprey (*Pandion haliaetus*) nests have been documented within 660 feet of the proposed project footprint. Twelve birds of conservation concern are identified as having the potential to occur within

the proposed project area. Of these, five (black-billed cuckoo (*Coccyzus erythrophthalmus*), eastern whip-poor-will (*Antrostomus vociferus*), prairie warbler (*Setophaga discolor*), red-headed woodpecker (*Melanerpes erythrocephalus*), and wood thrush (*Hylocichla mustelina*)) could potentially breed within the project footprint and be impacted by clearing activities if eggs or young are present at the time of clearing.

Field surveys on April 9, 2021 resulted in the finding of several red imported fire ant colonies along the eastern fence bordering the Highway 72 ROW. This species is an exotic, invasive species that was accidentally introduced into the United States during the 1930's through the port of Mobile, Alabama, and has since spread to at least 15 states. A combination of mild winters, as well as an increase in residential and industrial development continues to cause population expansion. Imported fire ants have an impact on agriculture and natural resources by damaging crops, agricultural equipment, and impacting wildlife. The United States Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS) works to prevent the artificial (human) spread of this pest by enforcing the Federal Quarantine and works with state cooperators to regulate high risk commodities, such as nursery stock, hay, and soil-moving equipment. Monroe County, Tennessee is currently under APHIS quarantine, as such, any soil, baled hay or straw, plants and sod with roots and soil attached, soil-moving equipment or other "Regulated Articles" as defined by USDA should be in compliance with APHIS Quarantine Regulations.

3.6.2.4 T&E and their Critical Habitats

3.6.2.4.1 T&E Plant Species

Adoption of proposed Action Alternative would not negatively impact state-listed plants and would have no effect on federally listed plants because no habitat for those species occurs within the proposed project area.

3.6.2.4.2 T&E Aquatic Animals

Under the proposed Action Alternative, TVA would proceed with the proposed action. Suitable habitat may exist for flame chub within the project footprint of the ADSS fiber line installation location. To minimize impacts, any potential ground disturbance would be minimized and all work would be conducted in accordance to BMPs as outlined in TVA 2017. These BMPs are designed in part to minimize erosion and subsequent sedimentation. Therefore, with proper implementation of BMPs, no impacts from the associated action are anticipated to water flow, stream channels, or stream banks; therefore, there would be no effect to T&E aquatic animal species.

3.6.2.4.3 T&E Terrestrial Animal Species

Under Action Alternative, TVA would construct the BESS, the associated substation, and install 0.4 miles of new ADSS fiber line. This would require clearing roughly 1 acre of forest and an additional 14 acres of early-successional, herbaceous habitat (pastures, cultivated fields, residential areas). Seven terrestrial species were addressed based on the potential for the species to occur in the project action area. Four of these (the federally protected bald eagle, federally threatened northern long-eared bat, and federally endangered gray bat and Indiana bat) have the potential to utilize the project action area.

The nearest record of rusty-patched bumble bee was recorded in 1966 approximately 11.7 miles away and the species is thought to be extirpated from Monroe County. This project would have no effect on rusty-patched bumble bee.

The nearest hellbender record was collected in 1964, approximately 2.3 miles away. This population was likely extirpated by the creation of Tellico Reservoir but others may be present in higher elevation watersheds within Monroe County. BMPs will be used to prevent impacts to water quality. This project will have no effect on hellbenders.

The nearest bald eagle record occurs approximately 1.2 miles from the proposed activities and would not be impacted by the proposed actions. BMPs will be used to prevent impacts to water quality and hydrology so that the proposed project would have no effect on bald eagles.

Carolina northern flying squirrels inhabit high-elevation (greater than 4,000 ft.) coniferous and mixed forest. Spruce-fir moss spiders inhabit rock outcrops in coniferous forests above 5,400 feet. The nearest record of Carolina northern flying squirrel is approximately 20.4 miles away. Spruce-fir moss spiders have not been documented in Blount County but the USFWS has determined that it may occur there. The project footprint at approximately 950 ft elevation and is unsuitable for these species; therefore, would have no effect.

Nine cave records are known within three miles of the proposed action area but the nearest is approximately 0.9 miles away and would not be impacted. Gray bat foraging habitat is present in the project action area over the Tellico Reservoir. BMPs must be implemented to minimize potential impacts to gray bat foraging habitat.

At least 148 records of northern long-eared bat are known in Monroe County, the nearest occurring approximately 7.2 miles from the proposed action area. At least 71 Indiana bat records are known in Monroe County, the nearest occurring approximately 8.3 miles from the project area. Nine cave records are known within three miles of the proposed action area but the nearest is approximately 0.9 miles away and would not be impacted. A small amount of forested foraging habitat for both species is present in the project action area. Additional foraging habitat exists over the Tellico Reservoir. Approximately one acre is proposed for clearing, which would be suitable for summer roosting by Indiana bats and northern long-eared bats.

A number of activities associated with the proposed project were addressed in TVA's programmatic consultation with the U.S. Fish and Wildlife Service on routine actions and federally listed bats in accordance with ESA Section 7(a)(2) and completed in April 2018. For those activities with potential to affect bats, TVA committed to implementing specific conservation measures. These activities and associated conservation measures are identified on page 5 of the TVA Bat Strategy Project Screening Form (Attachment D) and need to be reviewed/implemented as part of the proposed project. With the use of BMPs and identified conservation measures, proposed actions would not significantly impact gray bat, Indiana bat, or northern long-eared bat.

3.7 Visual Resources

3.7.1 Affected Environment

The BESS pilot study proposed project area occupies approximately 37.6 acres of agricultural and pasturelands that is bound on the east by State Highway 72. Approximately 7.5 acres of forested habitat exist within the reviewed area, with approximately 1 acre of forested area within the BESS and associated substation footprint. Areas surrounding the proposed project area consists of agricultural, residential, forested, undeveloped land, industrial, and commercial properties.

The associated ADSS fiber line installation proposed project area is comprised of 0.4-mile of existing and maintained transmission line ROW. There are a variety of natural landscape features located along the ADSS fiber upgrade proposed project area, such as fragmented forest habitat, wetlands, streams, agricultural lands, and residential or otherwise disturbed areas.

3.7.2 Environmental Consequences

Under the proposed Action Alternative, construction vehicles and equipment visible during construction activities (an excavator, bulldozer, dump truck, or similar vehicles and heavy machinery) would have a minor visual impact over the temporary construction period. A minor permanent impact would occur due to tree removal, and construction of the BESS and associated substation. Drivers along State Highway 72 would have direct views of the proposed project area and construction activities. The viewers from the highway would experience a minimal adverse, permanent change to visual quality. Current views from those areas would change from partially forested agricultural land to developed industrial land. In order to minimize the visual effect, TVA would plant a vegetative screen that would not impact security and operational requirements along the perimeter of the BESS and associated substation facility that is visual to the public. Therefore, implementation of the proposed Action Alternative would result in only a minor overall change in visual quality.

The ADSS fiber line would be installed along an existing transmission corridor. Therefore, the proposed ADSS fiber line installation would have a *de minimus* effect on visual aesthetics.

3.8 Noise

3.8.1 Affected Environment

Existing ambient noise levels, or background noise levels, are the current sounds from natural and artificial sources at receptors. The magnitude and frequency of background noise at any given location may vary considerably over the course of a day or night and throughout the year. The variations are caused in part by weather conditions, seasonal vegetative cover, and human activity. Existing sources of noise in the vicinity of the proposed project area are primarily associated with traffic along the surrounding roads and the surrounding businesses and residences.

Noise impacts associated with construction activities under the Action Alternative would be primarily from construction equipment. Construction activities would involve operation of an excavator, bulldozer, dump truck, or similar vehicles and heavy machinery in addition to power tools over the temporary duration of construction. Construction equipment noise levels are temporary and rarely steady; they fluctuate depending on the number and type of vehicles and equipment in use at any given time. In addition, construction-related sound levels experienced by a noise sensitive receptor in the vicinity of construction activity would be a function of distance, other noise sources, and the presence and extent of vegetation, structures, and intervening topography between the noise source and receptor.

Primary sensitive noise receptors in the area include two residential structures, both greater than 475 feet to the west/southwest and south of the BESS pilot proposed project area. A gasoline filling station is located roughly 500 feet to the southeast of the proposed project area, across State Highway 72. The average sound level is less than 75 decibels (dB) from at the most, 10 feet surrounding the facility. Specifically, the BESS HVAC at 10 feet would be 67.1 dB; PS1000 Inverters at 6 feet from exhaust end would be 75 dB; and 2500kVA

Transformers at 10 feet would be 55.5 dB. Each of these noise-producing machines would be at the closest, 24 feet from the fenceline. No further repetitive noises would occur from the construction of the BESS pilot project or the ADSS fiber line installation.

3.8.2 Environmental Consequences

Under the proposed Action Alternative, the noise would be localized and temporary, and no receptor would be exposed to significant noise levels for an extended period of time. Further, construction activities would be conducted during daylight hours only, when ambient noise levels are often higher and most individuals are less sensitive to noise. Thus, noise-related impacts resulting from implementation of the proposed Action Alternative are anticipated to be temporary and minor for both the proposed BESS pilot study proposed project area, as well as the ADSS fiber line installation proposed project area.

3.9 Cultural Resources

3.9.1 Affected Environment

Cultural resources include prehistoric and historic archaeological sites, districts, buildings, structures, and objects, as well as locations of important historic events that lack material evidence of those events. Cultural resources that are listed, or considered eligible for listing, on the National Register of Historic Places (NRHP) are called historic properties. Cultural resources become historic properties when they possess both integrity and significance. A historic property's integrity is based on its location, design, setting, materials, workmanship, feeling, and association. The significance is established when historic properties meet at least one of the following criteria: (a) are associated with important historical events that have made a significant contribution to the broad patterns of our history; (b) are associated with the lives of significant historic persons; (c) embody distinctive characteristics of a type, period, or method of construction or represent the work of a master or have high artistic value; or (d) have yielded or may yield information important in history or prehistory.

Section 106 of the NHPA requires federal agencies to consider the effects of their proposed undertakings on historic properties and provide the Advisory Council on Historic Preservation an opportunity to comment on those effects. Section 106 of the NHPA also requires federal agencies to consult with the respective SHPO when proposed federal actions could affect historic and cultural resources, including archaeological resources, which are also protected under the Archaeological Resources Protection Act, and the Native American Graves Protection and Repatriation Act, in addition to the NHPA.

TVA determined that the proposed Action Alternative is an "undertaking" as defined by the regulations under NHPA. Once an action is determined to be an undertaking, the regulations require agencies to consider whether the proposed activity has the potential to impact historic properties. If the undertaking is such an activity, then the agency must follow the following steps: (1) involve the appropriate consulting parties; (2) define the Area of Potential Effect (APE); (3) identify historic properties in the APE; (4) evaluate possible effects of the undertaking on historic properties in the APE; and (5) resolve adverse effects (36 CFR § 800.4 through 800.13). An APE is defined as the "geographic area or areas within which the undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist" (36 CFR § 800.16). TVA defined the APE for this undertaking as all areas that have the potential for ground disturbance (that have not been previously surveyed) as well as areas within a half-mile radius of the proposed substation and new structures from which the project would be visible, where visual effects on above-ground resources could occur.

TVA contracted with CRA, Inc. to carry out an archaeological and architectural survey for the project APE, which was conducted on August 17 through 20, 2021. As a result of the archaeological survey, no newly recorded sites were identified within the APE. One previously recorded site (40MR760) was identified during the survey but has previously been determined as ineligible for NRHP listing.

The architectural survey identified a total of 12 historic architectural resources within 0.5 mi of the proposed BESS facility and within its viewshed. Three of the structures were previously recorded and nine were not previously recorded.

3.9.2 Environmental Consequences

TVA determined that no archaeological or historical sites listed in, or eligible for, the NRHP will be affected by the proposed project actions. Therefore, the project will result in no historic properties affected.

In a letter dated November 12, 2021, the Tennessee State Historic Preservation Office concurred with TVA's "no adverse effect" finding. Pursuant to 36 CFR Part 800.3(f)(2). TVA consulted with federally recognized Indian tribes regarding properties within the project's area of potential effect that may be of religious and cultural significance to them and eligible for the NRHP. TVA received no objections from federally recognized tribes for this undertaking.

3.10 Socioeconomics and Environmental Justice

3.10.1 Affected Environment

This section evaluates the potential impact of the proposed Action Alternative on socioeconomic resources. It also considers the range of communities impacted to determine whether the proposed Action Alternative is likely to have a disproportionate and adverse impact on minority and low-income populations.

On July 20, 2021, the Office of Management and Budget (OMB) published a memorandum for the head of departments and agencies entitled "Interim Implementation Guidance for the Justice40 Initiative," hereby referred to the Justice40. The Justice40 memorandum provides interim guidance and initial recommendations on how to achieve the 40 percent goal of federal investments to flow toward disadvantaged communities, as defined in EO 14008. To date, TVA is working with OMB to identify and analyze how TVA plans to achieve the 40 percent goal.

Environmental justice-related impacts are analyzed in accordance with EO 12898 to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of federal programs, policies, and activities on minority and low-income populations. This analysis focuses on the state, county, and locality within which the Action Alternative would occur. Publicly available statistics generated by the U.S. Census Bureau and the U.S. Bureau of Labor Statistics were used to characterize socioeconomic conditions in the host state (Tennessee), county (Monroe), and locality (Madisonville, Tennessee) (Table 3-5). Details of the Action Alternative were then used to evaluate likely effects on existing socioeconomic resources. The demographics and income of the host counties and locality were considered, relative to the demographics and wealth levels at the state level, to identify the potential for a disproportionate and adverse impact on minority and low-income populations, which is commonly referred to as an evaluation of Environmental Justice.

The results of the evaluation of Environmental Justice consist of the following:

- Relative to the average Tennessee resident, the residents of Monroe County live at a lower population density and lower population growth. Relative to the average Tennessee resident, the residents of Madisonville live at much greater densities and much lower population growth.
- Relative to the average Tennessee resident, the residents of Monroe County and those of Madisonville are less likely to self-identify as a minority race or ethnicity.
- Median household income is greater in Tennessee than in Monroe County and those in Madisonville. This is consistent with the observation that the proportion of Monroe and Madisonville residents living below the poverty level exceeds these proportions in Tennessee as a whole.
- The unemployment rate in Madisonville and Monroe County are both higher than the statewide unemployment rate in Tennessee.

Table 3-5. Population, Demographics, Income, and Employment in the Host State, County and Locality

	Tennessee	Monroe County	Madisonville, Tennessee
POPULATION¹			
April 2010 Population	6,346,276	44,498	4,737
Most Recent Population Estimate (July 2019)	6,829,174	46,545	5,002
Population Change: April 2010 to July 2018	7.6%	4.6%	5.6%
People per Square Mile	153.9	70.0	737.3
DEMOGRAPHICS¹			
White Alone, not Hispanic or Latino	73.5%	90.8	89.2
Black or African American Alone	17.1%	2.2	5.1
Asian Alone	2.0%	0.4	0.0
Native Hawaiian and Other Pacific Islander Alone	0.1%	0.1	0.0
Two or More Races	2.0%	1.8	0.6
Hispanic or Latino (of any race)	5.7%	4.6	4.8
INCOME¹			
Median Household Income	\$53,320	\$42,429	\$41,148
Per Capita Income	\$29,859	\$23,207	\$31,310
Percent with Income Below the Poverty Level	13.9%	16.5%	15.9%
EMPLOYMENT²			
Labor Force	3,282,671	19,221	2,401
Employed	3,109,872	17,730	2,219
Unemployed	172,799	1,491	182
Unemployment Rate (%)	5.3%	7.8%	7.6%

¹While the locality profiled here is Madisonville, TN (Population: 5,002), the parcel associated with the Action Alternative is located more closely to Vonore, TN (Population: 1,552). Madisonville is approximately 6.9 miles southwest of the parcel, whereas Vonore is approximately 1.7 miles

east of the parcel. Both localities are located in Monroe County, TN. Madisonville is profiled as a result of the availability and recency of key socioeconomic data relative to those data available for Vonore.
²2019 ACS 5-Year Estimates

During project review, a residential area in close proximity to the BESS pilot study proposed project area was identified (within 0.25 miles to the west). Using the USEPA's EJScreen Tool, the following demographic characteristics were identified for this area. Relative to the state, this neighborhood has a lower proportion of people of color, is more linguistically isolated, has a higher proportion of population with less than high school education, and a lower proportion of low-income population.

The ADSS fiber line installation would occur on an existing transmission line ROW corridor. Since the corridor is existing and maintained under TVA's existing ROW, environmental justice analysis was not performed for this portion of the action.

3.10.2 Environmental Consequences

The proposed Action Alternative would require a small workforce, likely drawn from existing contractors working on similar projects in the region, for greater than six months. Implementation of the proposed Action Alternative is not anticipated to materially impact the local economy or workforce. In addition, no negative socioeconomic impacts are expected from implementation of the Action Alternative; therefore, no disproportionate negative impacts are anticipated to minority or economically disadvantaged populations as a result of the Action Alternative. Positive Indirect impacts may be noted through the increase in jobs as a result of the Action Alternative.

3.11 Transportation

3.11.1 Affected Environment

The primary site entrance for the BESS pilot study facility would be on the eastern side of the proposed project area from State Highway 72. Based on a review of TDOT's (TDOT 2021) online historical traffic data (2018), the nearest traffic count station on State Highway 72 is located approximately 2 miles south of the proposed BESS pilot study proposed project area (Station 000106 on Route SR072) in Monroe County. The 2018 annual average daily traffic count (AADT) for this station is 13,670. The proposed BESS pilot study proposed project area is located approximately 2.5 miles north of the intersection of State Highway 72 and Highway 411. The nearest traffic station for Highway 411 is located 0.46 miles west of the intersection with SR 72 (Station 000109 of Route SR033) and has an AADT for 2018 of 14,069.

The proposed ADSS fiber line installation proposed project area is located to the south of West Lamar Alexander Parkway (Highway 321), to the southwest of Friendsville in Blount County. The construction entrance will be accessed from existing driveways and roads off of Highway 321. Based on a review of TDOT's (TDOT 2021) online historical traffic data (2018), the nearest traffic count station on Highway 321 is located approximately 1.5 miles west of the proposed BESS and associated substation proposed project area (Station 000136 on Route SR073). The 2018 AADT for this station is 11,769.

The 3 transformers, 12 containers, and Li-ion batteries would be delivered by a semi-truck to the proposed BESS pilot study proposed project area. For the purpose of this EA, it is assumed one semi-truck delivery per each item.

3.11.2 Environmental Consequences

Under the proposed Action Alternative, in the context of the existing AADT volumes of these highways the anticipated traffic generated by the proposed activities would be negligible. It is anticipated that implementation of the Action Alternative would have negligible impact on overall traffic volumes and level of service of either State Highway 72 or Highway 321. A temporary traffic disruption would be anticipated during the transformer, containers, and battery delivery; however, this disruption would be temporary and minor with appropriate traffic control measures.

3.12 Public Health and Safety

3.12.1 Affected Environment

The U.S. Occupational Safety and Health Administration (OSHA), a division of the U.S. Department of Labor, mission is to ensure safe and healthful working conditions for working men and women by setting and enforcing standards and by providing training, outreach, education, and assistance. The State of Tennessee has an OSHA-approved plan under the Tennessee Occupational and Safety and Health Administration of the Tennessee Department of Labor and Workforce Development which covers employees in the private sector and state and local government.

Land uses on both the BESS pilot project and the ADSS fiber installation proposed project areas are primarily agricultural and undeveloped; no persons currently live within the proposed project footprints. Since the land proposed to be occupied by the proposed project area is not used by, or accessible to, the general public, there are no current public health and safety issues.

3.12.2 Environmental Consequences

Under the proposed Action Alternative, workers in the proposed project areas would have an increased safety risk associated with the construction activities. However, because construction work has known hazards, standard practice is for contractors to establish and maintain health and safety plans in compliance with OSHA regulations. Such health and safety plans emphasize BMPs for site safety management to minimize potential risks to workers. Examples of best practices include employee safety orientations; establishment of work procedures and programs for site activities; use of equipment guards; emergency shut-down procedures; lockout procedures; site housekeeping; personal protective equipment; regular safety inspections; and plans and procedures to identify and resolve hazards. Potential public health and safety hazards could result in association with the flow of construction traffic along the public roadways, as discussed in Section 3-10. Health and safety plans established and adhered to by the construction team would include traffic procedures to minimize potential safety concerns. Emergency response for the proposed proposed project areas would be provided by the local, regional, and state law enforcement, fire, and emergency responders. 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 Alternative would be considered temporary and minor.

3.13 Solid and Hazardous Waste

3.13.1 Affected Environment

Solid waste is defined by the Resource Conservation and Recovery Act (RCRA) as any garbage, sludge, or any other discarded material from industrial, commercial, mining,

agricultural operations, and community activities. Solid wastes are any material that has been discarded by being abandoned, inherently waste-like, a discarded military munition, or recycled in certain ways (USEPA 2021). The USEPA regulates solid waste under Subtitle D of the RCRA which bans the open dumping of waste and sets minimum federal criteria for the operation of municipal waste and industrial waste landfills, including design criteria, location restrictions, financial assurance, corrective action, and closure requirements. In Tennessee, the TDEC Division of Solid Waste Management operates under the authority of the Solid Waste Management Act of 1991 (T.C.A. §68-211-101 et seq.) and implements RCRA Subtitle D at the state level.

Hazardous waste materials may include any solid waste or combination of solid waste that, because of their quantity, concentration, or physical, chemical, or infectious characteristics, may present substantial danger to public health or the environment when released into the environment (40 CFR Part 261). To be classified as a hazardous waste, a solid waste must meet one or more of the USEPA established characteristic properties (ignitability, corrosivity, reactivity, and toxicity) or be specifically listed as a known hazardous waste (USEPA 2021). Hazardous wastes are regulated under the RCRA through the USEPA and the Atomic Energy Act through the U.S. Nuclear Regulatory Commission. In addition to the USEPA and U.S. Nuclear Regulatory Commission, hazardous materials are regulated in the U.S. by laws and regulations administered by the U.S. OSHA and the U.S. Department of Transportation. In Tennessee, the TDEC Division of Solid Waste Management operates under the authority of the Hazardous Waste Management Act of 1977 (T.C.A. §68-212-101 et seq.) and implements RCRA Subtitle C at the state level.

The Li-ion batteries have a typical lifespan of 20 years, at which point they will only hold approximately 70 percent of their initial amount of energy, and would be considered hazardous waste. TVA would then decide if adding new batteries or replacing all batteries to achieve the 100 percent capacity would be the most beneficial. TVA would attempt to recycle the Li-ion batteries when possible. The remaining equipment would have a lifespan of at least 40 years. Since this is a pilot project, the age of decommissioning this site is unknown. However, it is assumed that decommissioning would be at least 40 years for the proposed action.

3.13.2 Environmental Consequences

Construction of the proposed Action Alternative would result in the generation of hazardous and solid waste. Under the proposed Action Alternative, the replacement of the batteries and ultimate decommissioning of the site would produce solid and hazardous waste in need of disposal. With the implementation of BMPS and compliance with the Solid and Hazardous Waste Rules and Regulations of the State (TDEC DSWM, Rule 0400, Chapters 11 and 12, respectively), as well as the appropriate waste disposal requirements, no significant impacts associated with solid and/or hazardous waste are anticipated.

3.14 Cumulative Impacts

The proposed BESS pilot project and associated ADSS fiber line installation would be constructed on property located in Vonore, Monroe County and within Blount County, Tennessee, respectively. Construction of the proposed BESS pilot study site would disturb about 15 acres with the completed footprint occupying less than 10 acres. The associated proposed ADSS fiber line would be installed along an existing transmission line and maintained ROW.

With the implementation of a vegetative screen, the proposed BESS pilot project would present a minor, long-term visual effect. The minor loss of prime farmland within the substation footprint (less than one acre) is negligible when compared to the amount of land designated as prime farmland within the surrounding region. As such, cumulative impacts would be minor.

The installation of the proposed ADSS fiber line would include setting new poles and placing the overhead line on these poles. As stated previously, these facilities are existing, and the effects would be minor. Therefore, no significant cumulative impacts are expected as a result of implementing the proposed action.

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