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FLORENCE-IRON CITY 161-KV TRANSMISSION LINE

FINAL ENVIRONMENTAL ASSESSMENT

Lauderdale County, Alabama and Wayne and Lawrence Counties, Tennessee

EAXX-455-00-000-1730390329

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Acronyms, Abbreviations, and Glossary of Terms Used

acre	A unit measure of land area equal to 43,560 square feet
access road	A dirt, gravel, or paved road that is either temporary or permanent, and is used to access the right-of-way and transmission line structures for construction, maintenance, or decommissioning activities
ADCNR	Alabama Department of Conservation and Natural Resources
ADEM	Alabama Department of Environmental Management
APE	Area of potential effect
BMP	Best management practice or accepted construction practice designed to reduce environmental effects
CAA	Clean Air Act
CBMPP	Construction Best Management Practices Plan
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
circuit	A section of conductors (three conductors per circuit) capable of carrying electricity to various points
conductors	Cables that carry electrical current
CEQ	Council on Environmental Quality
CWA	Clean Water Act
danger trees	A tree located outside the right-of-way that could pose a threat of grounding a line if allowed to fall near a transmission line or a structure
EA	Environmental Assessment
easement	A legal agreement that gives TVA the right to use property for a purpose such as a right-of-way for constructing and operating a transmission line
EIS	Environmental Impact Statement
EMF	Electromagnetic field
endangered species	A species in danger of extinction throughout all or a significant part of its range
EO	Executive Order
EPA	United States Environmental Protection Agency
ephemeral stream	Watercourses or ditches that only have water flowing after a rain event; also called a wet-weather conveyance
ESA	Endangered Species Act
FHWA	Federal Highway Administration

feller-buncher	A piece of heavy equipment that grasps a tree while cutting it, which can then lift the tree and place it in a suitable location for disposal; this equipment is used to prevent trees from falling into sensitive areas, such as a wetland
FONSI	Finding of No Significant Impact
GIS	Geographic Information System
groundwater	Water located beneath the ground surface in the soil pore spaces or in the pores and crevices of rock formations
guy	A cable connecting a structure to an anchor that helps support the structure
HUC	Hydrologic Unit Code
hydric soil	A soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop conditions of having no free oxygen available in the upper part
hydrophytic vegetation	Aquatic and wetland plants that have developed physiological adaptations allowing a greater tolerance to saturated soil conditions including with limited or absence of oxygen
IFs	Isolated Finds
IPaC	The United States Fish and Wildlife Services' "Information for Planning and Conservation" database tool that allows users to identify managed resources quickly and easily.
IRP	Integrated Resource Plan
kV	Symbol for kilovolt (1 kV equals 1,000 volts)
load	That portion of the entire electric power in a network consumed within a given area; also synonymous with "demand" in a given area
LPC	Local power company
milligauss	The unit of measurement for the magnetic component of electromagnetic fields (EMF)
MOD	Motor operated device
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NESC	National Electric Safety Code
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
OHGW	Overhead ground wire
OPGW	Optical ground wire

outage	An interruption of the electric power supply to a user
PEIS	Programmatic Environmental Impact Statement
PI	Point of intersection at which two straight transmission line sections intersect to form an angle
RCRA	Resource Conservation and Recovery Act
riparian	Related to or located on the banks of a river or stream
ROW	Right-of-way, a corridor containing a transmission line
runoff	That portion of total precipitation that eventually enters a stream or river
SHPO	State Historic Preservation Officer
SMZ	Streamside management zone
structure	A pole or tower that supports a transmission line
substation	A facility connected to a transmission line used to reduce voltage so that electric power may be delivered to a local power distributor or user
switching station	Essentially a substation without transformers and that operates at a single voltage. Its main purpose is for operational flexibility in connecting circuits or isolating a faulty part of the system in the event of an unexpected outage
surface water	Water collecting on the ground or in a stream, river, lake, or wetland; it is naturally lost through evaporation and seepage into the groundwater
switch	A device used to complete or break an electrical connection
SWPPP	Stormwater Pollution Prevention Plan
TDEC	Tennessee Department of Environment and Conservation
TDOT	Tennessee Department of Transportation
TEPCO	Tennessee Electric Power Company
TMDL	Total maximum daily load
threatened species	A species likely to become endangered within the foreseeable future
TRAM	Tennessee Rapid Assessment Method developed to rapidly determine the condition of a wetland in the field based solely on hydrogeomorphic classification meant to be a “snapshot” of current condition based on on-site and external influences and variables relative to a reference standard. Information on the condition of the wetland is then used to evaluate a proposed impact justification and assess mitigation needs.
TVA	Tennessee Valley Authority
TVAR	Tennessee Valley Archaeological Research
TWRA	Tennessee Wildlife Resources Agency
U. S.	United States
USACE	U. S. Army Corps of Engineers

USCB	U. S. Census Bureau
USDA	U. S. Department of Agriculture
USFS	U. S. Forest Service
USFWS	U. S. Fish and Wildlife Service
USGS	U. S. Geological Survey
wetland	A marsh, swamp, or other area of land where the soil near the surface is saturated or covered with water, especially one that forms a habitat for wildlife
WHO	World Health Organization
WWC	Wet-weather Conveyance. See definition above for ephemeral stream.

CHAPTER 1 – PURPOSE AND NEED FOR ACTION

1.1. Proposed Action – Improve Reliability of Power Supply

The Tennessee Valley Authority (TVA) proposes to improve reliability of its existing transmission system in the Florence area in Lauderdale County, Alabama by constructing the Iron City 161-kV Switching Station in Lawrence County, Tennessee and the Florence-Iron City 161-kV Transmission Line (Figure 1-1). In addition, TVA would increase reliability of the area serviced by the existing Waynesboro, Loretto, and Crockett 161-kV substations in Wayne and Lawrence counties, Tennessee by installing three short loop lines in TVA's existing Colbert Fossil Plant (FP)-Lawrenceburg 161-kV Transmission Line to connect to the new Iron City Switching Station. The approximate 13.3-mile proposed transmission line would be constructed on existing TVA right-of-way (ROW) utilizing primarily steel, single-pole and H-frame structures. The proposed project would utilize about 161 acres for the new line and about 8.7 acres of a 45.6-acre site for the switching station.

Construction in Alabama of about 12.2 miles of the proposed transmission line (148 acres) would begin at Florence Utilities' existing Florence 161-kV Substation in Lauderdale County and be located on an existing almost 100-year-old ROW easement. The ROW was initially used by the Southern Tennessee Power Company and later sold to Tennessee Electric Power Company (TEPCO) before TVA assumed ownership of the easement. TVA would abandon any of the existing ROW easement that exceeds TVA's standard 100-foot width. The remaining 1.1 miles of the new line would utilize about 13.3 acres of existing 100-foot-wide ROW easement in Tennessee, ending at TVA's proposed Iron City 161-kV Switching Station in Lawerence County. Additionally, TVA would re-acquire 2.5 miles of Florence Utilities transmission line ROW easement. TVA would then co-locate the proposed transmission line for 1.1 miles within this section on the Florence Utilities structures.

TVA would also remove overhead ground wire (OHGW) and replace it with optical ground wire (OPGW) on the 3.4-mile-long section between the Reservation Switching Station and the Florence Substation on the existing TVA Reservation Switching Station-Florence 161-kV Transmission Line.

TVA expects to utilize existing and/or new temporary access roads for construction and maintenance of the proposed transmission line.

1.2. Need for the Proposed Action

TVA plans its transmission system according to industry-wide standards established by the North American Electric Reliability Corporation (NERC). Those standards state that the TVA transmission system must be able to survive NERC defined contingency events while continuing to serve customer loads[1] with adequate voltage and no overloaded facilities while maintaining adequate transmission line clearances as required by the National Electric Safety Code (NESC).

[1] "Load" is defined as that portion of the entire electric power in a network that is consumed within a given area. The term is synonymous with "demand" in a given area.

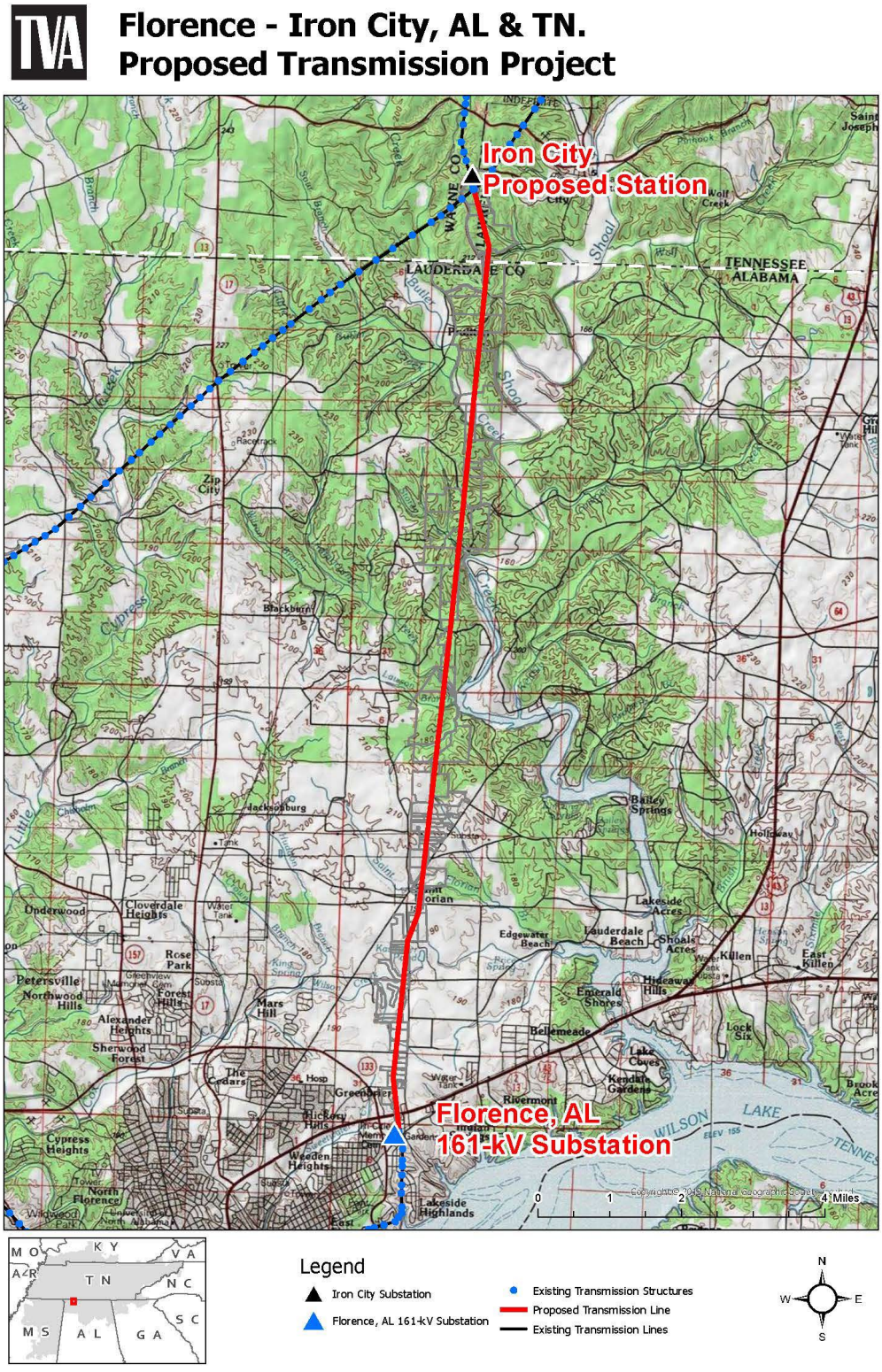

Figure 1-1. TVA's Preferred Transmission Line Route to Connect Florence Utilities' Existing Florence 161-kV Substation in Lauderdale County, Alabama and TVA's Proposed Iron City, TN 161-kV Switching Station in Lawrence County, Tennessee

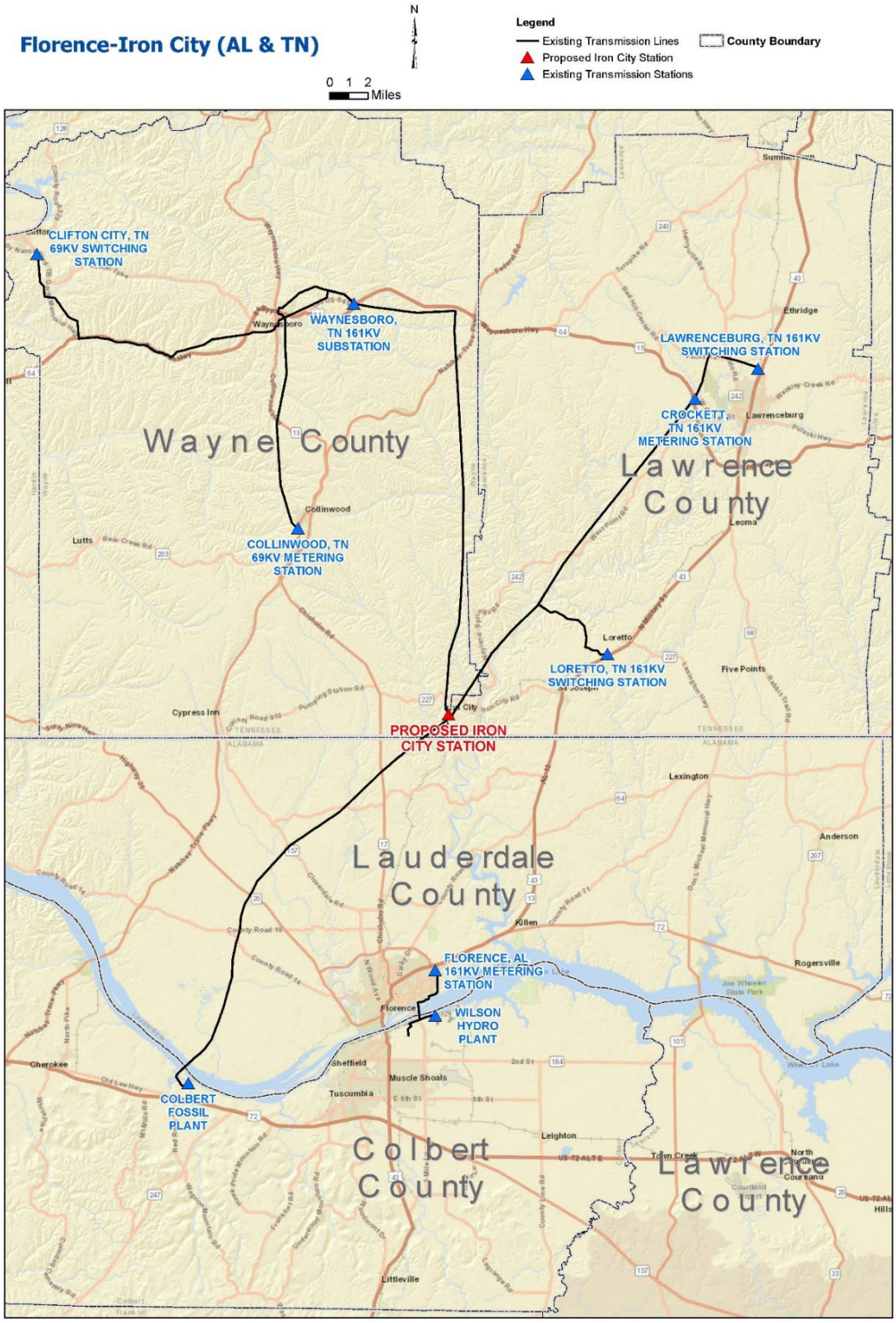

Figure 1-2. Existing TVA Transmission System Configuration in the Florence, Alabama Area

TVA's transmission system reliability is measured by frequency of Customer Connection Point interruptions. To maintain reliability system wide, TVA must make reliability improvements on the poorest performing facilities while also considering the least cost alternative. When possible, TVA considers upgrading existing facilities or utilizing existing ROW easements.

Florence Utilities serves the entire city of Florence and Lauderdale County. Most of the load center for the utility exists within downtown Florence and the immediate surrounding area. This load center is mostly served by the Florence 161-kV Substation which is a delivery point provided by TVA from a 4.2-mile radial 161-kV transmission line[2] from TVA's Reservation Substation. This radial line crosses the Tennessee River within a 0.81-mile-wide river crossing section with one of the spans extending a half mile (Figure 1-2). This span poses a high-risk situation that would create significant issues if a failure were to occur including voltage instability, limited operational flexibility, increased risk for substation and transmission line overloading, loss of service, and occurrence of violations of NERC reliability criteria. Florence Utilities has limited backup capability for the 161-kV feed.

The loss of the transmission line during certain situations could require multiple days or weeks to repair and would create significant challenges to supply all the loads in the City of Florence and Lauderdale County. In addition, TVA's Colbert FP-Lawrenceburg 161-kV Transmission Line serves three 161-kV substations – Waynesboro, Loretto, and Crockett – and has over 83 miles of exposure (i.e. any interruption will affect all three substations) (Figure 1-2). The Waynesboro Substation also provides the source for the Collinwood and Clifton City 69-kV stations, and the long transmission lines supplying those stations also have no backup power supply.

The recommended solution to address the reliability concerns would be for TVA to utilize an existing, vacant ROW to extend the Florence radial transmission line north 13.3 miles to the Colbert FP-Lawrenceburg 161-kV Transmission Line and construct a new four-position-ring bus switching station. A new switching station and transmission line would reduce the overall line exposure and thus increase the reliability of the Waynesboro, Loretto, and Crockett substations. Additionally, a new switching station would connect all four 161-kV substations (including Florence Utilities' Florence 161-kV Substation) (Figure 1-3). This project would also provide backup capability to the City of Florence and create additional transmission capacity which supports load growth and economic development in the Florence area.

[2] A single transmission line from a substation out to a number of customers.

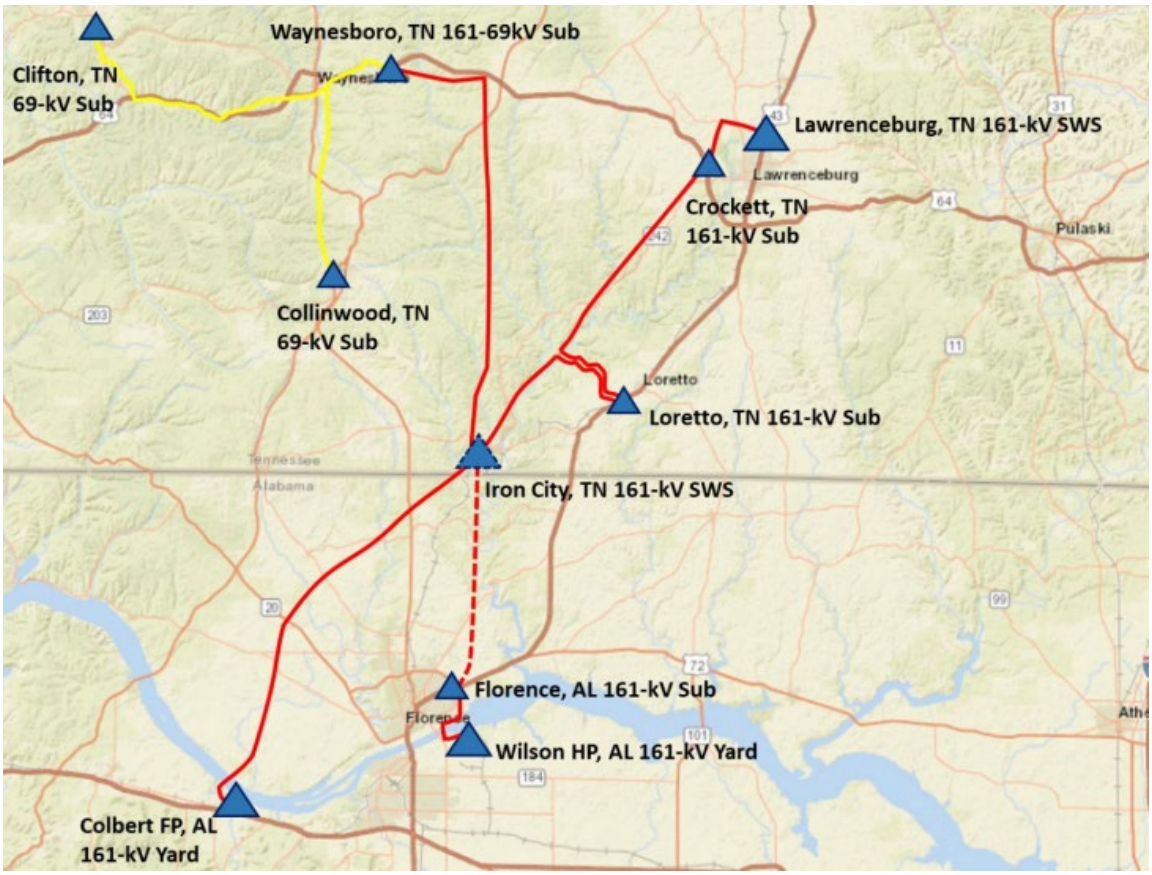

Figure 1-3. TVA's Proposed 13.3 Mile Florence-Iron City 161-kV Transmission Line (red dashed line) and Iron City 161-kV Switching Station

1.3. Decisions to be Made

The primary decision before TVA is whether to improve reliability of its existing transmission system by constructing, operating, and maintaining a new 161-kV, OPGW-inclusive, transmission line and switching station. TVA would also install three short loop lines to connect the proposed switching station with the existing Waynesboro, Loretto, and Crockett 161-kV substations. TVA would remove OHGW and replace it with OPGW on the existing 3.4-mile-long TVA transmission line between the Reservation Switching Station and the Florence Substation. If the proposed transmission line and switching station are to be built, other secondary decisions are involved. These include the following considerations:

- Timing of the proposed improvements;
- Most suitable route for the proposed transmission line (existing ROW or new ROW);
- Most suitable location for the proposed switching station; and
- Determination of any necessary mitigation and/or monitoring to meet TVA standards and to minimize the potential for damage to environmental resources.

A detailed description of the alternatives is provided in Section 2.1.

1.4. Related Environmental Reviews or Documentation

In 2019, TVA completed the 2019 Integrated Resource Plan (IRP) and the associated environmental impact statement (EIS) (TVA 2019a). These documents provide direction on how TVA can best deliver clean, reliable, and affordable energy in the Tennessee River Valley over the next 20-year planning period, 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. In September 2024, TVA released a new Draft IRP for public review and comment. The 2019 IRP remains valid and guides future generation planning until TVA's subsequent IRP is issued as Final with any new or modified recommendations.

In 2019, TVA released a Transmission System Vegetation Management Programmatic Environmental Impact Statement (PEIS), which is incorporated by reference (TVA 2019b). This review more broadly represented a comprehensive analysis of management activities and potential environmental impacts associated with TVA's vegetation management program within the TVA power service area. The analysis considered various vegetation management methods and tools. TVA issued a Record of Decision on October 18, 2019, identifying its preferred vegetation management program alternative as a condition-based control strategy with a goal of maintaining the ROWs in a meadow-like end-state (84 FR 55995).

On September 27, 2024, TVA issued a final EA and Finding of No Significant Impact (FONSI) for its proposal to perform routine vegetation management on about one-third of the transmission system ROWs in each of its Fiscal Years (FY) 2025 and 2026 (TVA 2024a). TVA issued final EAs and FONSIs for similar proposals on November 9, 2020 (addressing FY 2021) on October 1, 2021 (addressing FYs 2022 and 2023) and October 19, 2023 (addressing FY 24) (TVA 2020; TVA 2021, TVA 2023). The management of vegetation is needed to ensure the transmission system can continue to provide reliable power and to prevent outages related to incompatible vegetation. Site-specific effects were considered within twelve managed Sectors in areas that had been previously and continuously maintained on a recurring cycle. The EAs tiered from the PEIS which evaluated and analyzed TVA's vegetation management program (TVA 2019b).

1.5. Scoping Process and Public Involvement

TVA contacted the following federal and state agencies, as well as federally recognized Indian tribes, concerning the proposed project:

- Alabama Department of Environmental Management (ADEM)
- Alabama Department of Transportation (ALDOT)
- Alabama State Historic Preservation Officer (SHPO)
- Absentee Shawnee Tribe of Indians of Oklahoma
- Cherokee Nation
- The Chickasaw Nation
- The Choctaw Nation of Oklahoma
- Coushatta Tribe of Louisiana
- Eastern Band of Cherokee Indians
- Eastern Shawnee Tribe of Oklahoma
- Jena Band of Choctaw Indians

- Kialegee Tribal Town
- The Muscogee (Creek) Nation
- Poarch Band of Creek Indians
- The Seminole Nation of Oklahoma
- Shawnee Tribe
- Alabama Department of Conservation and Natural Resources (ADCNR)
- Tennessee Department of Environment and Conservation (TDEC)
- Tennessee Department of Transportation (TDOT)
- Tennessee State Historic Preservation Officer (SHPO)
- Tennessee Wildlife Resources Agency (TWRA)
- Thlopthlocco Tribal Town
- United Keetoowah Band of Cherokee Indians in Oklahoma
- U.S. Army Corps of Engineers (USACE)
- U.S. Fish and Wildlife Service (USFWS)

TVA developed a public communication plan that included a website with information about the project, a map of the route being considered for the proposed transmission line (Figure 1-1), and numerous feedback mechanisms. TVA held a virtual Information Session on TVA's website from February 11 to March 15, 2021. Property owners near and along the transmission line route were mailed a letter explaining the project and invited to the virtual Information Session– including about 187 property owners representing about 225 parcels.

TVA used local news outlets and notices placed in local newspapers to notify other interested members of the public of the virtual Information Session. Property owners and members of the public could submit questions online, by telephone, or in writing. The virtual information session was attended by 22 people. For those that were not able to access the virtual Information Session on TVA's website, a toll-free number, email address, and mailing address were provided as additional points of contact for questions about the project.

The project was delayed until 2023 following the 2021 information session. In November 2023, each property owner affected by the transmission line route or new switching station was mailed a letter explaining the project. Including the new switching station site and the proposed transmission line, this project affects about 100 property owners representing ownership of about 117 parcels.

The preferred location for the new transmission line would utilize existing TVA ROW easement. Any fine adjustments made to the proposed route were based on working with impacted property owners and information obtained from environmental field surveys.

TVA also held a two-week public review and comment period of the draft EA from February 3rd to February 14th, 2025. TVA received no comments on the proposed project.

1.6. Issues to be Addressed

TVA prepared this EA to comply with the National Environmental Policy Act (NEPA). The EA investigates the potential environmental and socio-economic effects of the proposed construction, operation, and maintenance of the new transmission line and switching station as well as the purchase of transmission low ROW easement from Florence Utilities for satisfying the projects purpose and need or taking no action.

TVA has determined the resources listed below are potentially affected by the alternatives considered. These resources were identified based on internal scoping.

- Water quality (surface waters and groundwater)
- Aquatic ecology
- Vegetation
- Wildlife
- Endangered and threatened species and their critical habitats
- Floodplains
- Wetlands
- Aesthetic resources (including visual and noise)
- Archaeological and historic resources
- Recreation, parks, and managed areas
- Socioeconomics

TVA's action would satisfy the requirements of Executive Order (EO) 11988 (Floodplain Management), EO 11990 (Protection of Wetlands), EO 12372 (Intergovernmental Review), EO 13112 (Invasive Species) and EO 13751 (Safeguarding the Nation From the Impacts of Invasive Species) that amends EO 13112, and applicable laws including the Farmland Protection Policy Act, the National Historic Preservation Act, the Endangered Species Act (ESA), the Clean Air Act (CAA), and the Clean Water Act (CWA). Correspondence received from agencies related to this review and coordination is included in Appendix A.

Potential effects related to prime farmland, transportation, air quality and global climate change, solid and hazardous waste, and health and safety were considered. Because of the nature of the action, any potential effects to these resources would be minor and insignificant. Thus, any further analysis for effects to these resources was not deemed necessary except as discussed in relation to other resource areas.

1.7. Necessary Permits or Licenses

Prior to construction, permits would be required from the ADEM and TDEC for the discharge of construction site storm water associated with the construction of the transmission line. TVA would prepare the required Storm Water Pollution Prevention Plan (SWPPP) and a Construction Best Management Practices Plan (CBMPP) and then coordinate them with the appropriate state and local authorities. A Section 401 Water Quality Certification or an Aquatic Resource Alteration Permit (ARAP) would be obtained as required for physical alterations to waters of the State. A Section 404 Nationwide Permit would be obtained from the USACE if construction activities would result in the discharge of dredge or fill into waters of the United States (U.S.). Permits would be obtained from the ALDOT and TDOT for crossing state highways or federal interstates during transmission line construction.

CHAPTER 2 – ALTERNATIVES INCLUDING THE PROPOSED ACTION

As described in Chapter 1, TVA proposes to build the Florence-Iron City 161-kV Transmission Line and Iron City 161-kV Switching Station to allow for growth and increase power reliability in the Florence area of Lauderdale County. A description of the proposed action is provided below in Section 2.1.2. Additional background information about construction, operation, and maintenance of the transmission line and switching station is also provided in Section 2.2 and would be applicable regardless of the location of the proposed facilities.

This chapter has seven major sections:

1. A description of alternatives;
2. A description of the construction, operation, and maintenance of the proposed transmission line and switching station;
3. An explanation of the transmission line siting process;
4. Identification of the proposed preferred transmission line route;
5. A comparison of anticipated environmental effects by alternative;
6. Identification of mitigation measures; and
7. Identification of the preferred alternative.

2.1. Alternatives

Two alternatives (i.e., the No Action Alternative and the Action Alternative) are addressed in further detail in this EA. Under the No Action Alternative, TVA would not implement the proposed action. The Action Alternative involves the construction, operation, and maintenance of the proposed transmission line and switching station and the acquisition of 2.5 miles of transmission line ROW easement from Florence Utilities.

2.1.1. The No Action Alternative – TVA Does Not Improve its Transmission System in the City of Florence and Lauderdale County Service Area

Under the No Action Alternative, TVA would not construct the proposed transmission line and switching station to improve power reliability. As a result, the TVA power system in the City of Florence and Lauderdale County service area would continue to operate under current conditions including voltage instability, limited operational flexibility, increased risk for substation and transmission line overloading, loss of service, and occurrence of violations of NERC reliability criteria. Additionally, the TVA's Colbert FP-Lawrenceburg 161-kV Transmission Line and the long transmission lines supplying the Waynesboro, Loretto, and Crockett substations would continue to have limitations on generation due to having no backup power supply (i.e., line exposure). TVA's ability to provide a strong, reliable source of power for continued economic health and future residential and commercial growth in the area would be jeopardized.

Should the transmission line and switching station be constructed by sources other than TVA to provide power in the area, the potential environmental effects of implementing the No Action Alternative would likely be comparable to those of the Action Alternative described in Chapter 3. However, some variability of impacts could occur as effects of the construction would be dependent upon various factors, such as the routes selected, and the construction methods used.

Considering TVA's obligation to provide reliable electric service, the No Action Alternative is not a reasonable alternative. However, the potential environmental effects of adopting the No Action Alternative were considered in the EA to provide a baseline for comparison with respect to the potential effects of implementing the proposed action.

2.1.2. Action Alternative – TVA Provides Improvements to its Transmission System in the City of Florence and Lauderdale County Service Area

Under the Action Alternative, TVA proposes to improve reliability of its existing transmission system in the Florence area by constructing the Iron City 161-kV Switching Station and the Florence-Iron City 161-kV Transmission Line which would be approximately 13.3 miles long, on existing ROW (Figure 1-1). The transmission line would consist primarily of steel, single-pole and H-frame structures. The proposed project would utilize about 161 acres for the new line and about 8.7 acres of a 45.6-acre site for the switching station.

TVA's proposed Florence-Iron City 161-kV Transmission Line would begin at Florence Utilities' existing Florence 161-kV Substation in Lauderdale County and extend north to TVA's new Iron City 161-kV Switching Station. The new transmission line construction would occur entirely within existing TVA ROW except for two small sections. One section, 0.08 miles in length, would be immediately north of the Florence 161-kV Substation, and one section, 0.19 miles in length, would be just east of the proposed switching station on land acquired in fee for the switching station. The existing almost 100-year-old ROW easement was initially used by the Southern Tennessee Power Company and later sold to TEPCO before TVA assumed ownership of the easement.

The southernmost approximately 4.2-miles of the proposed transmission line would be rebuilt on TVA's existing Colbert FP-Lawrenceburg 161-kV ROW which is currently occupied by a de-energized TEPCO transmission line. Many of the TEPCO structures have been overgrown with vegetation. After construction of the new transmission line is completed, TVA would remove the existing TEPCO line, including 75 TEPCO structures, which is currently located within the existing ROW and approximately 30 feet west of the centerline, beginning north of Gresham Road. The remaining approximately nine miles of proposed transmission line would be centered within existing TVA ROW easement that is currently unoccupied with no physical assets. At the northern terminus, TVA would construct a 400-foot-long loop line on new 100-foot-wide ROW into TVA's proposed 161-kV Switching Station. The switching station would be constructed on Ducktown Road in Lawrence County, adjacent to TVA's existing Colbert FP-Lawrenceburg 161-kV Transmission Line (L5617).

Florence Utilities, the local power company (LPC) owns the existing ROW easement for approximately 2.5 miles, beginning at the Florence Utilities' existing Florence 161-kV Substation and extending north to Middle Road in the City of Florence. TVA would re-acquire this 2.5-mile section of existing easement from Florence Utilities. Within this 2.5-mile section of the existing ROW easement, the proposed transmission line would be located on structures of an existing Florence Utilities' transmission line for about 1.1 miles.

Along this approximately 1.1-mile length, TVA would share the existing transmission line structures with Florence Utilities. The shared structures would be offset from the centerline of the ROW. Thus, TVA would not abandon down to 100 feet ROW in that section. TVA would keep 87.5 feet to the left of and 50 feet to the right of the centerline. This offset would end shortly after TVA stopped sharing structures. Beyond this point, new structures would be installed on centerline on 100-foot ROW.

The new transmission line would then shift slightly northeast and cross Highway 61 at the intersection of County Road 643. The new transmission line would continue northeast approximately 0.5 mile where it would cross County Road 30. Continuing north for another 1.0 mile, it would cross County Road 47 and continue north and travel on the west side of Shoal Creek for approximately 3.3 miles before crossing County Road 316. The new line would continue slightly northeast for 1.9 miles, crossing County Road 8, and then continue for 2.9 miles crossing County Road 61 twice before crossing the Alabama-Tennessee state border approximately 0.35 miles north of County Road 61. Immediately after entering Tennessee, the line would cross Pruitton Road and the Seaboard System Railroad and travel slightly northwest for approximately 1.1-miles, on the east side of Ducktown Road, before terminating at the new Iron City 161-kV Switching Station.

TVA's existing ROW easement ranges between 125- and 175-feet-wide in Alabama and would comprise about 12.2 miles of the new transmission line. TVA would abandon any of this ROW that exceeds TVA's standard 100-foot width and would not charge property owners to cover the fair market value, and the administrative costs as would normally be required when TVA abandons ROW. The remaining 1.1 miles of the new line would utilize about 13.3 acres of existing 100-foot-wide ROW easement in Tennessee.

TVA would acquire about 45.6 acres in fee for construction of the proposed switching station and transmission line work (Figure 2-1). The switching station would occupy approximately 8.7 acres of the 45.6-acre site. TVA would utilize an approximate 20-acre area of land immediately north of the proposed switching station and across Ducktown Road as a temporary laydown area and for spoil/borrow (Figure 2-1).

The Wilson Chemical-Reservation 161-kV Transmission Line connection at TVA's Reservation 161-kV Switching Station would be replaced with the connection from Iron City (through the Florence Substation) (see Figure 1-3). A switch ("motor operated device," or MOD) would be installed at the Florence Substation, such that the 13.3 miles of new transmission line construction under this project would extend this existing transmission line to the new Iron City Switching Station creating a new TVA Reservation-Iron City 161-kV Transmission Line. The existing portion of the Wilson Chemical-Reservation 161-kV Transmission Line from Structure 6 to Wilson Chemical would be "retired" (i.e., TVA drawings would be updated to reflect this change).

TVA would connect the new Reservation-Iron City 161-kV Transmission Line to the new Iron City Switching Station and would also loop three additional transmission lines into the new Iron City Switching Station from the existing Colbert FP-Lawrenceburg 161-kV Transmission Line, which would run immediately west and south of the new switching station. TVA would construct approximately 400 feet of loop line into the new switching station from the west to create the Iron City-West Centerville Transmission Line. TVA would also loop the Colbert FP-Lawrenceburg 161-kV Transmission Line into the new switching station from two southern locations, one west of Structure 121 and one east of

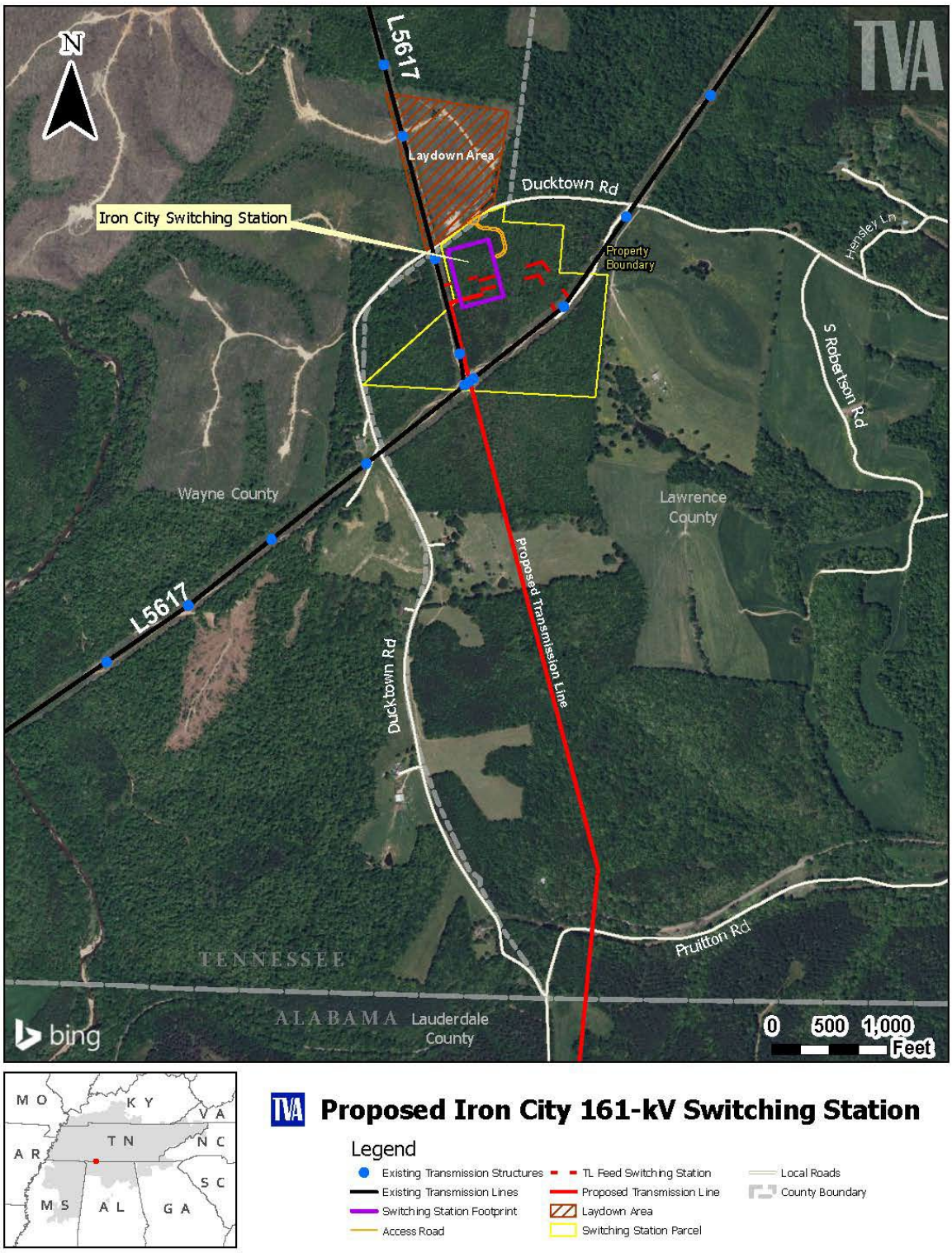

Figure 2-1. Iron City 161-kV Switching Station Arrangement Located in Lawrence County, Tennessee

Structure 121. The new loop line west of Structure 121 would be the Colbert FP-Iron City Transmission Line, and the loop line east of Structure 121 would be the Iron City-Lawrenceburg Transmission Line. These three loop lines would connect the new Iron City Switching Station with the existing Waynesboro, Loretto, and Crockett 161-kV substations. Thus, TVA's new Iron City 161-kV Switching Station would connect all four (including the Florence Substation) 161-kV substations (see Figure 1-2). These power system improvements would provide backup capability to the City of Florence and increase power reliability for the Waynesboro, Loretto, and Crockett substations.

TVA expects to utilize existing and/or new temporary access roads for construction and maintenance of the proposed transmission line. TVA would also remove the OHGW and replace it with OPGW to facilitate communications with the TVA network on the 3.4-mile-long transmission line section between the TVA Reservation Switching Station and the Florence Substation.

Additional information describing implementation of the proposed Action Alternative is provided below in Sections 2.2 through 2.4.

2.1.3. Alternatives Considered but Eliminated from Further Discussion

The following alternatives were not feasible for the reasons provided below.

2.1.3.1. Uprate or Upgrade existing Infrastructure

TVA considered various solutions to providing increased reliability for Florence Utilities. Currently, Florence Utilities receives about 130 MW of power from the Wilson Hydro Plant to service its power area. This power is served from a radial line and must also cross the Tennessee River (see Figure 1-2). Should this radial line fail, Florence Utilities would not be able to serve the load within their service area and the repair of this line would be complicated and drawn out. As such, TVA determined that uprating or upgrading the existing transmission line would not meet the Purpose & Need for the proposed project of improving reliability of transmission system capacity in the Florence area in a technically and economically feasible manner.

2.1.3.2.A New Greenfield Transmission Line

TVA evaluated alternatives to the proposed action during the Planning phase and determined that this alternative did not present a reasonable, economical method of achieving the project's purpose and need of improving electrical reliability and aligning with TVA's statutory mission of generating and transmitting electricity at the least system cost. To alleviate Florence Utilities from being served on a radial line, TVA considered from where another power source could be brought in. To the west and running north, TVA has the Colbert FP-Lawrenceburg 161-kV Transmission Line. Constructing a new transmission line to this power source would provide a second power source to Florence Utilities. TVA could construct a slightly shorter transmission line on new ROW easement to the west to connect to this line. However, it would be difficult to route due to the congestion of existing development present. Since TVA has custody and control of the easement on which the new transmission line is proposed which connects to this line further north, other alternative routes were not considered during the development of this proposal.

2.1.3.3. Underground Utility Lines

A frequent objection to the construction of new transmission lines involves their adverse visual effects. Thus, a frequently suggested alternative is the installation of underground transmission lines.

Power lines can be buried. However, most buried transmission lines tend to be low-voltage distribution lines (lines that are 13-kV or less) rather than high-voltage transmission lines, which tend to be 69-kV and above. Although low-voltage distribution lines can be laid into trenches and buried without the need for special conduits, burying higher voltage transmission lines requires extensive excavation as these transmission lines must be encased in special conduits or tunnels. Additionally, measures to ensure proper cooling and to provide adequate access are required. Usually, a road along or within the ROW for buried transmission lines must be maintained for routine inspection and maintenance.

Although buried transmission lines are much less susceptible to catastrophic storm damage, especially wind damage, they tend to be very expensive to install and maintain. Depending on the type of cable system used, special equipment or ventilation systems may be required to provide adequate cooling for the underground conductors. Similarly, they must be protected from flooding, which could cause an outage. Repairs of buried transmission lines may require excavation, and the precise location of problem areas can be difficult to determine.

The potential adverse environmental effects of constructing and operating a buried high-voltage transmission line would likely be greater overall than those associated with a traditional aboveground transmission line. In addition, the expense of a buried high-voltage transmission line would be prohibitive. For these reasons, burying the proposed transmission line is not a feasible option and this alternative was eliminated from further consideration.

2.2. Construction, Operation, and Maintenance of the Proposed Transmission Line and Switching Station

2.2.1. Transmission Line Construction

2.2.1.1. Right-of-Way Acquisition and Clearing

A ROW utilizes an easement that would be designated for a transmission line and associated assets. The easement would require maintenance to avoid the risk of fires and other accidents and to ensure reliable operation. The ROW provides a safety margin between the high-voltage conductors and surrounding structures and vegetation. The ROW for this project is described in Section 2.1.2.

TVA would utilize existing ROW easement for the proposed project. This easement would give TVA the right to clear the ROW and to construct, operate, and maintain the transmission line, as well as remove “danger trees” adjacent to the ROW. Danger trees include any trees located beyond the cleared ROW, but that are tall enough to pass within five feet of a conductor or strike a structure should it fall toward the transmission line. The fee simple ownership of the land within the ROW would remain with the landowner, and many activities and land uses could continue to occur on the property. However, the terms of the easement agreement prohibit certain activities, such as construction of buildings and any other activities within the ROW that could interfere with the operation or maintenance of the transmission line or create a hazardous situation.

Because of the need to maintain adequate clearance between tall vegetation and transmission line conductors, as well as to provide access for construction equipment, all trees and most shrubs would be removed from the entire width of the ROW. Equipment used during this ROW clearing would include chain saws, skidders, bulldozers, tractors, and/or low ground-pressure feller-bunchers[3]. 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 ROW to serve as sediment barriers.

Vegetation removal in streamside management zones (SMZs) and wetlands would be restricted to trees tall enough, or with the potential to soon grow tall enough, to interfere with conductors. Clearing in SMZs would be accomplished using handheld equipment or remote-handling equipment, such as a feller-buncher, to limit ground disturbance.

TVA utilizes standard practices for ROW clearing and construction activities. These guidance and specification documents (listed below) are provided on TVA's transmission system projects web page and are taken into account when considering the effects of the proposed Action Alternative (TVA 2024a). TVA transmission projects also utilize best management practices (BMPs) as identified in TVA (2022) to provide guidance for clearing and construction activities.

1. *ROW Clearing Specifications*
2. *Environmental Quality Protection Specifications for Transmission Line Construction*
3. *Transmission Construction Guidelines Near Streams*
4. *Environmental Quality Protection Specifications for Transmission Substation or Communications Construction*
5. *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities* (hereafter referred to as "TVA 2022")

The emission of criteria pollutants or their precursors would not exceed *de minimis* levels specified in 40 CFR § 93.153(b). Thus, consistent with Section 176(c) of the CAA, project activities would be in conformity with the requirements of Tennessee's State Implementation Plan for attaining air quality standards.

Following clearing and construction, an appropriate vegetative cover on the ROW would be restored. TVA would utilize appropriate seed mixtures as described in TVA 2022 or work with property owners with impacted crop land to ensure restoration supports or minimizes impacts to production. Erosion controls would remain in place until the plant communities become fully established. Streamside areas would be revegetated as described in the above documents. Failure to maintain adequate clearance can result in dangerous situations, including ground faults. As such, native vegetation or plants with favorable growth patterns (slow growth and low mature heights) would be maintained within the ROW following construction. All future ROW maintenance would be performed in accordance

[3] A feller-buncher is a self-propelled machine with a cutting head that is capable of holding more than one stem at a time. Tracked feller-bunchers are capable of operating on wet and loose soils, have a lower ground-pressure than wheeled equipment, and are less prone to rutting and compaction.

with the 2019 vegetation management programmatic EIS (TVA 2019b) in accordance with the injunction arising under *Sherwood v. TVA* (Appendix B); until the *Sherwood* injunction is lifted by a court of competent jurisdiction, TVA will adhere to the terms and conditions of the injunction for all ROW maintenance actions within its scope.

2.2.1.2. Access Roads

Access roads would be needed to allow vehicular access to each structure and other points along the ROW. Typically, new permanent or temporary access roads used for transmission lines are located on the ROW wherever possible and are designed to avoid severe slope conditions and to minimize environmental resources such as stream crossings. Access roads are typically about 12 to 16 feet wide and are covered with dirt, mulch, or gravel.

Culverts and other drainage devices, fences, and gates would be installed as necessary. Culverts installed in any permanent streams would be removed following construction. However, in ephemeral[4] 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. Additional applicable ROW clearing and environmental quality protection specifications are listed in *TVA ROW Clearing Specifications*, *Environmental Quality Protection Specifications for Transmission Line Construction*, and *Transmission Construction Guidelines Near Streams* (TVA 2024a).

2.2.1.3. Construction Assembly Areas

A construction assembly area (or "laydown" area) would be required for worker assembly, vehicle parking, and material storage. This area may be on existing substation property or may be leased from a private landowner for the duration of the construction period. The property is typically leased by TVA about a month before construction begins. Properties such as existing parking lots or areas used previously as car lots are ideal laydown areas because site preparation is minimal. Selection criteria used for locating potential laydown areas include areas that are typically five acres in size; relatively flat; well drained; previously cleared; preferably graveled and fenced; preferably with wide access points with appropriate culverts; sufficiently distant from streams, wetlands, or sensitive environmental features; and located adjacent to an existing paved road near the transmission line. TVA initially attempts to use or lease properties that require no site preparation. However, at times, the property may require some minor grading and installation of drainage structures such as culverts. Likewise, the area may require graveling and fencing. Trailers used for material storage and office space would be parked on the site. Following completion of construction activities, all trailers, unused materials, and construction debris would be removed from the site. Removal of TVA-installed fencing and site restoration would be performed by TVA at the discretion of the landowner.

2.2.1.4. Structures and Conductors

The proposed transmission line would consist primarily of steel, single-pole and H-frame structures on existing TVA ROW easement varying in length from 100 to 175 feet. Examples of these structure types are shown in Figure 2-2. Structure heights (above ground) would vary according to the terrain but would range between 65.5 to 110.5 feet tall, with an average height of 88 feet above ground.

[4] Ephemeral streams are also known as wet-weather conveyances or streams that run only following a rainfall.

Figure 2-2. Typical Steel, Single-Pole and H-Frame Structures

Three conductors (the cables that carry the electrical current) are required to make up a single circuit in alternating current transmission lines. For a 161-kV transmission line, each single-cable conductor is attached to porcelain insulators suspended from the structure cross arms. A smaller overhead ground wire or wires are attached to the top of the structures.

Poles at angles (angle points) in the transmission line may require supporting screw, rock, or log-anchored guys. Some angle structures may be self-supporting poles or steel towers, which would require concrete foundations. Most poles would be directly imbedded in holes augured into the ground to a depth equal to 10 percent of the pole's length plus an additional two feet. Normally, the holes would be backfilled with the excavated material, but, in some cases, gravel or a concrete-and-gravel mixture would be used, depending on local soil conditions.

Equipment used during the construction phase would include trucks, truck-mounted augers and drills, excavators, as well as tracked cranes and bulldozers. Low ground-pressure-type equipment would be used in specified locations (such as areas with soft ground) to reduce the potential for environmental impacts.

2.2.1.5. Conductor and Ground Wire Installation

Reels of conductor and ground wire would be delivered to the construction assembly area(s), and temporary clearance poles would be installed at road crossings to reduce interference with traffic. A small rope would be pulled from structure to structure. The rope would be connected to the conductor and ground wire and used to pull them down the line through pulleys suspended from the insulators. A bulldozer and specialized tensioning equipment would be used to pull conductors and ground wires to the proper tension. Crews would then clamp the wires to the insulators and remove the pulleys.

2.2.2. Switching Station Property Acquisition, Clearing, and Construction

TVA would acquire about 45.6 acres in fee for construction of the new four-position ring bus switching station and transmission line work. The switching station would occupy approximately 8.7 acres of the 45.6-acre site (Figure 2-1). TVA would utilize an area of land immediately north of the proposed switching station and across Ducktown Road as a temporary laydown area and for spoil/borrow (Figure 2-1).

The new switching station would be constructed on Ducktown Road in Lawrence County, Tennessee, adjacent to TVA's existing Colbert FP-Lawrenceburg 161-kV Transmission Line (L5617). The Wilson Chemical-Reservation 161-kV Transmission Line connection at TVA's Reservation 161-kV Switching Station would be replaced with the connection from Iron City (through the Florence substation) (see Figure 1-3). A switch ("motor operated device," or MOD) would be installed at the Florence substation, such that the 13.3 miles of new transmission line construction under this project would extend this existing transmission line to the new Iron City 161-kV Switching Station creating a new TVA Reservation-Iron City 161-kV Transmission Line. The Wilson Chemical-Reservation 161-kV Transmission Line name would be "retired" (i.e., TVA drawings would be updated to reflect this change).

TVA would connect the new Reservation-Iron City 161-kV Transmission Line to the new Iron City Switching Station and would also loop three additional transmission lines into the new Iron City Switching Station from the existing Colbert FP-Lawrenceburg 161-kV Transmission Line, which would run immediately west and south of the new switching station. TVA would construct approximately 400 feet of loop line into the new switching station from the west to create the Iron City-West Centerville Transmission Line. TVA would also loop the Colbert FP-Lawrenceburg 161-kV Transmission Line into the new switching station from two southern locations, one west of Structure 121 and one east of Structure 121. The new loop line west of Structure 121 would be the Colbert FP-Iron City Transmission Line, and the loop line east of Structure 121 would be the Iron City-Lawrenceburg Transmission Line. These three loop lines would connect the new Iron City Switching Station with the existing Waynesboro, Loretto, and Crockett 161-kV substations. Thus, TVA's new Iron City 161-kV Switching Station would connect all four (including the Florence substation) 161-kV substations. These power system improvements would provide backup capability to the City of Florence and increase reliability for the Waynesboro, Loretto, and Crockett substations.

TVA would clear vegetation on the site, remove the topsoil, and grade the property in accordance with TVA's *Site Clearing and Grading Specifications* (TVA 2024a). Equipment used during clearing would include chain saws, skidders, bulldozers, tractors, and/or low ground-pressure feller-bunchers. However, because the site is an open pasture, essentially no marketable timber occurs on the parcel. As necessary, any woody debris and other vegetation would likely be piled and burned, chipped, or taken off site. Prior to burning, TVA would obtain any necessary permits. 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 *Site Clearing and Grading Specifications,* (TVA 2024a), and Transmission's BMP guidance (TVA 2022) would provide further guidance for clearing and construction activities.

The proposed switching station site would be located in a wooded area on a slight slope and would be leveled through a cut and fill process to help achieve a design elevation. The areas of the site that are too high (sloped) would be "cut" down to a level elevation, and other areas that are too low require "fill" to raise the elevation. Any additional fill required would be obtained from an approved/permitted borrow area.

Once the switching station site has been graded, excess soil (i.e., "spoil") would be removed in preparation for foundations. Temporary spoil storage is proposed to be located onsite. Silt fences, site drainage structures, and any necessary detention pond(s) would be installed during construction. Total disturbance for the switching station, including grading, onsite spoil storage, and any necessary detention basins would be approximately 11.9 acres. The switching station yard would be covered with crushed stone and enclosed with chain link fencing. A new gravel access road, approximately 550 feet long, would be constructed from Ducktown Road to the switching station. Once completed, the switching station is expected to occupy approximately 8.7 acres.

Following clearing and construction, disturbed areas on the property, excluding the switching station, would be restored to the extent practicable to pre-construction conditions, utilizing appropriate seed mixtures as described in TVA 2022. Erosion controls would remain in place site-wide until the plant communities become fully established.

Major equipment installed at the switching station site would include equipment support, circuit breaker, pull-off switch, transformer, bus support, and a switch house. The circuit breakers would utilize SF-6 as the electrical insulator and would contain no oil. The switch house would be equipped with potable water and septic tank drain field. A water line would be installed along the switching station access road and connected to the local water supply system. A field line system would be installed to treat the generated sewage.

As described in TVA's Substation Lighting Guidelines (TVA 2024a), all lights at the substation would be fully shielded or would have internal low-glare optics, such that no light is emitted from the fixtures at angles above the horizontal plane. TVA's Environmental Quality Protection Specifications for Transmission Substation or Communications Construction (TVA 2024a) would be utilized during the construction of the switching station.

2.2.3. Operation and Maintenance

2.2.3.1. Inspection

Periodic inspections of 161-kV transmission lines are performed by helicopter aerial surveillance or by drones after operation begins. Foot patrols or climbing inspections are performed to locate damaged conductors, insulators, or structures, and to discover any abnormal conditions that might hamper the normal operation of the line or adversely affect the surrounding area. During these inspections, the condition of vegetation within the ROW, as well as that immediately adjoining the ROW, is noted. These observations are then used to plan corrective maintenance and routine vegetation management.

2.2.3.2. Vegetation Management

Management of vegetation along the ROW would be necessary to ensure access to structures and to maintain an adequate distance between transmission line conductors and vegetation. Adequate ground clearance is important to account for construction, design, and survey tolerances (e.g., conductor sagging). TVA uses more conservative distances than NESC requirements. TVA uses a minimum ground clearance of 24 feet for a 161-kV

transmission line and 30-feet for a 500-kV transmission line at the maximum line operating temperature. Vegetation management along the ROW would consist of two different activities: felling danger trees adjacent to the cleared ROW (as described in Section 2.2.1.1), and vegetation control within the cleared ROW total width. These activities occur on approximately 3-year cycles.

As referenced in Section 1.4, TVA completed the Transmission System Vegetation Management PEIS in 2019 which addresses tools and methods TVA would use to manage ROW vegetation. Subsequent site specific NEPA documents which tiered from the PEIS were also completed (TVA 2020; TVA 2021; TVA 2023; TVA 2024b) to ensure resource impacts would be avoided, minimized, or mitigated. Management of vegetation within the cleared ROW would include an integrated vegetation management approach designed to encourage the low-growing plant species and discourage tall-growing plant species. A vegetation re-clearing plan would be developed for each transmission line connection, based on the results of the periodic inspections described above. The two principal management techniques are mechanical mowing (using tractor-mounted rotary mowers) and herbicide application. Herbicides are normally applied in areas where heavy growth of woody vegetation is occurring on the ROW and mechanical mowing is not practical. Herbicides would be selectively applied from the ground with backpack sprayers or vehicle-mounted sprayers, or, in rare cases, by helicopter.

Any herbicides used are applied in accordance with applicable state and federal laws and regulations. Only herbicides registered with the U.S. Environmental Protection Agency (EPA) are used. A list of the herbicides currently used by TVA in ROW management is presented in Appendix C. This list may change over time as new herbicides are developed or new information on presently approved herbicides becomes available. Additionally, as described in Section 2.2.1.1 Right-of-Way Acquisition and Clearing, all vegetation management actions subject to the scope of the *Sherwood* injunction will comply with its terms and conditions until a court of competent jurisdiction actions to lift the injunction.

2.2.3.3. Structure Replacement

Other than vegetation management, only minor maintenance work is generally required. The transmission line structure and other components typically last several decades. If a structure needs to be replaced, the structure would normally be lifted out of the ground by crane-like equipment, and the replacement structure would be inserted into the same hole or an adjacent hole. Access to the structures would be via existing roads. Replacement of structures may require leveling the area surrounding the replaced structures, but additional area disturbance would be minor compared to the initial installation of the structure.

2.3. Siting Process

The Siting methodology is a process of weighing all relevant factors to achieve a balanced solution. The process of Siting the proposed transmission line followed the basic steps used by TVA to determine a transmission line route. These include the following steps:

- Determine the potential existing power sources to supply the transmission line.
- Define the study area.
- Collect data to minimize potential impacts to social, engineering, and environmental (cultural and natural) features.
- Identify general route segments producing potential routes.

- Gather public input.
- Redefine general route segments.
- Incorporate public input into the final selection of the transmission line route, if necessary.

For the proposed project, TVA has custody and control of the easement on which the new transmission line would be built, and the new switching station site would be limited to a small quadrant in the vicinity of the existing Colbert FP-Lawrenceburg 161-kV Transmission Line. For these reasons, TVA did not follow the standard Siting process for greenfield transmission line projects, as outlined above. Further, TVA held a virtual Information Session rather than a virtual Open House. During the Information Session, the public could view the information and provide contact information or ask questions, but no alternatives were presented and thus no opportunity for public comments. Any fine adjustments made to the proposed route were based on working with impacted property owners and information obtained from environmental field surveys.

GIS data was limited to a small quadrant in the vicinity of the existing Colbert-Lawrenceburg 161-kV Transmission Line during siting the new Iron City 161-kV Switching Station location. Proximity to an existing line would ultimately reduce the length of loop lines needed to connect the existing Waynesboro, Loretto, and Crockett 161-kV substations.

2.3.1. Definition and Description of the Study Area

The study area was determined primarily by the geographic boundaries of TVA's existing power system assets, in addition to existing, empty TVA ROW assets, in the Florence area (see Figure 1-2). The proposed project's Study Area encompasses Wayne and Lawrence counties, Tennessee as well as Lauderdale and Colbert counties, Alabama.

The Colbert–Lawrenceburg 161-kV Transmission Line serves three 161-kV substations. The Waynesboro 161-69 kV Substation provides the source for a 69-kV network that serves Tennessee Valley Electric Cooperative's Collinwood and Clifton City 69-kV substations in Tennessee. The two 69-kV transmission lines that serve these 69-kV substations are 16.4 miles and 22.6 miles long, respectively. The other two substations served by the Colbert-Lawrenceburg 161-kV Transmission Line are Lawrenceburg Utility System's Loretto and Crockett 161-kV substations (see Figure 1-2).

The recommended solution to address the reliability concerns is for TVA to extend the existing radial line, coming from the TVA Reservation to Florence, north 13.3 miles to the Colbert–Lawrenceburg 161-kV Transmission Line and construct a new four-position ring bus switching station. This new Iron City 161-kV Switching Station would also increase the reliability of the Waynesboro, Loretto, and Crockett substations. TVA has custody and control of the ROW easement for the proposed transmission line from the existing Florence Substation to the proposed Iron City Switching Station location. The new switching station site would be limited to a small quadrant in the vicinity of the existing Colbert FP-Lawerence 161-kV Transmission Line. Figure 1-3 below shows an overview of the study area recommended solution (dashed red line) from an aerial view and a single line view.

2.3.2. Data Collection

TVA collected geographic data such as topography, land use, transportation, environmental features, and cultural resources for the study area. Information sources used in the transmission line study included design drawings for area transmission lines, data collected into a geographic information system (GIS), including U.S. Geological Survey (USGS) digital line graphs, National Wetland Inventory (NWI) maps, wetland modelling results, floodplains, photo-interpreted land use/land cover data, and Lauderdale and Lawrence counties tax maps. Also used were various proprietary data maintained by TVA in a corporate geo-referenced database (i.e., TVA Regional Natural Heritage file data on sensitive plants and animals and archaeological and historical resources).

Data was then analyzed both manually and with GIS. The use of GIS allows substantial flexibility in examining various types of spatially superimposed information. This system allowed the multitude of study area factors to be examined simultaneously for developing and evaluating numerous options and scenarios to select the transmission line route that would best meet project needs, which included avoiding or reducing potential environmental impacts.

2.4. Identification of the Proposed Preferred Transmission Line Route and Switching Station Site

TVA did not identify route alternatives because TVA already has custody and control of the easement on which the new transmission line would be built. As such, TVA's proposed preferred transmission line route would be to utilize TVA's existing ROW located between Florence Utilities' existing Florence 161-kV Substation in Lauderdale County and TVA's existing Colbert FP-Lawrenceburg 161-kV Transmission Line. TVA would acquire about 45.6 acres in fee for construction of the proposed Iron City 161-kV Switching Station in Lawrence County.

2.5. Comparison of Environmental Effects by Alternative

A summary of the anticipated potential effects of implementing the No Action and the Action Alternative is provided in Table 2-1.

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

Resource Area	Impacts From No Action Alternative	Impacts From Proposed Action Alternative
Groundwater and Geology	No effects to local groundwater quality or quantity are expected.	Impacts to groundwater quality or quantity are anticipated to be minor.
Surface Water	No changes in local surface water quality are anticipated.	Any impacts to surface waters in the project area are expected to be minor, temporary impacts with the proper implementation of erosion and sediment BMPs identified in the SWPPP and CBMPP for TDEC and ADEM, respectively, and TVA requirements as described in TVA 2022.
Aquatic Ecology	Aquatic life in local streams would not be affected.	With the implementation of SMZs and BMPs, impacts to aquatic animals resulting from the proposed project would be temporary and insignificant.

Resource Area	Impacts From No Action Alternative	Impacts From Proposed Action Alternative
Vegetation	Local vegetation would not be affected.	Site preparation and clearing of approximately 47.27 acres, of which are mostly deciduous forest, would have a minor effect on most local vegetation. No uncommon plant communities are known from the vicinity of the project area and no rare plant communities were observed in the project area during the field survey. Implementation of the proposed project would not affect unique or important terrestrial habitat.
Wildlife	Local wildlife would not be affected.	Temporary direct impacts could occur to immobile wildlife and migratory birds of conservation concern during construction activities. Temporary minor indirect impacts are anticipated due to removing trees and other vegetation within the project area that would displace wildlife using these habitats. Because there are sufficient adjacent local habitats, any effects to populations of these species are expected to be insignificant.
Endangered and Threatened Species	No effects to endangered or threatened species or any designated critical habitats are anticipated.	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 relevant conservation measures in the Bat Strategy Project Review Form (Appendix E), the proposed TVA action is expected to have only minor effects on federally or state-listed species.
Floodplains	No changes in local floodplain functions are expected.	With the implementation of standard BMPs and mitigation measures, no significant impact on floodplains would occur. All actions would be consistent with EO 11988.
Wetlands	No changes in local wetland extent or function are expected.	The proposed project would permanently impact 0.04 acres of forested wetlands within the Wilson Lake-Shoal Creek Watershed and 1.09 acres in the Tennessee River-Cypress Creek Watershed of the project area. With appropriate permits, mitigation, and BMPs implemented, wetland impacts would be minor on a watershed scale.

Resource Area	Impacts From No Action Alternative	Impacts From Proposed Action Alternative
Visual Resources	Aesthetic character of the area is expected to remain virtually unchanged.	Minor visual discord above ambient levels would be produced during construction and maintenance activities. The proposed transmission line would present a minor, long-term visual effect.
Noise and Vibration	No noise or vibration impacts from construction or operation would occur because the proposed transmission line and switching station would not be constructed.	Overall, temporary, minor noise above ambient levels would be produced during construction, operation, and maintenance activities.
Archaeological and Historic Resources	No adverse effects to archaeological or historic resources are anticipated.	TVA finds that the proposed undertaking would result in no adverse effects on historic properties.
Recreation, Parks, and Managed Areas	No changes in local recreation opportunities, managed areas, natural areas, or ecologically significant sites are expected.	No major impacts are anticipated to managed areas, natural areas, or ecologically significant sites from construction or operation of the proposed transmission line and switching station.
Socioeconomics	No change in local demographics, socioeconomic conditions, or community services.	Any adverse impacts to low income or minority communities in the project area would be similarly experienced by all people living along the proposed transmission line corridor. However, any adverse impacts would be minor due to the distance between residences and the proposed project area. These impacts are similar to impacts experienced by communities living along TVA's transmission line network across the Valley. The proposed alternative would allow for growth and increase power reliability in the Florence area in Lauderdale County.

2.6. Identification of Mitigation Measures

TVA employs standard practices when constructing, operating, and maintaining substations, transmission lines, structures, and the associated ROW and access roads. These can be found on TVA's Transmission organization's website (TVA 2024a). Some of the more specific routine measures which would be applied to reduce the potential for adverse environmental effects during the construction, operation, and maintenance of the proposed transmission line and access roads are as follows:

- TVA would implement erosion and sediment BMPs identified in the SWPPP and CBMPP for TDEC and ADEM, respectively, and TVA requirements as described in Transmission's BMP guidance (TVA 2022), 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 guidance (TVA 2022).

- Wetlands would be protected by TVA's compliance with all USACE/TDEC/ADEM mitigation requirements and by the implementation of standard BMP's as identified in Transmission's BMP guidance (TVA 2022).

- Ephemeral streams, also called wet-weather conveyances (WWC), that could be affected by the proposed construction would be protected by implementing standard BMPs as identified in Transmission's BMP guidance (TVA 2022).

- Perennial and intermittent streams, both classified as "streams" in this document, would be protected by the implementation of standard stream protection (Category A) as defined in Transmission's BMP guidance (TVA 2022).

- Integration of BMPs and the use of relevant conservation measures identified in the Bat Strategy Project Review Form (Appendix E, Table 4, pages 5 and 6) during construction and maintenance to minimize potential impacts to bat foraging habitat.

- Vegetation would be managed as outlined in TVA's Transmission System Vegetation Management PEIS (TVA 2019b) and according to TVA's *Transmission Environmental Protection Procedures Right-of-Way Vegetation Management Guidelines* (see Appendix C).

- During vegetation clearing activities, marketable timber would be salvaged where feasible; otherwise, woody debris and other vegetation would be piled, 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 *Site Clearing and Grading Specifications, Environmental Quality Protection Specifications for Transmission Substation or Communications Construction* (TVA 2024a), and Transmission's BMP guidance (TVA 2022) would 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/WWCs, 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.

- No herbicide use is permitted within 200 feet of known caves due to potentially sensitive subterranean aquatic resources. Clearing would be limited to hand machinery only, (i.e.: chainsaws, bush hog, mowers). Vehicles and equipment would be confined to existing access roads.

- 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 EPA-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 (Appendix C).

The following non-routine measures would be applied during construction of the proposed transmission line and access roads to reduce the potential for adverse environmental effects.

- Construction would adhere to the TVA subclass review criteria for transmission line location in floodplains (TVA 1980).

- Any road improvements or construction in 100-year floodplains would be done in such a manner that upstream flood elevations would not be increased by more than 1.0 foot.

- Excess material would be spoiled outside of published floodways.

- TVA would coordinate with the Blackberry Trail Golf Course to ensure the safety of their golf cart/walking trail. The old de-energized TEPCO transmission line runs directly over this trail. Signage would be placed by TVA to warn pedestrians of the construction. The trail may need to be temporarily closed depending on the potential hazards presented during the project.

2.7. The Preferred Alternative

The Action Alternative—that TVA provides improvements to its transmission system in the Florence area of Lauderdale County—is TVA's preferred alternative for this proposed project. TVA would build the Iron City 161-kV Switching Station in Lawrence County, Tennessee and the Florence-Iron City 161-kV Transmission Line which would be approximately 13.3 miles long centered on an existing TVA 100-foot-wide ROW easement (Figure 1-2). TVA would re-acquire 2.5 miles of Florence Utilities transmission line ROW easement and would co-locate the proposed transmission line for 1.1 miles within this section on the Florence Utilities structures. Additionally, TVA would install three short loop lines to connect the new Iron City Switching Station with the existing Waynesboro, Loretto, and Crockett 161-kV substations located in Tennessee. TVA would also remove OHGW and replace it with OPGW on the 3.4-mile-long section of the existing TVA Reservation Switching Station-Florence 161-kV Transmission Line.

TVA's proposed Florence-Iron City 161-kV Transmission Line would begin at Florence Utilities' existing Florence 161-kV Substation in Lauderdale County, Alabama and extend north to TVA's new Iron City 161-kV Switching Station. The proposed project would utilize about 161 acres for the new transmission line and approximately 8.7 acres of a 45.6-acre site for the switching station.

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 switching station and approximately 13.3 miles of transmission line is described in this chapter. The descriptions below of the potentially affected environment are based on field surveys conducted between February and March 2024, and October 2024, 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 analysis of potential effects to endangered and threatened species and their habitats included records of occurrence within a 3-mile radius for terrestrial animals, a 5-mile radius for plants, and a 10-mile radius for aquatic animals. The analysis of potential effects to aquatic resources included the local watershed but was focused on watercourses within or immediately adjacent to the proposed ROW, switching station and associated access roads. The area of potential effects (APE) for architectural resources included all areas within a 0.5-mile radius from the proposed transmission line route and switching station, 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 entire ROW width as described in Section 3.10.1 for the proposed route, the associated access roads, and area associated with the proposed switching station and temporary laydown area.

Potential effects related to prime farmland, transportation, air quality, global climate change, solid waste, hazardous and nonhazardous wastes, and health and safety were considered. Potential effects on these resources were found to be minimal or absent because of the nature of the action.

3.1. Groundwater and Geology

3.1.1. Affected Environment

The geology within the project area in Tennessee includes Paleozoic Devonian-Silurian sedimentary rocks characterized by limestone, chert, shale and sandstone (TDEC 1966). Geology within the project area in Alabama includes Mississippian Tuscumbia limestone and Fort Payne chert. Additionally, the project area also includes portions of Silurian rocks with undifferentiated silty limestone within Alabama (Geological Survey of Alabama [GSA] 1962).

Based on a geotechnical exploration conducted in 2023 at the proposed Iron City 161-kV Switching Station location in Lawrence County, the site is underlain by the Fort Payne and Chattanooga Shale formation. The Fort Payne formation consists of calcareous and dolomitic silica stone which contains bedded chert, cherty limestone, and minor shale. Scattered crinoidal limestone lenses are present throughout the formation. The Fort Payne formation weathers to produce a tan and yellowish-tan clayey residuum with abundant chert fragments. The Chattanooga Shale formation consists of grayish-black, fissile, carbonaceous shale (GEI 2023).

Carbonate rock (i.e., limestone/dolomite), while appearing very hard and resistant, is soluble in slightly acidic water. This solubility is responsible for karst features such as caves, sinkholes and springs. With karst features come potential hazards such as irregular weathering, cave and cavern conditions, and overburden sinkholes. Since the bedrock immediately underlying the project area contains carbonate rock, the project site is susceptible to karst features and the hazards associated with carbonate rock. Of these hazards, the occurrence of sinkholes is potentially the most damaging to overlying soil-supported structures. Sinkholes occur primarily due to differential weathering of the bedrock and flushing or raveling of overburden soils into the cavities in the bedrock. The loss of solids creates a cavity or dome in the overburden. Growth of the dome over time or excavation over the dome can create a condition in which rapid, local subsidence or collapse of the roof of the dome occurs (GEI 2023).

The main aquifer within the project area in Alabama is the Tuscumbia-Fort Payne aquifer in the Highland Rim. The Highland Rim extends northward from Alabama into Tennessee and Kentucky. In Alabama, the Highland Rim is located in the northwest and central north portion of the state and is drained exclusively by the Tennessee River (GSA 2018). The Tuscumbia-Fort Payne aquifer flows from northeast to southwest along the Cahaba Mountain Syncline at a rate of about 2.4 miles per year and yields as much as 2,300 gallons of water per minute to wells (GSA 2012, United States Geological Survey [USGS] 1990). This aquifer is found at depths of 3,500 feet and is contained in the upper Mississippian Paleozoic system (USGS 1989). Groundwater in the Highland Rim system occurs primarily in secondary openings. These openings include solution openings, joints, and faults that receive recharge from precipitation, rivers, or lakes. Flow directions are generally from upland areas to major streams which act as drains. Additional discharge points also include springs (USGS 1986).

In Tennessee, the principal aquifer under the project area is the Mississippian carbonate aquifer (USGS 2003). The Mississippian carbonate aquifer is located in the middle region of Tennessee and extends into the northern parts of Alabama (Kingsbury and Shelton 1999). This aquifer system has a depth of 50 to 200 feet and yields 5 to 50 gallons per minute (United States Department of Agriculture [USDA] 2013). Well data shows that annual average groundwater withdrawal from the Mississippian carbonate aquifer ranges from 0.26 to 0.45 million gallons per day in Lawrence County, Tennessee, 0.20 million gallons per day in Wayne County, Tennessee, and 0.01 to 0.25 million gallons per day in Lauderdale County, Alabama (USGS 2003, Alabama Department of Economic and Community Affairs 2015). In carbonate rock, such as that which forms the Mississippian carbonate aquifer, fractures and bedding planes are enlarged by dissolution of the rock allowing for the storage and movement of groundwater. Dissolution occurs as slightly acidic water dissolves calcite and dolomite which are principal components of carbonate-rock aquifers.

The chemical quality of water in the freshwater parts of the Mississippian carbonate aquifer is generally hard water, with high iron, sulfide, or sulfate concentrations in some areas. This aquifer is also susceptible to contamination from point and nonpoint sources (USDA 2013, Kingsbury and Shelton 1999). Contamination of groundwater in this aquifer system could likely be the result of a number of factors including shallow depth of groundwater (generally less than 50 feet), low organic content of soils, moderately well to well-drained soils, and the karst groundwater flow system where the potential for rapid contamination transport is high (Kingsbury and Shelton 1999). Groundwater in the Tuscumbia-Fort Payne aquifer is classified as moderately hard to hard, and may contain iron, carbon dioxide, or

hydrogen sulfide (GSA 2012, Alabama A&M University 2021). The Tuscumbia-Fort Payne aquifer is also susceptible to surface contamination (USGS 1989). Aquifers are susceptible to surface contamination wherever recharge occurs. The source of contamination may be point sources such as leaking waste ponds or nonpoint sources such as agricultural areas that have received fertilizer and pesticide applications (USGS 1989).

Public water suppliers within the three counties of the project area include 8 suppliers in Lauderdale County, 86 suppliers in Wayne County and 42 suppliers in Lawrence County (Safe Drinking Water Information System 2024a, 2024b, 2024c). The State of Tennessee and TDEC have developed a Wellhead Protection Program to protect public water systems from contaminated groundwater by designating official wellhead protection areas to monitor groundwater (TDEC 2024a). The Alabama Department of Environmental Management has been delegated authority by the EPA to carry out the provisions of the Safe Drinking Water Act in Alabama. This is accomplished through enforcement of water quality regulations established by construction and operating permits, robust monitoring and reporting, and frequent inspections of the nearly 600 public water systems in the state (ADEM 2024a).

In addition to these water safety programs, the Safe Drinking Water Act of 1974 established the sole source aquifer protection program that regulates certain activities in areas where the aquifer (water-bearing geologic formations) provides at least half of the drinking water consumed in the overlying area. No sole source aquifers exist in Tennessee or Alabama (EPA 2024).

3.1.2. Environmental Consequences

3.1.2.1. Alternative A – No Action

Under the No Action Alternative, TVA would not construct the proposed 13.3-mile Florence-Iron City 161-kV Transmission Line or the Iron City 161-kV Switching Station, or associated access roads. Therefore, no impacts to groundwater or geologic resources would occur as a result of TVA actions associated with the proposed project.

3.1.2.2. Alternative B – Action Alternative

Under the Action Alternative, construction activities would entail localized ground disturbance and shallow excavation. Depth of excavation would be approximately 10 percent of the pole structure height plus an additional two feet. Because proposed structures would range from 75 to 125 feet in height, excavation depth would be approximately 9.5 to 14.5 feet below ground surface. The maximum depth of soil disturbance for the switching station would be 15 feet. These construction activities would be limited to the transmission line ROW and the switching station footprint. Because the Mississippian carbonate aquifer is located 50 to 200 feet below ground surface and the Tuscumbia-Fort Payne Aquifer is located 3,500 feet below ground surface, both the transmission line structures, and the switching station would not directly impact these aquifers.

Potential water quality impacts to shallow groundwater can occur at the construction site due to contamination of stormwater infiltration from releases of pollutants associated with the operation and maintenance of construction equipment, such as petroleum fuels, lubricants, and hydraulic fluids. The use of appropriate BMPs would prevent and minimize the potential for such releases. These BMPs are included in the *TVA Environmental Quality Protection Specifications for Transmission Line Construction* (TVA 2022a). BMPs described in this document incorporate the proper maintenance of vehicles, restriction of

maintenance and fueling activities to appropriate offsite areas, measures to avoid spills, and immediate management of incidental and accidental releases in accordance with standard practice and regulatory requirements. Additionally, TVA specifies BMPs to be used for the construction of switching stations in their *TVA Environmental Quality Protection Specifications for Transmission Substation or Communications Construction* document to ensure that impacts to groundwater are minimal (TVA 2022b).

Indications of karst activity were identified underlying the project area due to bedrock containing carbonate rock (GEI 2023). Upper soil layers provide a natural seal over subsurface cracking. Therefore, areas where the surface soils are disturbed can expose fissures in the soil structure to rainfall and surface water, thus increasing the potential for sinkhole activity. BMPs, including backfilling any excavated subsurface in identified karst areas and avoiding identified karst features to the extent practicable, would be implemented (GEI 2023).

If groundwater is encountered during construction activities, dewatering processes would be used to control groundwater in the excavation site and all state and federal requirements relating to groundwater protection would be followed. BMPs as described in *A Guide for Environmental Protection and Best Management Practices for TVA Construction and Maintenance Activities* would be used to control sediment transport from storm water runoff to minimize impacts to groundwater (TVA 2022c). The proposed construction activities, including excavation, would be localized and limited to the construction phase of the proposed project; therefore, impacts to groundwater would be minor.

No groundwater use would be required for construction or operation of the transmission line and the switching station; therefore, there would be no impacts to groundwater levels or availability.

3.2. Surface Water

3.2.1. Affected Environment

The Federal Water Pollution Control Act, commonly known as the Clean Water Act (CWA) is the primary law that presides over water quality. The CWA establishes standards for the quality of surface waters and prohibits the discharge of pollutants from point sources unless a National Pollutant Discharge Elimination (NPDES) permit is obtained. Additionally, several other environmental laws contain provisions aimed at protecting surface water resources from hazardous pollutants including the Resource Conservation and Recovery Act (RCRA); the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA); and the Federal Insecticide, Fungicide, and Rodenticide Act.

Tennessee's Water Quality Control Act (T.C.A. §§ 69-3-101) assigns the investigation, prevention, abatement, control, and establishment of water quality standards for water pollution to the Board of Water Quality, Oil, and Gas, which is an interagency governance council that is staffed by the Division of Water Resources at TDEC. Ultimately, TDEC is the primary environmental and natural resource regulatory agency in Tennessee, and the Board of Water Quality, Oil, and Gas must follow general considerations outlined in TDEC Rules 0400-40-03, General Water Quality Criteria, and 0400-40-04, Use Classifications for Surface Waters, when determining permissible conditions of waters with respect to pollution prevention (TDEC 2024b, 2024c). TDEC assigns use classifications to certain surface waters of the state to identify uses that serve the public interest. Water quality standards can then be determined based on protecting the public interest. Like TDEC, ADEM

administers Water Quality Standards and Use Classifications within the State of Alabama in accordance with ADEM Administrative Code 335-6-10, Water Quality Criteria, and 335-6-11, Use Classifications for Surface Water, respectively. ADEM designates water use classifications to the State's water resources so that water quality criteria can enhance the quality and productivity of the State's water resources (ADEM 2021a).

The Florence-Iron City 161-kV Transmission Line ROW and associated access roads (herein referred to as the proposed project area) lies within the Wilson Lake-Shoal Creek (0603000505), Tennessee River-Cypress Creek (0603000506), and Tennessee River-Pickwick Lake (0603000508) Hydrologic Unit Code (HUC) 10 watersheds (USGS 2023a). Generally, the proposed project area drains into Shoal Creek which transports water south into the Tennessee River and Wilson Lake. The analysis of potential effects to surface water resources includes those watersheds that are hydrologically connected to the project site; however, the affected environment is focused on surface water resources within or immediately adjacent to the proposed project area.

Field surveys conducted in February 2024 identified 20 streams, 4 ponds, and 18 WWC/ephemeral streams. An access road field survey conducted in October 2024 identified one additional stream and pond, for a total of 44 watercourses within the proposed project area. Details of stream and pond crossings within the proposed project area are provided in Appendix D (WWC/ephemeral streams are not included). None of the proposed stream or pond crossings in the Tennessee portion of the proposed project area are specifically named by TDEC as having designated uses; however, TDEC classifies all the unspecified water resources within the Lower Tennessee River Basin as supporting the following uses: fish and aquatic life, recreation, livestock watering and wildlife, and irrigation. WWC are not classified as having designated uses in accordance with TDEC Rule 0400-40-04 (TDEC 2024c). In addition, all the proposed project area stream crossings located in the Alabama portion of the proposed project area are not specifically named as having a classified designated use by ADEM (ADEM 2001). In accordance with 335-6-11-.01, these stream segments are considered acceptable for fish and wildlife use unless demonstrated otherwise (ADEM 2021a).

Under Section 303(d) of the CWA, all states are required to submit a list (i.e., 303[d] list) to the EPA that identifies impaired and threatened waters for which technology-based regulations and other required controls are not sufficient to attain or maintain water quality standards set by the state. States are then required to establish a priority ranking for water on the 303(d) list and develop Total Maximum Daily Loads (TMDLs) for these waters based on the severity of the pollution and sensitivity of the water uses. TMDLs include calculations of the maximum amount of a pollutant that can be present in a waterbody and still meet water quality standards. In Tennessee, the 303(d) list is organized by HUC 8 and the Tennessee portion of the proposed project area is included in the Pickwick Lake watershed (06030005). None of the stream or pond crossings within the Tennessee portion of the proposed project area occur over impaired waterbodies. The closest 303(d) listed waterbody is Shoal Creek which is impaired for total phosphorus, *E. Coli,* Nitrate/Nitrite, and Nickel (TDEC 2022, 2024d). In Alabama, the 303(d) list is organized by River Basin and Indiancamp Creek is the only impaired stream located in the proposed project area. Indiancamp Creek is impaired for pathogens (i.e., E. coli) from collection system failures and pasture grazing (ADEM 2024b).

3.2.2. Environmental Consequences

3.2.2.1. Alternative A - No Action

Under the No Action Alternative, TVA would not construct the proposed 13.3-mile Florence-Iron City 161-kV Transmission Line, the Iron City 161-kV Switching Station, or associated access roads. Therefore, there would be no impacts to surface waters.

3.2.2.2. Alternative B - Action Alternative

3.2.2.2.1. Surface Runoff

Construction activities associated with the proposed switching station, transmission line, and access roads would involve ground disturbance resulting in the potential for increased erosion and sediment release, which may temporarily affect local surface water via stormwater runoff. A General Permit for storm water discharges associated with construction activities would be required and obtained from both ADEM and TDEC for the proposed project along with the development of a project-specific SWPPP and a CBMPP for TDEC and ADEM, respectively (TDEC 2024e, ADEM 2021b). BMPs would be designed and implemented prior to and throughout the duration of construction activities in accordance with both General Permits to minimize potential impacts and possible introduction of pollutants into surface waters due to the proposed project. Additionally, BMPs would be designed and installed in accordance with the Tennessee Erosion and Sediment Control Handbook and the Alabama Handbook for Erosion Control, Sediment Control, and Stormwater Management on Construction Sites and Urban Areas (TDEC 2012; Alabama Soil and Water Conservation Committee 2022). Additionally, applicable ARAP and USACE Section 404 Permits would be obtained for impacts to jurisdictional wetlands, stream channels, or other waters of the United States within the project area. Section 401 Water Quality Certification would be obtained, as necessary, for stream alterations or crossings located within the project area.

TVA expects to utilize existing access roads to the extent possible and, as such, potential impacts to streams would be minimized through avoidance (if practical) and the implementation of erosion and sediment BMPs identified in the SWPPP and CBMPP, to reduce potential sediment-laden runoff into adjacent or downgradient streams. However, temporary stream crossings may be required. Temporary stream crossings and other construction activities would comply with appropriate state and federal permit requirements and TVA requirements as described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities* (TVA 2022). Proper implementation of BMPs would be expected to result in only minor, temporary impacts to surface waters. See Section 3.3 Aquatic Ecology and Appendix D for buffer zone sizes and additional stream crossing details.

Changes in the perviousness of ground cover may alter the percolation rates of rain through the soil resulting in additional runoff of water and pollutants into storm drains, ditches, and streams. Clearing of vegetation and ground cover along with the addition of impervious switching station structures under this alternative would alter the current stormwater flows on the site(s). This flow would be properly controlled and treated through implementation of the stormwater BMPs or an engineered discharge drainage system that could handle any increased flows prior to discharge into the outfall(s).

3.2.2.2.2. Domestic Sewage

During the construction phase, portable toilets would be provided for the construction workforce as needed. These toilets would be provided by a licensed vendor, would be pumped out regularly, and the sewage would be transported by tanker truck to a publicly owned wastewater treatment works that accepts domestic sewage.

3.2.2.2.3. Equipment Washing and Dust Control

Equipment washing and dust control discharges would be handled in accordance with BMPs described in the *Tennessee Erosion and Sediment Control Manual* (TDEC 2012) and the *Alabama Handbook for Erosion, Sediment Control and Stormwater Management on Construction Sites and Urban Areas* (Alabama Soil and Water Conservation Committee 2022). TVA routinely includes precautions in the design, construction, and maintenance of its transmission line projects to minimize these potential impacts. BMPs as described in TVA's *A Guide for Environmental Protection and Best Management Practices* include washing equipment in specified areas where water runoff is mitigated to minimize pollution entering surface waters (TVA 2022). Proper implementation of these controls is expected to result in only minor temporary impacts to surface waters.

3.2.2.2.4. Stream Crossings

Intermittent or perennial stream crossings that cannot be avoided are designed to maintain existing runoff patterns and the natural movement of aquatic fauna. Temporary stream crossings and other construction and maintenance activities would comply with appropriate state permit requirements as well as those provided by TVA in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities* (TVA 2022). SMZs would be established to protect stream banks, instream aquatic habitat, and water quality. SMZs also function as buffers if herbicides or fertilizers are applied to adjacent lands (TVA 2022).

3.2.2.2.5. Transmission Line Maintenance

Improper use of herbicides to maintain and control vegetation within the transmission line ROW has the potential to result in runoff to streams which can impact resident aquatic biota. Therefore, any herbicide/pesticide use associated with construction or maintenance activities in Tennessee would comply with the TDEC General Permit for Application of Pesticides, which also requires a pesticide discharge management plan. Additionally, TVA would comply with the Alabama Pesticide Act of 1971 (Chapter 27, Title 2, Code of Alabama) which requires that a pesticide-use permit be obtained before a restricted-use pesticide may be purchased, used, or possessed in the State of Alabama. In areas requiring chemical treatment, only EPA-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. Proper implementation and application of these products would be expected to have no significant impacts to surface waters.

ROW maintenance would employ manual and low-impact methods wherever possible. Maintenance of vegetation within the transmission line ROW would also be consistent with TVA's Transmission System Vegetation Management Final Programmatic Environmental Impact Statement (TVA 2019b) and *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities* (TVA 2022).

3.2.2.2.6. Summary

Construction and maintenance of the proposed transmission line and switching station would temporarily increase septic output, solid wastes, and the potential for sediment, herbicides, and other pollutants to enter waterways. Appropriate BMPs would be followed to minimize impacts associated with soil disturbance and all proposed project activities. Additionally, all construction and operation activities would be conducted in a manner to ensure that waste materials are contained and managed appropriately (e.g., refueling, maintenance activities, and storage of equipment) to ensure that the introduction of pollutants to the receiving waters would be minimized (TVA 2022).

Proposed project activities that result in unavoidable direct impacts to surface water resources would be mitigated as appropriate in conjunction with agency consultation. Additionally, BMPs would be used that would further reduce indirect impacts to surface water. Design, construction, and maintenance of the Florence-Iron City 161-kV Transmission Line, Iron City 161-kV Switching Station, and associated access roads would abide by all federal, state, and local guidelines and all applicable permits; therefore, impacts to surface waters would be minor.

3.3. Aquatic Ecology

3.3.1. Affected Environment

The analysis of potential effects to aquatic resources included the local watersheds but was focused on the location of the proposed project (herein referred to as the proposed project area) which included the watercourses within or immediately adjacent to the proposed Florence-Iron City 161-kV Transmission Line ROW and associated access roads. The proposed project area lies within the Wilson Lake-Shoal Creek (0603000505), Tennessee River-Cypress Creek (0603000506), and Tennessee River-Pickwick Lake (0603000508) HUC-10 watersheds, in the Western Highland Rim level IV sub-ecoregion of the greater Interior Plateau level III ecoregion. This sub-ecoregion is characterized by open rolling hills with dissected river valleys with chert bottom streams. Oak and hickory forests, river valleys with row-crop agriculture, and patches areas of rural and urban development comprise the majority of landcover (Griffith et al. 2009). Field surveys conducted in February 2024 identified 42 watercourses (20 streams and 18 WWC/ephemeral streams) and four ponds (Appendix D).

Because transmission line construction and maintenance activities primarily affect riparian conditions and instream habitat, TVA evaluated the existing condition of these factors at each stream crossing along the proposed transmission line route. Hydrologic determinations were made using the Tennessee Division of Water Resources Version 1.5 field data sheets by Tennessee qualified hydrologic professionals in training. These data sheets evaluate the geomorphology[5], hydrology[6] , and biology of each stream.

A listing of stream and pond crossings within the proposed ROW and associated access roads, excluding ephemeral streams (WWCs) is provided in Appendix D. Additional information regarding water courses located in the vicinity of the project area can be found in Section 3.2 Surface Water.

[5] The branch of geology that studies the form of the earth's surface.
[6] The scientific study of the properties, distribution, and effects of water on the earth's surface, in the soil and underlying rocks, and in the atmosphere.

During the field surveys in February 2024, a mix of high gradient, headwater streams and large tributaries such as Shoal Creek and Butler Creek were encountered. These streams were observed in primarily forested cover with some agricultural interface. The substrates were primarily chert gravel and smooth bedrock with patches of sand and clay.

Three classes were used to indicate the current condition of streamside vegetation along streams encountered during field surveys, as defined below, and accounted for in Table 3-1.

- Forested - Riparian area is mostly vegetated with trees, shrubs, and herbaceous plants. Vegetative disruption from mowing or grazing is minimal or not evident. Riparian width extends more than 60 feet on either side of the stream.

- Partially forested - Although not forested, sparse trees and/or scrub-shrub vegetation is present within a wider band of riparian vegetation (20 to 60 feet). Disturbance of the riparian zone is apparent.

- Non-forested - No trees or only a few trees are present within the riparian zone. Significant clearing has occurred, usually associated with pasture or cropland.

Table 3-1. Riparian Condition of Streams Crossed by the Proposed Florence-Iron City 161-kV Transmission Line and Associated Access Roads

Riparian Condition	Streams Within ROW
Forested	10
Partially forested	6
Non-forested	4
Total	**20**

TVA assigns appropriate SMZs and BMPs based on field observations and other considerations (i.e., State 303(d) listing and presence of endangered or threatened aquatic species). Appropriate application of SMZs and BMPs would minimize the potential for impacts to water quality and in-stream habitat degradation which could limit impacts on aquatic organisms. TVA would be obliged to adhere to state and federal permit requirements and to commit to any mitigation provisions as a result of adverse modifications made to the project area.

Hydrological determinations were conducted by a Tennessee Qualified Hydrologic Professional-In Training to determine its jurisdictional status. Linear watercourses were classified as stream or WWC/ephemeral streams. Streams according to the 2020 TDEC Division of Water Resources Guidance for Making Hydrologic Determinations are “a surface water that is not a wet-weather conveyance” [Rule 0400-4-3-.04(20)]. A WWC is a “man-made or natural watercourse, including natural watercourses that have been modified by channelization: (a) that flow only in direct response to precipitation runoff in their immediate locality; (b) whose channels are at all times above the ground water table; (c) that are not suitable for drinking water supplies; and (d) in which hydrological and biological analysis indicate that, under normal weather conditions, due to naturally occurring ephemeral or low flow there is not sufficient water to support fish, or multiple populations of obligate lotic aquatic organisms whose life cycle includes an aquatic phase of at least two months [Rule 0400-40-03.04].

3.3.2. Environmental Consequences

3.3.2.1. Alternative A – No Action

Under the No Action Alternative, TVA would not construct the proposed 13.3-mile Florence-Iron City 161-kV Transmission Line or the Iron City 161-kV Switching Station, or associated access roads. No impacts would occur to aquatic ecology from TVA actions. However, changes to aquatic ecology are anticipated to continue to occur from the cumulative effects of surrounding land use practices and development.

3.3.2.2. Alternative B – Action Alternative

Aquatic life could be affected by the proposed Action Alternative. The proposed project would construct a new transmission line and associated structures within an existing ROW easement. As such, it is foreseeable that the proposed ROW grading and clearing as well as future vegetation management processes could result in associated stream impacts.

Impacts could either occur directly by the alteration of habitat conditions within the stream or indirectly due to modification of the riparian zone and storm water runoff resulting from construction and maintenance activities associated with the vegetation removal efforts.

Potential impacts due to removal of streamside vegetation within the riparian zone include increased erosion and siltation, loss of instream habitat, and increased stream temperatures. Other potential effects resulting from construction and maintenance include alteration of stream banks and stream bottoms by heavy equipment and by herbicide runoff into streams.

Siltation has a detrimental effect on many aquatic animals adapted to riverine environments. Turbidity caused by suspended sediment can negatively impact spawning and feeding success of fish and mussel species (Brim Box and Mossa 1999; Sutherland et al. 2002).

Watercourses that convey only surface water during storm events (e.g., WWC/ephemeral streams and ponds) and that could be affected by the construction, operation, or maintenance would be protected by TVA's standard BMPs as identified in TVA (2022) and/or standard permit requirements. These BMPs are designed in part to minimize disturbance of riparian areas, and subsequent erosion and sedimentation that can be carried to streams or ponds.

TVA also provides additional categories of protection to watercourses directly affected by an Action Alternative based on the variety of species and habitats that exist in the streams, as well as the state and federal requirements to avoid harming certain species (Appendix D). For any alterations to perennial or intermittent streams, TVA would require SMZs to be implemented. The width of the SMZ is determined by the type of watercourse, primary use of the water resource, topography, or other physical barriers (TVA 2022).

Applicable permits would be obtained prior to any construction for any stream alterations located within the proposed ROW. The terms and conditions of these permits would be followed including any required mitigation from the proposed activities. All perennial or intermittent watercourses and ponds identified in Appendix D within the proposed ROW or crossed by proposed access roads would be protected by Standard Stream Protection (Category A) as defined in TVA (2022). This standard (basic) level of protection for streams

and the habitats around them is aimed at minimizing the amount and length of disturbance to the water bodies without causing adverse impacts on the construction work.

SMZs and BMPs would minimize the potential for impacts to water quality and instream habitat for aquatic organisms (TVA 2022). These guidelines outline site preparation standards with emphasis on soil stabilization practices, structural and sediment controls including runoff management, and general stream protection practices associated with construction activities.

Because appropriate BMPs and SMZs would be implemented during construction, operations and maintenance activities, any impacts to aquatic ecology would be temporary and insignificant as a result of implementing the proposed Action Alternative.

Cumulative impact analysis of the aquatic ecology effects considers stream loss at a watershed-level scale and includes current actions or those that will occur within the reasonable and foreseeable future. Since conductors would span any watercourse within the ROW, no stream loss is anticipated due to the construction, operation, or maintenance of the proposed transmission line, access roads, or switching station.

3.4. Vegetation

3.4.1. Affected Environment

The proposed project would occur in the Western Highland Rim level IV ecoregion (Griffith et al. 1998). The Western Highland Rim level IV ecoregion is characterized dissected, rolling terrain of chert, shale, gravel, and limestone with generally acidic soils between 400 feet and 1000 feet in elevation. The characteristic land vegetation type for this ecoregion is oak-hickory forest. Land cover is predominantly forestry and agricultural, but had a historic mining presence in the 1800's.

Field surveys were conducted in February and March 2024 to document plant communities, infestations of invasive plants, and to search for possible threatened and endangered plant species in areas where work would occur. Most areas along the proposed transmission line ROW and switching station site were visited during the surveys. Using the National Vegetation Classification System (Grossman et al. 1998), vegetation types observed during field surveys can be classified as a combination of deciduous forest and herbaceous vegetation. No forested areas in the proposed ROW, switching station or access roads had structural characteristics indicative of old growth forest stands (Leverett 1996). The plant communities observed on-site are common and well represented throughout the region.

Deciduous forest, where deciduous trees account for more than 75 percent of total canopy cover, occupies approximately 23 percent of the proposed project area. This habitat type is found between large swaths of agricultural fields and urban development and is dominated by American beech, American Holly, black cherry, blackjack oak, post oak, red maple, Southern red oak, shagbark hickory, tulip poplar, and white oak. The understory consisted of American hornbeam, blueberry, Christmas fern, ebony spleenwort, green briar, harbinger of spring, Japanese honey suckle, mayapple, oak-leaf hydrangea, pennywort, rue anemone, sassafras, Southern lady-fern, thyme-leaved bluet, toothwort, and Virginia saxifrage. Most deciduous forests in the proposed project area have trees that average between 6 and 18 inches in diameter at breast height. Forested wetlands were found in several locations of the proposed ROW. Forested wetlands are described in detail in Section 3.8 Wetlands.

Herbaceous vegetation is characterized by greater than 75 percent cover of forbs and grasses and less than 25 percent cover of other types of vegetation and occurs on about 72 percent of the proposed project area. Most of this habitat type occurs along roadsides, cropland, hayfields, recent clear-cuts: heavily manipulated pastures also support herbaceous vegetation. Most of these sites are dominated by plants indicative of early successional habitats including many non-native species. Early successional areas with naturalized vegetation contain herbaceous species like American pokeweed, annual ragweed, blackberry, broomsedge, bearded beggarticks, common elephant's-foot, dog fennel, giant ragweed, Johnson grass, kudzu, meadow-grass, multifloral rose, purple-top grass, silver plume grass, stinging nettle, Venus's looking-glass and white clover. Areas of emergent wetlands were present in the proposed project area. See Section 3.8 Wetlands for species indicative of those areas.

Evergreen forest, where evergreen trees account for more than 75 percent of the total canopy cover, occupies approximately five percent of the project area. The overstory of this habitat primarily consisted of trees of a similar age class and include loblolly pine, Virginia pine, and white pine. Little understory can be found in these areas but include privet, green briar, and summer grape.

EO 13112 directs TVA and other federal agencies to prevent the introduction of invasive species (both plants and animals), control their populations, restore invaded ecosystems and take other related actions. EO 13751 amends EO 13112 and directs actions by federal agencies to continue coordinated federal prevention and control efforts related to invasive species. This order incorporates consideration of human and environmental health, climate change, technological innovation, and other emerging priorities into federal efforts to address invasive species; and strengthens coordinated, cost-efficient federal action. Some invasive plants have been introduced accidentally, but most were brought here as ornamentals or for livestock forage. Because these robust plants arrived without their natural predators (insects and diseases) their populations spread quickly across the landscape displacing native species and degrading ecological communities or ecosystem processes (Miller 2010). No species included in the federal noxious weed list were observed, but many non-native invasive plant species were observed throughout the proposed project area and access roads. Invasive species present across significant portions of the landscape include Callery pear, Chinese privet, Japanese honeysuckle, Japanese stiltgrass, Johnson grass, sericea lespedeza, tall fescue, and wild garlic. During field surveys, invasive plants were prevalent in sections of herbaceous vegetation types.

3.4.2. Environmental Consequences

3.4.2.1. Alternative A – No Action

Under the No Action Alternative, areas within the proposed ROW, switching station, and access roads would remain in their current condition. Thus, adoption of the No Action Alternative would not affect plant life because no project-related work would occur. Changes to local plant communities resulting from natural ecological processes and human-related disturbance would continue to occur, but the changes would not result from the proposed project. Therefore, there would be no direct, indirect, or cumulative impacts to plant life under the No Action Alternative.

3.4.2.2. Alternative B – Action Alternative

Adoption of the Action Alternative would not significantly affect the terrestrial ecology of the region. Clearing and converting forested land for the construction of the proposed transmission line, switching station, and access roads would be long-term in duration, but insignificant. Adoption of this alternative would require clearing of approximately 47.27 acres, most of which are deciduous forest. Virtually all forest in the proposed project area has been previously cleared and the plant communities found there are common and well represented throughout the region.

Cumulatively, project-related effects to forest resources would be negligible when compared to the total amount of forested land found in the region. Also, project-related work would temporarily affect herbaceous plant communities, but these areas would likely recover to their pre-project condition in less than one year.

Nearly the entire proposed project area currently has a substantial component of invasive terrestrial plants. Adoption of the Action Alternative would not significantly affect the extent or abundance of these species at the county, regional, or state level. The use of TVA standard operating procedures for revegetating with noninvasive species (TVA 2022) would serve to minimize the potential introduction and spread of invasive species in the proposed project area.

3.5. Wildlife

3.5.1. Affected Environment

Habitat assessments for terrestrial animal species were conducted in the field in February and October 2024 for the proposed 13.3-mile-long Florence-Iron City 161-kV Transmission Line and associated 100-foot-wide ROW and access roads, as well as the proposed Iron City 161-kV Switching Station. The proposed project area is composed of mixed upland and bottomland oak-hickory forest with mature trees as well as patches of planted pines. Landscape features surrounding the project area consist of forested and urban areas, a variety of early successional habitat, and cropland (i.e., pasture and agricultural).

Approximately 47.27 acres of the project area are mixed hardwood forest. Approximately 39 acres consist of previously cleared ROW that is either fallow field or entering the early successional stage of regeneration. Finally, approximately 83.8 acres of the project area consist of agricultural fields. The forested section is made up of a mixed, mesic hardwood forest with mature oaks (white oak, scarlet oak), hickories (shagbark hickory and mockernut), tulip poplar, elm, and beech. Most deciduous forests in the project area were mature. Some areas were previously cut for a ROW and are in the early stages of regeneration. Mesic hardwood forests are characterized by blowdowns, tip-up mounds, standing snags, and canopy gaps resulting in patchy understory. Rotting stumps and root holes provide important microhabitat structure for various amphibians and reptiles (Mitchell 2006). Snags and live trees with cavities or hollows provide areas that are used as nests, nurseries, storage areas, foraging, roosting, and perching spots for birds and small mammals.

Nonforested areas within the project area included cultivated hayfields, residential yards, and previously cut ROW in stages of early regeneration. The approximately 4.2 miles of existing ROW, where the proposed structures would replace the existing TEPCO structures, consisted of scrubby brush and grassland. These areas can provide habitat for grassland bird species as well as habitat for pollinators.

Birds typical of this habitat include blue-gray gnatcatcher, song sparrow, downy woodpecker, eastern whip-poor-will, pileated woodpecker, red-bellied woodpecker, red-eyed vireo, red-tailed hawk, scarlet tanager, wild turkey, wood thrush, and yellow-rumped warbler (National Geographic 2002). Common mammal inhabitants of hardwood forests include bobcat, coyote, eastern gray squirrel, raccoon, red fox, Virginia opossum, and white-tailed deer (Whitaker 1997). During a February 2024 field survey, squirrel nests and nine-banded armadillo dens were observed. Armadillos are a very adaptable species and have been expanding throughout the southeastern U.S. (Cook 2023). Reptiles and amphibians including American toad, gray tree frog, wood frog, spotted salamander, eastern box turtle, five-lined skink, ring-necked snake, brown snake, king snake, rat snake, timber rattlesnake, and copperhead are also known to occur in this habitat type (Mitchell 2006). Wetlands within forested areas provide habitat for amphibians including chorus frog, green frog, spring peeper, slimy salamander, and zigzag salamander which were observed during field surveys.

Review of the TVA Regional Natural Heritage database in March 2023, returned results for sixteen caves within three miles of the project area; an additional cave was found on the ROW during field surveys. This cave was not big enough to be suitable for human entrance, and no signs of bat use were observed around the entrance. There is one record of a migratory bird colony within three miles of the project area, located approximately 1.98 miles away. This record is suitably distant that project actions would have no impact.

3.5.1.1. Migratory Birds

Review of the USFWS's Information for Planning and Consultation (IPaC) website in March 2023, identified nine migratory birds of conservation concern (bald eagle, bobolink, brown-headed nuthatch, chimney swift, field sparrow, prothonotary warbler, red-headed woodpecker, rusty blackbird, and wood thrush) with the potential to occur within the project area.

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 (USFWS 2007). The nearest bald eagle record occurs approximately 2.45 miles from the proposed activities. No additional bald eagle nests were observed during a site visit in February 2024. One aquatic feature, Butler Creek, within the project area could provide foraging habitat for bald eagle, as well as the adjacent Shoal Creek. Proposed actions are in compliance with the National Bald Eagle Management Guidelines (USFWS 2007).

Bobolinks breed primarily in open grasslands. Developments in agriculture have led to the loss of much of this habitat, although this species will still utilize grasslands and agricultural fields (Renfrew. et al, 2020). While habitat is present in the project area, this species does not breed in Tennessee or Alabama and would only be present in the project area during migration.

Brown-headed nuthatches nest in pine forests year-round in the southeastern U.S. They utilize cavities in dead and decaying trees (National Geographic 2002). Some pure pine stands exist in the project area and portions of the woodlots contain some pine trees throughout.

Chimney swifts use chimneys in more urban areas as nesting sites and communal roosts (Steeves 2020). No chimney-like structures were observed within the project area.

Field sparrows are residents year-round in Alabama. They are found in old field habitats and field edges (Carey 2020). Suitable habitat is present in portions of the project area.

Prothonotary warblers are a migratory species that nest in wooded swamps, flooded bottomland forests, and forests near lakes and streams. They avoid forests smaller than 250 acres (Petit 2020). Habitat for this species exists in and around a small embayment of Shoal Creek.

Red-headed woodpeckers use a variety of tree habitats but show preference for forested areas exhibiting more openness and a high number of tree snags available (Frei et al. 2020). Suitable nesting and foraging habitat for red-headed woodpeckers is present throughout the project area and an individual was spotted during a field survey.

Rusty blackbirds are a migratory species that breed in the boreal forest and winter in the eastern U.S. (Avery 2020). Nesting habitat for this species is not present within the project area as they do not breed here.

Wood thrush are a migratory species that nest in the lower branches of a sapling or shrub in mature deciduous and mixed forests in eastern North America (Evans 2020). Ample suitable habitat for this species exists throughout the project area.

3.5.2. Environmental Consequences

3.5.2.1. Alternative A – No Action

Under the No Action Alternative, TVA would not construct the proposed transmission line, switching station, or the associated access roads. Terrestrial animals and their habitats would not be affected under the No Action Alternative.

3.5.2.2. Alternative B – Action Alternative

The proposed Action Alternative would result in the displacement of any wildlife (primarily common, habituated species) currently using the project area. Direct effects to some individuals may occur if those individuals are immobile during the time of habitat removal. This could be the case if activities take place during breeding/nesting seasons. Habitat removal likely would disperse mobile wildlife into surrounding areas to find new food and shelter sources and to reestablish territories. Due to the availability of similarly suitable habitat in areas immediately adjacent to the project area, populations of common wildlife species are not likely to be impacted by the proposed actions.

Known bald eagle nests are a suitable distance from the project area such that project actions should not impact them. Suitable foraging habitat exists in and around the project area and BMPs would be implemented to avoid impacting this habitat. Additional nests were not observed during field surveys. Significant impacts are not anticipated for bald eagle.

If clearing occurs in the fall and winter (October to February), the majority of migratory birds are unlikely to be present or breeding in the project area. Of the birds listed above, brown-headed nuthatch, chimney swift, field sparrow, red-headed woodpecker, rusty blackbird, and wood thrush could be expected to be present on the landscape. These species would not be breeding in the area at this time. Individuals present would be expected to flush if disturbed. The proposed action alternative with fall and winter clearing would not significantly affect populations of migratory birds.

If clearing occurs in the summer and spring season, brown-headed nuthatch, chimney swift, field sparrow, prothonotary warbler, red-headed woodpecker, and wood thrush would be expected to be present. Bobolink could occur in the spring when migrating to their breeding grounds in the northern U.S. Direct impacts are anticipated for individual nests, eggs, and juveniles in trees removed as a part of project actions, however due to the abundance of suitable habitat near the project area, project actions are not anticipated to significantly impact populations of migratory birds.

3.6. Endangered and Threatened Species

The Endangered Species Act (ESA) provides broad protection for species of fish, wildlife, and plants that are listed as threatened or endangered in the U.S. or elsewhere. The ESA outlines procedures for federal agencies to follow when taking actions that may jeopardize federally listed species. In accordance with ESA Section 7, federal agencies must use their authorities to help conserve federally listed species and ensure that their actions are not likely to jeopardize listed species or destroy designated critical habitat.

The States of Tennessee and Alabama provide legal protection for species considered threatened, endangered, or deemed in need of management within the state. The legal listing is handled by TDEC in Tennessee and ADCNR in Alabama; however, the state natural heritage programs and TVA both maintain databases of species that are considered threatened, endangered, of special concern, or tracked in their respective areas. Species listed under the ESA or by the States (see Table 3-2) are discussed in this section.

Table 3-2. Federally and State-listed Species from the Proposed Florence-Iron City 161-kV Transmission Line Project Area

Common Name	Scientific Name	Federal Status[2]	State Status[2]	State Rank[3]
Aquatic Animals				
Fishes				
Alabama Cavefish	*Speoplatyrhinus poulsoni*	E	SP[4]	S1[4]
Blotchside Logperch	*Percina burtoni*	–	T[5]	S2[5]
Boulder Darter	*Etheostoma wapiti*	E, EXPN	E[5]	S1[5]
Lollipop Darter	*Etheostoma neopterum*	–	D[5]	S1S2[5]
Snail Darter	*Percina tanasi*	DL	SP[4]	S1[4]
Spotfin Chub	*Erimonax monachus*	T, EXPN	T[5]	S2[5]
Tuscumbia Darter	*Etheostoma tuscumbia*	UR	SP[4]	S2[4]
Mussels				
Acornshell	*Epioblasma haysiana*	–	PSM[4]	SX[4]
Alabama Lampmussel	*Lampsilis virescens*	E, EXPN	SP[4]	S1[4]
Angled Riffleshell	*Epioblasma biemarginata*	–	PSM[4]	SX[4]
Birdwing Pearlymussel	*Lemiox rimosus*	E, EXPN	SP[4]	SP[4]
Butterfly	*Ellipsaria lineolata*	–	PSM[4]	S4[4]
Clubshell	*Pleurobema clava*	E, EXPN	SP[4]	SX[4]
Cracking Pearlymussel	*Hemistena lata*	E, EXPN	SP[4], P1[4]	SP[4]
Cumberland Leafshell	*Epioblasma stewardsonii*	–	PSM[4]	SX[4]
Cumberland Moccasinshell	*Medionidus conradicus*	PE	SP[4]	S1[4]
Cumberland Monkeyface	*Quadrula intermedia*	E, EXPN	SP[4]	SX[4]
Cumberlandian Combshell	*Epioblasma brevidens*	E, EXPN	SP[4]	S1[4]

Common Name	Scientific Name	Federal Status[2]	State Status[2]	State Rank[3]
Dromedary Pearlymussel	*Dromus dromas*	E, EXPN	SP[4]	SX[4]
Elktoe	*Alasmidonta marginata*	–	PSM[4]	S1[4]
Fanshell	*Cyprogenia stegaria*	E, EXPN	SP[4]	S1[4]
Fine-rayed Pigtoe	*Fusconaia cuneolus*	E, EXPN	SP[4]	S1[4]
Fluted Kidneyshell	*Ptychobranchus subtentum*	E	SP[4]	SX[4]
Hickorynut	*Obovaria olivaria*	–	PSM[4]	SX[4]
Kidneyshell	*Ptychobranchus fasciolaris*	–	PSM[4]	S2[4]
Longsolid	*Fusconaia subrotunda*	T	PSM[4]	S1[4]
Ohio Pigtoe	*Pleurobema cordatum*	–	PSM[4]	S2[4]
Orange-foot Pimpleback	*Plethobasus cooperianus*	E, EXPN	SP[4]	SX[4]
Oyster Mussel	*Epioblasma capsaeformis*	E, EXPN	SP[4]	SX[4]
Pink Mucket	*Lampsilis abrupta*	E	SP[4]	S1[4]
Pocketbook	*Lampsilis ovata*	–	PSM[4]	S2[4]
Purple Catspaw	*Epioblasma obliquata obliquata*	E, EXPN	SP[4]	SX[4]
Rayed Bean	*Villosa fabalis*	E	–	SX
Ring Pink	*Obovaria retusa*	E, EXPN	SP[4]	SP[4]
Rock Pocketbook	*Arcidens confragosus*	–	PSM[4]	S3[4]
Rough Pigtoe	*Pleurobema plenum*	E, EXPN	SP[4]	S1[4]
Round Combshell	*Epioblasma personata*	–	PSM[4]	SX[4]
Round Hickorynut	*Obovaria subrotunda*	T	PSM[4]	S2[4]
Scaleshell	*Leptodea leptodon*	E	SP[4]	SX[4]
Sheepnose	*Plethobasus cyphyus*	E	SP[4]	S1[4]
Shiny Pigtoe Pearlymussel	*Fusconaia cor*	E, EXPN	SP[4]	S1[4]
Slabside Pearlymussel	*Pleuronaia dolabelloides*	E	SP[4]	S1[4]
Smooth Rabbitsfoot	*Quadrula cylindrica cylindrica*	T	SP[4]	–
Snuffbox	*Epioblasma triquetra*	E	PSM[4]	S1[4]
Spectaclecase	*Cumberlandia monodonta*	E	SP[4]	S1[4]
Sugarspoon	*Epioblasma arcaeformis*	–	PSM[4]	SX[4]
Tennessee Clubshell	*Pleurobema oviforme*	PE	PSM[4]	S1[4]
Tennessee Pigtoe	*Pleuronaia barnesiana*	PE	PSM[4]	S1[4]
Tuberculed Blossom Pearlymussel	*Epioblasma torulosa torulosa*	DL	SP[4]	SX[4]
Turgid Blossom Pearlymussel	*Epioblasma turgidula*	DL	SP[4]	SX[4]
Wavy-rayed Lampmussel	*Lampsilis fasciola*		PSM[4]	S2[4]
White Wartyback	*Plethobasus cicatricosus*	E, EXPN	SP[4]	S1[4]
Yellow-blossom Pearlymussel	*Epioblasma florentina florentina*	DL	SP[4]	SX[4]
Snails				
Anthony's River Snail	*Athearnia anthonyi*	E, EXPN	SP[4]	S1[4]
Corpulent Hornsnail	*Pleurocera corpulenta*	UR	–	S1
Shortspire Hornsnail	*Pleurocera curta*	UR	–	S1S2
Telescope Hornsnail	*Pleurocera walkeri*	–	–	S3
Crayfish				
Alabama Cave Crayfish	*Cambarus jonesi*	–	–	S2
Tennessee Bottlebrush Crayfish	*Barbicambarus simmonsi*	–	T[5]	T[5]

Common Name	Scientific Name	Federal Status[2]	State Status[2]	State Rank[3]
Terrestrial Plants				
Allegheny-spurge	*Pachysandra procumbens*	–	SLNS[4]	S2S3[4]
American Spikenard	*Aralia racemosa*	–	SLNS[4]	S1[4]
Blue-eyed Mary	*Collinsia verna*	–	SLNS[4]	S1[4]
Dutchman's Breeches	*Dicentra cucullaria*	–	SLNS[4]	S2[4]
False Rue-anemone	*Enemion biternatum*	–	SLNS[4]	S2[4]
Goldenseal	*Hydrastis canadensis*	–	SLNS[4]	S2[4]
Nodding Trillium	*Trillium flexipes*	–	SLNS[4]	S2S3[4]
Purple Fringeless-orchid	*Platanthera peramoena*	–	SLNS[4]	S1[4]
Puttyroot	*Aplectrum hyemale*	–	SLNS[4]	S2[4]
Sedge	*Carex hirtifolia*	–	S[5]	S1S2[5]
Springs Clearwood	*Pilea fontana*	–	SLNS[4]	S1[4]
Tennessee Yellow-eyed Grass	*Xyris tennesseensis*	E	E[5]	S1[5]
White Fringeless-orchid	*Platanthera integrilabia*	T	SLNS[4]	S2[4]
Yellow Trout-lily	*Erythronium rostratum*	–	S[5]	S2[5]
Terrestrial Animals				
Amphibians				
Hellbender	*Cryptobranchus alleganiensis*	E, PE	SP[4]E[5]	S1S2[4] S3[5]
Birds				
Bald eagle	*Haliaeetus leucocephalus*	DL	SP[4–5]	S4B[4–5]
Whooping crane[8]	*Grus americana*	EXPN	–[4_5]	S1N[4]SX[5]
Insects				
Beetle	*Batriasymmodes spelaeus*	–	–[4]	S3[4]
Monarch butterfly[6]	*Danaus plexippus*	PT	–[4_5]	S5[4]S4[5]
Mammals				
Gray bat	*Myotis grisescens*	E	SP[4]E[5]	S2[4]S2[5]
Indiana bat[7]	*Myotis sodalis*	E	SP[4]E[5]	S2[4]S1[5]
Northern long-eared bat[8]	*Myotis septentrionalis*	E	SP[4]T[5]	S2[4]S1S2[5]
Tricolored bat	*Perimyotis subflavus*	PE	–[4]T[5]	S3[4]S2S3[5]
Reptiles				
Alligator snapping turtle[7]	*Macrochelys temminckii*	PT	SP[4]T[5]	S1[4]S2S3[5]

[1] Sources: TVA Regional Natural Heritage database (accessed March 2023, July 2023, and April 2024); Alabama Natural Heritage database (accessed July 2023); Tennessee Natural Heritage database (accessed July 2023); USFWS Ecological Conservation Online System (http://ecos.fws.gov/ecos/home.action) (accessed March 2023); USFWS IPaC (accessed April 2024)

[2] Status Codes: C = Candidate Species; D = Deemed in Need of Conservation/Management; DL = Delisted; E = Endangered; EXPN= Experimental Population; P1 = Highest Conservation Concern; PE = Proposed Endangered; PS = Partial Status; PSM = Protected Status Mussels; PT = Proposed Threatened; SLNS = State Listed, No Status; S = Special concern; SP = State Protected; T = Threatened; UR = Under Review

[3] State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; S4 = Apparently Secure; S_B = Breeding; S_N = Nonbreeding; SX = Presumed Extirpated.

[4] Species status or rank in Alabama

[5] Species status or rank in Tennessee

[6] Historically this species has not been tracked by state or federal heritage programs; USFWS has determined that this species could occur within the project footprint.

[7] Federally listed or protected species known from Lauderdale County, AL or Lawrence County, TN but not within three miles of the project footprint.

[8] Species has not been documented in Lauderdale County or Lawrence County although USFWS has determined it could exist in the project area.

3.6.1. Affected Environment

3.6.1.1. Aquatic Animals

A query of the TVA Regional Natural Heritage database and the USFWS's IPaC indicated 35 federally listed species and one state-listed crayfish are known from the affected 10-digit HUC watersheds of the proposed project area (Table 3-2). All of the mussels occur in the tailwater below Wilson dam, which is over two miles from the southern portion of the project area. Impacts to these species are therefore not anticipated. The remaining federally and state-listed species (boulder darter, spotfin chub, and bottlebrush crayfish) occur in the upper sections of Shoal Creek and its larger tributaries. Both the boulder darter and spotfin chub are native to the Tennessee River system. Through population decline, both species became extirpated to many parts of its historical range (Boschung and Mayden 2004). Now, experimental populations of the boulder darter and spotfin chub exist in the Shoal Creek water system because of reintroduction efforts by the USFWS (USFWS 2005). Both species prefer small to medium, fast flowing streams with rocky substrates (Etnier and Starnes 1993). Records of blotchside logperch from the Shoal Creek system are likely the misidentified Tennessee logperch which is listed as state-threatened in Tennessee (J.M. Mollish, TVA, pers. comm.). As for the state-listed bottlebrush crayfish, it is found in high gradient creeks with strong current over cobble and bedrock (Taylor and Schuster 2010). Although its populations have declined dramatically over its historical range, it was reported in Shoal Creek near Goose Shoals during May 2023.

3.6.1.2. Vegetation

Review of the TVA Regional Natural Heritage database indicated there are no federally listed plant species previously reported within a five-mile vicinity of the proposed project area; however, there has been 12 state-listed plant species (Table 3-2). One federally listed plant species has been previously reported from Lauderdale County (purple fringeless-orchid). One federally listed plant species is also known from Lawrence County (Tennessee yellow-eyed grass). No federally or state-listed plants were observed in the proposed project area during field surveys. No designated critical habitat for plants occurs in the proposed project area.

3.6.1.3. Wildlife

A review of terrestrial animal species in the TVA Regional Natural Heritage database returned records of one state-listed or protected species, one federally protected species (bald eagle), one federally endangered species (gray bat) and two species proposed for a federal listing (tricolored bat and hellbender) within three miles of the project area. One federally listed species (Indiana bat), and one species proposed for federal listing (alligator snapping turtle) are known from Lauderdale County. The USFWS also has determined that two federally listed species (northern long-eared bat and whooping crane) and a species proposed for a threatened listing (monarch butterfly) have the potential to occur in the project area. Thus, habitat suitability and potential impacts to these species also will be addressed (Table 3-2).

Species Accounts

Hellbenders are large slimy amphibians found under large rock slabs in medium to large sized streams (Jensen 2008). This species is federally listed as endangered throughout part of its range, and the population in Alabama is proposed for federal listing as endangered. The closest known record is located approximately 0.44 miles from the project area. This record is upstream from the proposed transmission line route on Shoal and Little Butler Creeks.

Batriasymmodes spelaeus is a cave obligate beetle only known to occur in Alabama and Tennessee. The closest known record of this species is approximately 1.4 miles from the project area. There are sixteen known cave records within three miles of the project area. Additionally, one unrecorded cave was found on the proposed ROW during field surveys.

Monarch butterfly is a highly migratory species, with eastern U.S. populations overwintering in Mexico. Monarch populations typically return to the eastern U.S. in April (Davis and Howard 2005). Summer breeding habitat requires milkweed plant species, on which adults exclusively lay eggs for larvae to develop and feed on. Adults will drink nectar from other blooming wildflowers when milkweeds are not in bloom (NatureServe 2024). Several grasslands were present that have potential to contain some wildflower and other flowering plant species that could provide suitable foraging habitat. However, due to the agricultural usage of most of the grassland areas, no significant quantities of flowering plants are likely to occur on site. No milkweed plants were observed during field surveys. Though this species has not been historically tracked by state or federal heritage programs, the USFWS IPaC tool determined that this species could occur within the project area.

Alligator snapping turtles are a proposed threatened, highly aquatic reptile that emerges from water only for nesting, rarely for basking (USFWS 2021). This species is restricted to river and stream drainages which flow into the Gulf of Mexico. These turtles are found in floodplain swamps and oxbow lakes associated with large rivers but do not occur in isolated wetlands and ponds. Most nesting occurs May to July. The nearest record of this species occurs approximately 4.05 miles away. This is a historical record and according to the most up to date USFWS range maps for this species, the project area is outside of the known range. No habitat is present in the project area for this species.

See Section 3.5 for analysis concerning bald eagles.

The whooping crane is a large bird that once occurred throughout North America. Currently, the species has declined to three populations that breed in Canada and winter in coastal Texas. In the Eastern U.S., a small captive-raised population breeds in Wisconsin and overwinters in Florida. The whooping crane is listed as endangered in the Southwest (USFWS Region 2). Outside of this region, the whooping crane is categorized as a non-essential experimental population. For the purposes of consultation, non-essential experimental populations are treated as threatened species on National Wildlife Refuge and National Park land (require consultation under 7(a)(2) of the ESA) and as a proposed species on private land (no section 7(a)(2) requirements), but Federal agencies must not jeopardize their existence (section 7(a)(4)) (Federal Register [FR] 2001). Migration habitat does not exist within the project area.

Gray bats are a federally listed species associated year-round with caves, roosting in different caves throughout the year (Brady et al. 1982; Tuttle 1976). Bats disperse from colonies at dusk to forage along waterways (Harvey et al. 2011). The nearest gray bat record is from a cave approximately 1.49 miles away. There are sixteen cave records within three miles of the proposed project area; the closest is located approximately 0.25 miles away. One additional cave was observed on the ROW during site visits. This cave did not show signs of bat use. Aquatic foraging habitat exists in the project area on Shoal and Butler creeks. BMPs would be used to minimize impacts to this aquatic foraging habitat.

The Indiana bat hibernates in caves during winter and inhabits forested areas around these caves for swarming (mating) in the fall and staging in the spring, prior to migration to summer habitat. During summer, Indiana bats roost under exfoliating bark and in cracks and crevices of trees. These trees are typically located in mature forests with an open understory and a nearby source of water. Indiana bats are known to change roost trees frequently throughout the season, yet still maintain site fidelity, returning to the same summer roosting areas in subsequent years (Pruitt and TeWinkel 2007; Kurta et al. 2002). The nearest record is from a cave approximately 20.7 miles away. There are sixteen cave records within three miles of project area, the closest located approximately 0.25 miles away. One additional cave was observed on the ROW during site visits. This cave did not show signs of bat use. Aquatic foraging habitat exists in the project area on Shoal and Butler creeks. BMPs must be used to minimize impacts to this aquatic foraging habitat.

The northern long-eared bat predominantly overwinters in large hibernacula such as caves, abandoned mines, and cave-like structures. During fall and spring, they utilize entrances of caves and the surrounding forested areas for swarming and staging. In the summer, northern long-eared bats roost individually or in colonies beneath exfoliating bark or in crevices of both live and dead trees. Roost selection by northern long-eared bats is similar to that of Indiana bats; however, it is thought that northern long-eared bats are more opportunistic in roost site selection. This species also roosts in abandoned buildings and under bridges. Northern long-eared bats emerge at dusk to forage below the canopy of mature forests on hillsides and roads, and occasionally over forest clearings and along riparian areas (USFWS 2014). There are no records of northern long-eared bat in Lauderdale County or Lawrence County; however, the USFWS has determined they may occur there (USFWS 2023). There are sixteen cave records within three miles of project area, the closest located approximately 0.25 miles away. One additional cave was observed on the ROW during site visits. This cave did not show signs of bat use. Aquatic foraging habitat exists on the project area on Shoal and Butler creeks. BMPs would be used to minimize impacts to this aquatic foraging habitat.

Tricolored bats are a species that has been proposed for federal listing and are generally solitary or found in small groups. They are associated with forested landscapes where they forage near trees and along waterways, especially riparian areas. Maternity and other summer roosts are typically in clumps of dead or live tree foliage. Caves, mines, culverts, and rock crevices may be used as night roosts and winter hibernacula (USFWS 2024). The nearest tricolored bat record is from a cave approximately 1.47 miles away. There are sixteen cave records within three miles of project area, the closest located approximately 0.25 miles away. One additional cave was observed on the ROW during site visits. This cave did not show signs of bat use. Aquatic foraging habitat exists over the project area on Shoal and Butler creeks. BMPs must be used to minimize impacts to this aquatic foraging habitat.

There are sixteen cave records within three miles of project area, the closest located approximately 0.25 miles away. One additional cave was observed on the ROW during site visits. This cave did not show signs of bat use. Aquatic foraging habitat exists in the project area on Shoal and Butler creeks. BMPs would be used to minimize impacts to this aquatic foraging habitat. Trees were assessed for potential summer roosting and foraging sites for Indiana bat, northern long-eared bat, and tricolored bat following the Range Wide Indiana Bat and Northern Long-eared Bat Survey Guidelines (USFWS 2024). Summer roosting habitat for these species is present throughout the project area.

3.6.2. Environmental Consequences

3.6.2.1. Alternative A – No Action

Under the No Action Alternative, TVA would not construct the proposed transmission line, switching station, or associated access roads. Therefore, tree clearing and earth moving would not occur. Trees, soil, and vegetation would remain in their current state.

As a result, no direct, indirect, or cumulative effects to federally or state-listed endangered or threatened aquatic animal species or critical habitats by TVA project-related actions would occur.

No impacts would occur to federally or state-listed plants or their designated critical habitat, because no project-related work would occur. No federally listed plants or designated critical habitat occurs within the proposed project area. Changes to local plant communities resulting from natural ecological processes and human-related disturbance would continue to occur. These changes may benefit or negatively affect plants present in the proposed project area or access roads, but the changes would be unrelated to the proposed project.

Threatened and endangered terrestrial animals and their habitats would not be affected.

3.6.2.2. Alternative B – Action Alternative

3.6.2.2.1. Aquatic Animals

As previously stated, aquatic species could be affected by the proposed action directly or indirectly.

Boulder darter, spotfin chub, Tennessee logperch, and bottlebrush crayfish are the only species of concern present near the proposed project area. Populations of these species are most abundant in Shoal Creek, which is outside the potential areas of impact. It is possible small populations may colonize tributaries to Shoal Creek; however, these tributaries would not be directly impacted by the construction of or ongoing maintenance of the proposed transmission line. Additionally, these tributaries would be protected by enhanced “Category B” SMZ buffers during construction, operation and maintenance activities to prevent any indirect effects.

All watercourses documented within the proposed project area would be protected by standard BMPs. Additional SMZ protection measures as identified in Appendix C and described in TVA 2022 or as required by standard permit conditions would also be implemented on all intermittent and perennial streams and ponds. These categories of protection are based on the variety of species and habitats that exist in the streams as well as the state and federal requirements to avoid harming certain species. No federally designated critical habitat is known from the potentially affected 10-digit HUC watersheds of the proposed project area.

Therefore, with appropriate implementation of BMPs and SMZ protection measures during construction, operation, and maintenance of the proposed transmission line, switching station, and access roads, no impacts to federally or state-listed aquatic species are anticipated to occur as a result of the proposed Action Alternative.

3.6.2.2.2. Vegetation

Adoption of the Action Alternative would have no effect on federally listed plant species because no federally listed plant species occur in the proposed project area. Also, no populations of state-listed species were observed during field surveys of the proposed project area. Therefore, no direct, indirect, or cumulative impacts on endangered and threatened species and their critical habitats are anticipated as a result of implementing the Action Alternative.

3.6.2.2.3. Wildlife

Impacts were assessed for ten terrestrial animal species with the potential to occur in the project area. Suitable habitat exists in the project area for *Batriasymmodes spelaeus* beetles, hellbender, gray bat, Indiana bat, northern long-eared bat, and tricolored bat. No suitable migration habitat exists in the project area for whooping crane. No habitat for alligator snapping turtle is present. Due to the agricultural usage of most of the grassland areas, no significant quantities of flowering plants suitable for monarchs are likely to occur on site. However, the continued vegetation management of the ROW could minimally increase flowering habitat available within the project area. Project actions would not jeopardize populations of whooping crane, monarch butterfly or alligator snapping turtle.

Batriasymmodes spelaeus beetles are cave obligates that would only be present in cave ecosystems. Of the seventeen caves located within three miles of the action area, only one is close enough to be impacted by project actions. No herbicide use would be permitted within 200 feet of this cave due to potentially sensitive subterranean aquatic resources. Clearing would be limited to hand tools and small machines only (i.e.: chainsaws, bush hog, mowers). The cave entrance is not big enough for human entry. Project actions would not significantly impact populations of *Batriasymmodes spelaeus* beetles.

Streams and aquatic areas that would provide habitat for hellbender would not be altered as a part of the proposed project actions. BMPs would be used during work to minimize impacts to this species. With the implementation of BMPs to avoid impacting these habitats with runoff and sediment, project actions would not jeopardize the existence of hellbender populations.

There are sixteen known cave records within three miles of the project area, the closest known database record is approximately 0.25 miles from the project area. One additional cave was located on the ROW during surveys. There was no sign of bat use around this cave and the entrance was small enough that human entry was not possible for further survey. Northern long-eared bat, Indiana bat, and tricolored bat have separate but often overlapping requirements for summer roosting habitat. Of the 47.27 forested acres to be cleared in the project area, approximately 30 acres are suitable for roosting by tricolored bats. Within those 30 acres of habitat, approximately 15 acres are suitable summer roosting habitat for northern long-eared bat and Indiana bat. There are similar forested areas present within the county and adjacent to the project area.

Activities associated with this approval were addressed in TVA's programmatic consultation with the USFWS on routine actions and federally listed bats in accordance with Endangered Species Act Section 7(a)(2), originally completed April 2018, and then updated in May 2023, and November 2024. TVA has determined that the proposed actions under the Action Alternative would have potential effects on federally listed bats. As a result, a Bat Strategy Project Review Form was completed (see Appendix E). For those activities with potential to affect bats, TVA committed to USFWS to implement specific conservation

measures when impacts to federally listed bat species are expected. Relevant conservation measures to this project are identified in the bat strategy form and must be reviewed and implemented as part of the approved project (Appendix E, Table 4, Pages 5 and 6). With the use of identified conservation measures and BMPs, proposed actions would not significantly impact gray bats, Indiana bats, northern long-eared bats, or tricolored bats.

3.7. Floodplains

3.7.1. Affected Environment

A floodplain is the relatively level land area along a stream or river that is subjected 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 subjected 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.

The proposed transmission line and several access roads would cross the 100-year floodplains of Wilson Creek and unnamed tributaries, Saint Florian Branch and unnamed tributaries, Jones Branch, Lawson Branch, Indiancamp Creek and one unnamed tributary, unnamed tributaries of Shoal Creek, Storey Branch, and Little Butler Creek and unnamed tributaries in Lauderdale County and Lawrence County. The proposed switching station would be located adjacent to Ducktown Road at the Lawrence County-Wayne County line.

3.7.2. Environmental Consequences

3.7.2.1. Alternative A – No Action

Under the No Action Alternative, TVA would not construct the proposed 13.3-mile Florence-Iron City 161-kV Transmission Line or the Iron City 161-kV Switching Station, or associated access roads. Therefore, no impacts to floodplains in the project area would occur as a result of TVA actions associated with the proposed project.

3.7.2.2. Alternative B – Action Alternative

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.

For certain "critical actions," the minimum floodplain of concern is the 500-year floodplain. The U.S. Water Resources Council defines "critical actions" as "any activity for which even a slight chance of flooding would be too great" (U.S. Water Resources Council 1978). Critical actions can include facilities producing hazardous materials (such as liquefied natural gas terminals), facilities whose occupants may be unable to evacuate quickly (such as schools and nursing homes), and facilities containing or providing essential and irreplaceable records, utilities, and/or emergency services (such as large power-generating facilities, data centers, hospitals, or emergency operations centers).

All of the transmission line ROW is existing. Figures 7-1 through 7-6 in Appendix F show the locations where the proposed transmission structures, Iron City Switching Station, and access roads would cross floodplains. Consistent with EO 11988, overhead transmission lines and related support structures are considered repetitive actions in the 100-year floodplain that should result in minor impacts (TVA 1981).

While the proposed ROW would cross floodplains, none of the proposed structures would be located within 100-year floodplains. The conductors would be located well above the 100-year flood elevation. The support structures for the proposed conductors would not be expected to result in any increase in flood hazard, either as a result of increased flood elevations or changes in flow-carrying capacity of the streams being crossed. Construction in the floodplain would be consistent with EO 11988 provided the TVA subclass review criteria for transmission line location in floodplains are followed (TVA 1980).

Based upon a topographic map review, aerial photography, aquatics field survey, and a review of the FEMA National Flood Hazard Layer, portions of several access roads would cross 100-year floodplains. Consistent with EO 11988, access roads are considered repetitive actions in the 100-year floodplain that should result in minor impacts. To minimize adverse impacts, any road improvements in floodplains would be done in such a manner that upstream flood elevations would not be increased by more than 1.0 foot.

Cumulative impacts of the proposed project include TVA's construction of the planned Iron City 161-kV Switching Station. Based on USGS topo maps, aerial photography, and detailed terrain maps on the egis web viewer, the substation would be located well outside of 100-year floodplains and tens of feet above the nearest perennial stream – an unnamed tributary of Shoal Creek, which would be consistent with EO 11988, and when applicable, EO 13690.

By implementing the mitigation measures below, the proposed project would have no significant impact on floodplains and their natural and beneficial values:

- Standard BMPs would be used during construction activities.
- Construction would adhere to the TVA subclass review criteria for transmission line location in floodplains.
- Any road improvements or construction in floodplains would be done in such a manner that upstream flood elevations would not be increased by more than 1.0 foot.
- Excess material would be spoiled outside of published floodways.

3.8. Wetlands

3.8.1. Affected Environment

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 such as toxin absorption and sediment retention for improved downstream water quality, storm water impediment and attenuation for flood control, shoreline buffering for erosion protection, and provision of fish and wildlife habitat for commercial, recreational, and conservation purposes.

Wetland assessments were performed to ascertain wetland presence, condition, and extent to which wetland functions are provided within the proposed project area. Field surveys were conducted in February 2024 to delineate wetland areas potentially affected by the proposed transmission line and in October 2024 for the proposed access roads.

Activities in wetlands are regulated by state and federal agencies to ensure no net loss of wetland resources. Under Clean Water Act (CWA) §404, activities resulting in the discharge of dredge or fill material to waters of the U. S., including wetlands, must be authorized by the USACE through a Nationwide, Regional, or Individual Permit to ensure no more than minimal impacts to the aquatic environment. Section §401 of the Clean Water Act requires state water quality certification for projects in need of USACE approval. In Tennessee, TDEC is responsible, and in Alabama, ADEM is responsible for issuance of water quality certifications pursuant to Section 401 of the Federal Water Pollution Control Act (33 U.S.C. 1251, 1341) regarding regulated waters of the State. Lastly, Executive Order 11990 requires federal agencies to avoid construction in wetlands and minimize wetland degradation to the extent practicable. Wetland determinations were performed according to the USACE standards, which require documentation of hydrophytic (wet-site) vegetation, hydric soil, and wetland hydrology (Environmental Laboratory 1987; USACE 2020; USACE 2012). The USACE defines vegetative cover stratums as:

- Trees/Forest: Woody plants, excluding woody vines, approximately 20 feet or more in height and 3 inches or larger in diameter at breast height.
- Shrub stratum: Woody plants, excluding woody vines approximately 3 to 20 feet in height.
- Herb/emergent: All herbaceous (non-woody) plants, including herbaceous vines, regardless of size, and woody plants, except woody vines, less than approximately 3 feet in height.

Using the Tennessee Rapid Assessment Method (TRAM) in Tennessee and the TVA Rapid Assessment Method (TVARAM) for wetlands in Alabama, wetlands were evaluated by their functions and classified into three categories: (Table 3-3) (TDEC 2015; Mack 2001).

- “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 than low quality wetlands 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 a 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 exceptional quality wetlands often represent restoration goals for wetlands functioning at a lower capacity.

Table 3-3. Wetlands located within proposed Florence-Iron City 161-kV Transmission Line Right-of-Way

Wetland Identifier	Wetland Type[1]	TRAM[2]/TVARAM[3] Functional Capacity (Score)	Wetland Acreage within the Project Area	Wetland HUC10	Wetland HUC Name
W001	PEM1E	Moderate (57)[2]	0.34	0603000505	Wilson Lake-Shoal Creek
W002	PEM1E	Moderate (52)[2]	0.10	0603000505	Wilson Lake-Shoal Creek
W003	PEM1E	Moderate (48)[3]	0.04	0603000505	Wilson Lake-Shoal Creek
W004a	PEM1E	Moderate (59)[3]	0.04	0603000505	Wilson Lake-Shoal Creek
W004b	PEM1E	Exceptional (62)[3]	0.15	0603000505	Wilson Lake-Shoal Creek
W005	PEM1E	Low (27)[3]	0.02	0603000505	Wilson Lake-Shoal Creek
W006	PFO1E	Moderate (54)[3]	0.33	0603000506	Tennessee River-Cypress Creek
W007	PFO1E	Low (23)[3]	0.46	0603000506	Tennessee River-Cypress Creek
W008	PFO1E	Low (22)[3]	0.06	0603000506	Tennessee River-Cypress Creek
W009	PEM1E	Low (19)[3]	0.24	0603000506	Tennessee River-Cypress Creek
W010	PEM1E	Low (17)[3]	0.05	0603000508	Tennessee River-Pickwick Lake
W011	PEM1E	Low (37)[2]	0.14	0603000505	Wilson Lake-Shoal Creek
W012	PFO1E	Moderate (60)[2]	0.04	0603000505	Wilson Lake-Shoal Creek
Total Acres			**2.02**		

[1]Classification codes as defined in Cowardin et al. (1979): P = Palustrine; E = Seasonally flooded/saturated; EM1=Emergent, persistent vegetation; FO1=Forested, broadleaf deciduous vegetation
[2]TRAM = Tennessee Rapid Assessment Method that categorizes wetland quality by their functional capacity
[3]TVARAM = Tennessee Valley Rapid Assessment Method that categorizes wetland quality by their functional capacity

The proposed project traverses a rural landscape, dominated by agricultural fields, forested uplands and bottomlands, and some urban and suburban landscapes towards the southern portion of the project. The project area is located across three watersheds traversing the Wilson Lake-Shoal Creek (0603000505), Tennessee River-Cypress Creek (0603000506), and the Tennessee River-Pickwick Lake (0603000508) watersheds. The project area for the Action Alternative was field surveyed to identify actual wetland extent and quality. Twelve wetland complexes, totaling 2.02 acres, were identified within the proposed project area (Table 3-3). W001-W005 and W011-W012 are located in the Wilson Lake-Shoal Creek; W006-W009 is located in the Tennessee River-Cypress Creek Watershed; W010 is located in the Tennessee River-Pickwick Lake Watershed. The combination of land-use practices and landscape position dictates the wetland habitat type, wetland functional capacity, and wetland value. The identified wetlands consisted of emergent and forested habitat, exhibiting a range of low, moderate, and exceptional condition, thus providing poor to excellent wetland value to the surrounding landscape (Table 3- 4 and 3- 5).

Table 3-4. Acreage of Wetlands Representing Low, Moderate, or Exceptional Resource Value Within the Action Alternative Footprint and Relative to Total Mapped Wetland Occurrence Within the Watersheds

Watershed (10-HUC)	NWI Estimated Total Wetland Acres in Watershed*	Delineated Wetland Acreage in Proposed Project Area			
		Low Value	Moderate Value	Exceptional Resource Value	TOTAL
Wilson Lake-Shoal Creek (0603000505)	**3329**	0.16	0.56	0.15	**0.87**
Tennessee River-Cypress Creek (0603000506)	**2731**	0.76	0.33	0	**1.09**
Tennessee River-Pickwick Lake (0603000508)	**15084**	0.05	0	0	**0.05**

*National Wetlands Inventory (U.S. Fish and Wildlife Service 1982)

Table 3-5. Acreage of Wetlands by Habitat Type Within the Action Alternative Footprint and Relative to Total Mapped Wetland Occurrence Within the Watersheds

Watershed (10-HUC)	NWI Estimated Total Wetland Acres in Watershed	Delineated Total Wetland Acreage in Proposed Project Area			
		Emergent	Scrub-Shrub	Forested	TOTAL
Wilson Lake-Shoal Creek (0603000505)	**3329**	0.83	0	0.04	**0.87**
Tennessee River-Cypress Creek (0603000506)	**2731**	0.24	0	0.85	**1.09**
Tennessee River-Pickwick Lake (0603000508)	**15084**	0.05	0	0	**0.05**

Emergent wetland within the project area totaled 1.12 acres across nine delineated wetlands. Emergent wetlands are generally devoid of woody vegetation with predominant cover by non-woody species across areas periodically saturated and/or inundated. Emergent wetlands in this general vicinity are often found where land-use practices or inundation deter growth of woody species. Emergent wetland habitats encountered within the proposed project area included stream bank seep (W001), valley bottoms and swales (W002, W003, W009, W010, W011), floodplain (W004a, W004b), and ponds fringe (W005). These wetlands contained indicators of wetland hydrology influencing soil physiology such that coloration indicative of wetland conditions was evident in the soil profile. Emergent wetlands were dominated by common emergent wetland vegetation including curly dock, shallow sedge, soft rush, switchgrass, cattail, dark green bulrush, and Japanese stiltgrass. Emergent wetland habitat encountered ranged from low to exceptional quality using TRAM

and TVARAM, indicating poor to excellent wetland quality, due to size, surrounding land use, and evidence of disturbance (e.g. mowing, agriculture, etc.) (Table 3-3; Table 3-5).

Forested wetlands in general have deeper root systems and contain greater biomass (quantity of living matter) per acre than do emergent and scrub-shrub wetlands, which do not grow as tall. As a result, forested wetlands provide higher levels of wetland functions, such as sediment retention, carbon storage, and pollutant retention and transformation (detoxification), storm water storage, and flood attenuation, all of which support better water quality and protection of downstream infrastructure (Ainslie et al. 1999; Scott et al. 1990; Wilder and Roberts 2002). A total of 0.89 acres of forested wetland were delineated across four wetland areas within the proposed project area (W006 – W008, W012). All of these wetland areas contained indicators of wetland hydrology influencing soil physiology such that coloration indicative of wetland conditions was evident in the soil profile. All forested wetlands identified were dominated by common wetland vegetation including sweetgum, red maple, and sugarberry. Forested wetland habitat encountered scored as moderate or low-quality using TRAM and TVARAM, indicating low to moderate wetland quality, due to small size and surrounding land use (Table 3-3; Table 3-6).

Table 3-6. Acreage of Low, Moderate, and Exceptional Resource Value Forested Wetlands by Watershed Within the Action Alternative Footprint

Watershed (10-HUC)	NWI Estimated Forested Wetland Acres in Watershed	Delineated Forested Wetland Acreage in Proposed Project Area			
		Low Value	Moderate Value	Exceptional Resource Value	TOTAL
Wilson Lake-Shoal Creek (0603000505)	**3188**	0	0.04	0	**0.04**
Tennessee River-Cypress Creek (0603000506)	**2600**	0.52	0.33	0	**0.85**
Tennessee River-Pickwick Lake (0603000508)	**13634**	0	0	0	**0**

Wilson Lake-Shoal Creek (0603000505) contains forested wetland W012 within the proposed Florence-Iron City 161-kV Transmission Line project area. Of an estimated total 3,188 forested wetland acres in this watershed, the proposed project area contains 0.04 acres proposed for clearing, or 0.001% (Table 3-6). Tennessee River-Cypress Creek (0603000506) contains forested wetlands W006, W007, and W008. Of an estimated total 2,600 forested wetland acres in this watershed, the proposed project area contains 0.85 acres proposed for clearing, or 0.03% (Table 3-6). All forested wetlands identified on this project scored as moderate or low quality due to size, hydrological influence, and surrounding land use (Table 3-3). Wetland hydrology indicators, such as inundation, saturation, high water table, drainage patterns, and geomorphic position were exhibited within these wetlands. These hydrology parameters influenced the soil profile, and hydric soil coloration was evident. Hydrophytic forested vegetation was dominant and included sweetgum, red maple, and sugarberry.

3.8.2. Environmental Consequences

3.8.2.1. Alternative A – No Action

Under the No Action Alternative, the proposed project would not proceed. As such, no project related disturbance to wetlands within the proposed project footprint would occur. Therefore, no impacts to wetlands in the project area would occur as a result of TVA actions associated with the proposed project.

3.8.2.2. Alternative B – Action Alternative

Activities in wetlands are regulated by state and federal agencies to ensure no net loss of wetland resources. Under CWA Section 404, activities resulting in the discharge of dredge, fill, and associated secondary impacts to waters of the U.S., including wetlands, must be authorized by the USACE through a Nationwide, Regional, or Individual Permit. This project is located in the Nashville District USACE. CWA Section 401 mandates state water quality certification for projects requiring USACE approval. In Tennessee, TDEC certifies CWA Section 401 permits and impacts to intrastate wetland resources through a general or individual aquatic resources alteration permit. In Tennessee, this permit is required for any alteration to the physical, chemical, or biological properties of any waters of the state, including wetlands, pursuant to the Tennessee Water Quality Control Act (§69-3-108, 0400-40-07). TDEC's permit process ensures compliance with Tennessee's anti-degradation policy as well (§69-3-108, 0400-40-04). In Alabama, ADEM certifies the CWA Section 401 permit through the USACE with notification from the district office and implementation of special conditions if required. Lastly, EO 11990 requires federal agencies to minimize wetland destruction, loss, or degradation, avoid new construction in wetlands wherever there is a practicable alternative.

Efforts were made during project planning and siting to avoid wetlands to the extent practicable. However, because of project and topographic constraints, and because of the goal of minimizing impacts to other resources, no practicable alternative was available that would allow complete avoidance of wetlands. The process for detecting and avoiding wetland resources identified during the office level review, prior to field surveys, is described in Section 2.3.3.

Under the Action Alternative, the proposed transmission line would be constructed. As described in Section 2.2.3.2, adequate clearance between tall vegetation and transmission line conductors would require trees within the proposed ROW to be cleared. Establishing a transmission line corridor would require vegetation clearing within the full extent of the ROW and future maintenance of low stature vegetation to accommodate clearance and abate interference with overhead wires.

The proposed project area contains a total of 1.12 acres emergent wetland and 0.89 acres forested wetland. No additional wetlands were found on the proposed access roads. Emergent wetlands located on the proposed new ROW corridors would experience temporary impacts to accommodate access during construction. These wetlands would be maintained long term in their current state and functional capacity, due to their existing height being compatible and consistent with transmission line ROW vegetation management objectives. Of the 0.89 acres of forested wetland area within the proposed project for construction, all 0.89 acres would be cleared and permanently converted to emergent, meadow like wetland habitat for the perpetuity of the transmission line's existence (Table 3-7). Woody vegetation would be removed with a feller buncher. This involves a grip and blade attachment on a mechanized tracked or wide tire (low ground

pressure) vehicle. The grip holds the tree trunk while the blade cuts below the grips. This method allows for removal of the cut aerial portion of a tree to an upland location for deposition, while leaving stumps less than 12 inches and the below ground root system entirely intact with minimal soil disturbance.

Table 3-7. Impacts to Forested Wetlands Within the Proposed Project Area

Wetland Identifier	Impact Type	Temporary Impacts for Access	Acreage of Wetland Fill	Acreage of Forested Wetland Clearing (FO)
W001	Temporary for Access	Yes		--
W002	Temporary for Access	Yes		--
W003	None	--		--
W004a	None	--		--
W004b	None	--		--
W005	None	--		--
W006	Clearing for TL* Construction	Yes		0.33
W007	Clearing for TL Construction	Yes		0.46
W008	Clearing for TL Construction	Yes		0.06
W009	Temporary for Access	Yes		--
W010	Structure Placement	Yes	0.0003	--
W011	Temporary for Access	Yes		--
W012	Clearing for TL Construction	Yes		0.04
	TOTAL ACRES		**0.0003 Acres**	**0.89 Acres**

*TL = transmission line

Woody (forested and scrub-shrub) wetland conversion to emergent habitat results in reduction in wetland function. Due to the rate of water uptake, extensive root system, and structural integrity of trees and shrubs relative to herbaceous plants, wooded wetlands function at a greater capacity to impede and hold storm water, absorb toxins, retain sediment, and provide the shaded forage and spawning habitat necessary for its aquatic and terrestrial inhabitants to exist. Therefore, conversion to a habitat devoid of woody vegetation would result in a reduction of existing functional capacity.

Forested wetland conversion to accommodate structure locations and transmission line spans is considered a secondary impact under section 404b of the CWA. Therefore, forested wetland loss is subject to the authority of the regulatory agencies to ensure no net loss of wetland functions and values, per the directive of the CWA and the federal no net loss of wetland policy (EPA 1990). The CWA authorizes regulatory oversight for these impacts. The USACE, Tennessee, and Alabama exert this oversight through an established permit process that ensures maintenance of the physical, biological, and chemical integrity of national and state waters, including wetlands, and the objectives of the CWA are upheld. The permitting process involves a demonstration of wetland avoidance, minimization of disturbance, and compensation for loss of wetland functions and values. In compliance with the CWA and EO 11990, TVA has considered all options to avoid and minimize wetland impacts, resulting in the least wetland disturbance practicable (Section 2.1).

Wetland habitat located in areas proposed for heavy equipment travel could experience minor and temporary impacts during transmission line construction or long-term asset and vegetation management. TVA would minimize wetland disturbance through adherence to wetland BMPs for all work necessary within the delineated wetland boundaries (TVA 2022). This includes the use of low ground-pressure vehicles, mats, or other wetland crossings to minimize rutting to less than 12 inches, erosion control techniques to deter indirect impacts through siltation into adjacent wetland area, dry season work, etc. Vehicular traffic would be limited to narrowed access corridors along the ROW for structure and conductor placement, OPGW installation, and long-term maintenance.

With wetland avoidance and wetland minimization techniques in place, TVA would comply with all USACE/TDEC/ADEM mitigation requirements with wetland avoidance and minimization to compensate for the proposed loss of wetland resources, functions, and values resulting from the proposed Action Alternative. TVA would obtain the necessary Section 404/401 CWA permits and required compensatory mitigation to ensure the proposed wetland impacts are compensated to the extent deemed appropriate such that wetland functions and values remain at the current capacity within the larger affected watershed. Required compensatory mitigation would be purchased through an approved wetland mitigation bank per the directive of the USACE, Tennessee, and Alabama to ensure no more than minimal impacts to the aquatic environment result and the objectives of the CWA and Tennessee's anti-degradation policy are upheld.

Cumulative impact analysis of wetland effects considers wetland loss and habitat conversion at a watershed scale currently and within the reasonable and foreseeable future. Loss of wetland habitat due to wetland fill would be compensated through wetland mitigation banking, resulting in no cumulative wetland impacts. Loss of wetland functions and values from forested wetland clearing would be compensated for at the discretion of the USACE engineer. Forested wetland conversion for this project would take place across two watersheds. A total of 0.04 acres of proposed forested wetland clearing would occur in Wilson Lake-Shoal Creek (0603000505) comprising 0.001 percent of mapped forested wetlands within the watershed, and 0.85 acres of proposed forested wetland clearing would occur in Tennessee River-Cypress Creek (0603000506), comprising about 0.03 percent of mapped forested wetlands within the watershed.

Similarly, general trends in wetland impacts resulting from development within the watershed would be subject to CWA, USACE, ADEM and TDEC mandates, and these regulatory requirements are in place to ensure wetland impacts do not result in cumulative loss. In this context, the proposed wetland impacts should be kept to a minimum on a cumulative scale due to the avoidance, minimization, and compliance measures in place. Therefore, in compliance and accordance with the CWA and the directives of USACE, TDEC and ADEM ensuring no more than minimal adverse effects on the aquatic environment, the Action Alternative's impacts to wetlands would be insignificant.

3.9. Aesthetics

3.9.1. Visual Resources

3.9.1.1. Affected Environment

This assessment provides a review and classification of the visual attributes of existing scenery, along with the anticipated attributes resulting from the proposed action. The classification criteria used in this analysis are adapted from a scenic management system developed by the U.S. Forest Service (USFS) and integrated with planning methods used by TVA (USFS 1995). Potential visual impacts to cultural and historic resources are not included in this analysis as they are assessed separately in Section 3.10 Archaeological and Historic Resources.

The visual landscape of an area is formed by physical, biological, and man-made features that combine to influence both landscape identifiability and uniqueness. The scenic value of a particular landscape is evaluated based on several factors that include scenic attractiveness, scenic integrity, and visibility. Scenic attractiveness is a measure of scenic quality based on human perceptions of intrinsic beauty as expressed in the forms, colors, textures, and visual composition of each landscape. Scenic attractiveness is expressed as one of the following three categories: distinctive, common, or minimal. Scenic integrity is a measure of scenic importance based on the degree of visual unity and wholeness of the natural landscape character. The scenic integrity of a site is classified as high, moderate, low, or very low. The subjective perceptions of a landscape's aesthetic quality and sense of place are dependent on where and how it is viewed.

Views of a landscape are described in terms of what is seen in the foreground, middleground, and background. In the foreground, defined as an area within 0.5 miles of the observer, details of objects are easily distinguished in the landscape. In the middleground, normally between 0.5 and 4 miles from an observer, objects may be distinguishable, but their details are weak and tend to merge into larger patterns. Details and colors of objects in the background, the distant part of the landscape, are not normally discernable unless they are especially large and standing alone. In this assessment, the background is measured as 4 to 10 miles from the observer. Visual and aesthetic impacts associated with an action may occur as a result of the introduction of a feature that is not consistent with the existing viewshed. The impressions of an area's visual character can have a significant influence on how it is appreciated, protected, and used. Consequently, the visual character of an existing site is an important factor in evaluating potential impacts.

For purposes of this visual assessment, the project area is defined as the area encompassing the proposed 13.3-mile Florence-Iron City 161-kV Transmission Line and the proposed Iron City 161-kV Switching Station. The southernmost approximately 4.2-miles of the proposed line, beginning at the existing Florence 46/161-kV Substation, would be rebuilt on the existing Colbert FP-Lawrenceburg 161-kV ROW which is currently occupied by de-energized towers. The remaining approximately 9-miles of proposed transmission line would consist of new structures within an existing TVA ROW easement that is currently unoccupied. At the northern terminus, TVA would construct a 400-foot loop line on new 100-foot-wide ROW into the proposed 161-kV switching station, located west of Iron City.

The proposed transmission line project area is comprised of level to gently rolling terrain. The landscape is characterized by rural lands (dense forest and agricultural fields) as well as areas of moderate development including commercial and residential properties, roadways, and existing utility corridors. Thus, the project vicinity consists of a combination of natural elements, such as rolling fields and forested areas, and human development, such as commercial and residential development and transportation and utility corridors.

The composition and patterns of vegetation are the prominent natural features of the landscape within the project area. Apart from crop fields and pasture, vegetation within the project area consists of a variety of brush and trees, which are predominantly deciduous. Residential and commercial development occurs within the project area, largely concentrated along the southern portion of the proposed transmission line in the City of Florence. The forms, colors, and textures of the natural features of the project area are typical of southern Tennessee and northern Alabama and are not considered to have distinctive visual quality. Therefore, scenic attractiveness of the project area is considered common, due to the ordinary or common visual quality in the foreground, middleground, and background (Table 3-8). The scenic integrity is considered moderate due to noticeable human alteration, including commercial, residential, agricultural, and transportation uses. The scenic value class of a landscape is determined by combining the levels of scenic attractiveness, scenic integrity, and visibility and can be excellent, good, fair, or poor. Based on the criteria used for this analysis, the overall scenic value class for the project area is good.

Table 3-8. Visual Assessment Ratings for Project Area

	Existing Landscape	
View Distance	**Scenic Attractiveness**	**Scenic Integrity**
Foreground	Common	Moderate
Middleground	Common	Moderate
Background	Common	Moderate

In a visual impact assessment, sensitive receptors generally include any scenic vistas, scenic highways, residential viewers, and public facilities or recreational areas located in the project's viewshed. The proposed transmission line would be visible to passing motorists from U.S. Route 72, as well as various county and local roads along the transmission line route. Other sensitive visual receptors in the foreground include scattered residences and farmsteads. As shown in Figure 3-1, other sensitive visual receptors within the viewshed of the proposed transmission line include churches, cemeteries, schools, parks, and natural areas. The majority of these facilities occur within the middleground of the project area, at a distance between 0.5 and 4 miles. There are seven churches, one school, and three cemeteries located within the foreground of the proposed project area, the majority of which are located toward the southern portion of the line, near Florence. In addition, the proposed transmission line traverses through the Shoal Creek Preserve, an approximately 300-acre nature preserve with trails for hiking, biking, and horseback riding.

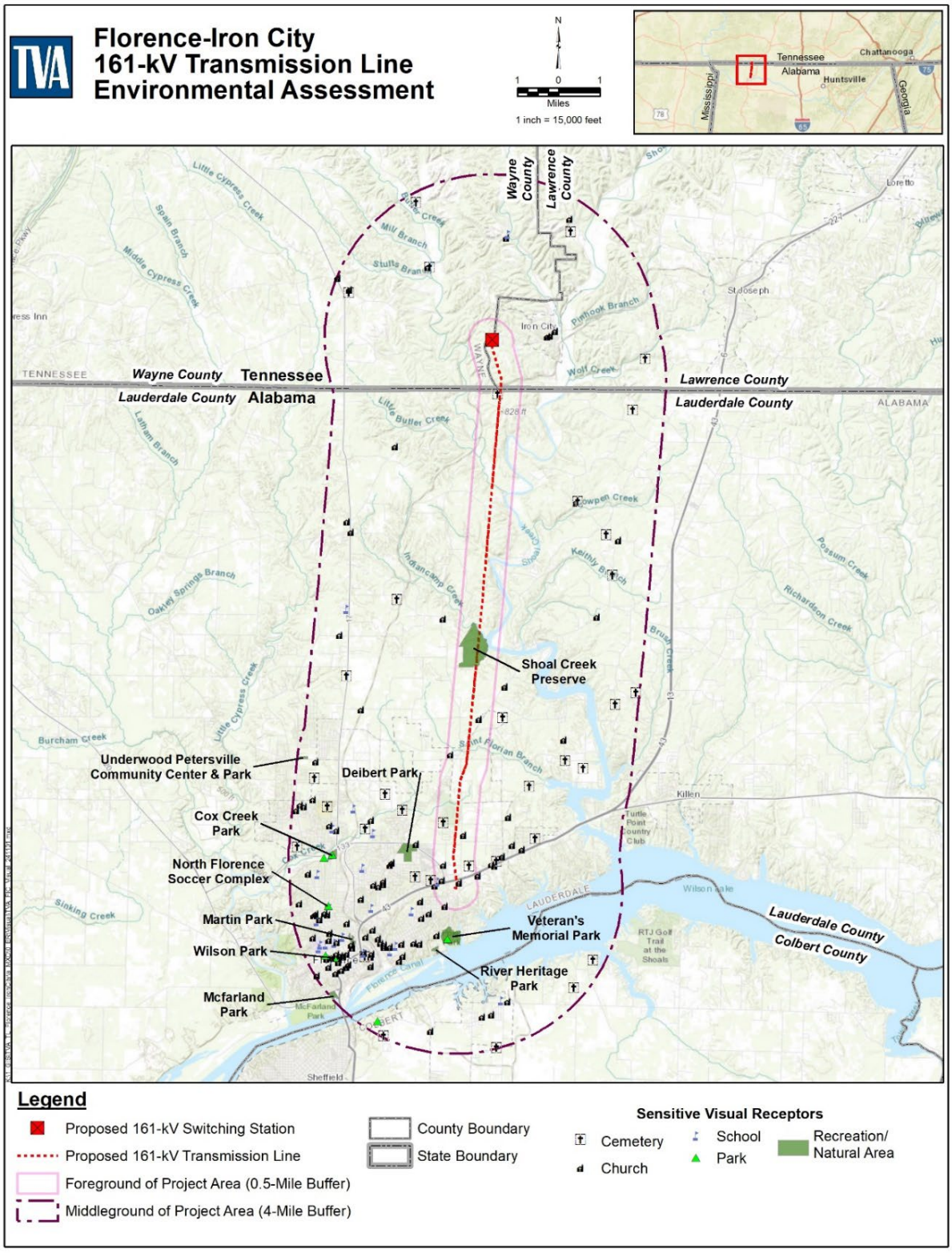

Figure 3-1. Sensitive Visual Receptors Within the Foreground and Middleground of the Proposed Florence-Iron City 161-kV Transmission Line

3.9.1.2.Environmental Consequences

The potential impacts to the visual environment from a given action are assessed by evaluating the potential for changes in the scenic value class ratings based upon landscape scenic attractiveness, integrity, and visibility. Sensitivity of viewing points available to the general public, their viewing distances, and visibility of the proposed action are also considered during the analysis. These measures help identify changes in visual character based on commonly held perceptions of landscape beauty and the aesthetic sense of place. The extent and magnitude of visual changes that could result from the proposed alternatives were evaluated based on the process and criteria outlined in the scenic management system as part of the environmental review required under NEPA.

3.9.1.2.1. Alternative A – No Action

Under the No Action Alternative, TVA would not construct the proposed Florence-Iron City 161-kV Transmission Line or the Iron City 161-kV Switching Station or construct associated access roads. Thus, landscape character and integrity would remain in its current state and there would be no impact to visual resources associated with TVA's activities.

3.9.1.2.2. Alternative B – Action Alternative

Under the Action Alternative, construction of the proposed Florence-Iron City 161-kV Transmission Line and the proposed Iron City 161-kV Switching Station would result in both short-term and long-term impacts to visual resources. During the approximately 18-month construction period, there would be some visual discord from existing conditions due to an increase in personnel and equipment coupled with disturbances of the current site characteristics. However, this would be contained within the immediate vicinity of the construction activities and would only last until all project activities have been completed and the disturbed areas have been seeded and restored through the use of TVA's standard BMPs (TVA 2022). Because of their temporary nature, construction-related impacts to local visual resources are expected to be minor.

In addition, there may be some visual discord associated with clearing and installation of access roads required for transmission line construction and maintenance activities. Where possible, these access roads would utilize existing roadways and existing utility ROW. Most of the required access roads would be temporary to support construction of the transmission line. Where possible, these access roads would utilize existing roadways and utility ROW. Sensitive visual receptors located along the access roads would experience some minor visual discord during construction and maintenance activities. These impacts would be greater in areas with new access roads, compared to access established on existing roads and utility ROW. The access roads would mainly be utilized during the short-term construction period and then periodically utilized for maintenance of transmission lines. Given the preference for use of existing roads and corridors, and minimal visual discord, construction and utilization of the access roads would have a minor impact on sensitive receptors and scenic quality.

Long-term impacts consist of the visible alterations associated with new transmission structures, overhead wires, ROW clearing, the switching station, and access road development. The most visible elements of the electric transmission system are the transmission structures (with a maximum height of 110.5 feet above ground), the new switching station, and the permanent removal of woody vegetation within the ROW that creates a visible corridor. However, the addition of lines on or near existing structures or within existing utility or transportation ROW increases compatibility with the landscape and minimizes visual impacts. Therefore, on the approximately 4.2-mile section of the

transmission line where the proposed structures would replace existing structures, changes to viewshed would be minimized. Additional ROW clearing may be required in areas where vegetation was not maintained along the de-energized line, but overall visual impacts would be lessened by the existence of the existing structures. Within the remaining nine miles of the transmission line, the removal of forested areas and the installation of single-pole and H-frame (multi-pole) steel structures and overhead wires would add discordantly contrasting elements and colors to the environment. Although much of the proposed transmission line would not be visible to the public due to the distance from developed areas and presence of forested buffers, they would be visible in the foreground to motorists on nearby roadways, a number of residences, and recreationists on trails within the Shoal Creek Preserve. Visual intrusions to viewers in the foreground include the new structures and overhead wires, as well as the visual corridor created by clearing vegetation within the existing ROW. The proposed switching station would also add discordant elements, including a transformer bank, overheard wires, a switch house, and maintenance building, to the viewshed; however, due to the lack of sensitive visual receptors in the foreground, direct views of the proposed substation would generally be limited to users of Duckburg Road as they pass the site. These observers would be transient motorists who would typically only be exposed to these features for short periods of time.

The majority of residents in the project area would only view the transmission line over expanses of pasture or would be obscured by vegetated buffers or outbuildings, making it less obtrusive. A small number of residences are located at a distance where they have an unobstructed view of the transmission line. However, these homes' close proximity to existing roadways and utility corridors increases the landscape's ability to absorb the visual change. While the proposed transmission line would add some discordant visual elements to the existing landscape, the view of these elements would be limited by the minimal number of residential receptors in the immediate foreground and would be somewhat absorbed into the overall landscape character near existing utility corridors and roadways.

In addition to nearby residents and motorists, other sensitive visual receptors in the foreground include seven churches, one school, and three cemeteries. Additionally, the Shoal Creek Preserve is also located within the foreground and is intersected by the existing ROW (Figure 3-1). Development of the transmission line within the Shoal Creek Preserve would be limited to the existing ROW. While the addition of structures and clearing of vegetation would create a visual intrusion, it would be limited to viewers along short segments of trails that intersect the ROW. Dense vegetation within the Preserve would shield the transmission line from view for the majority of the property and would not significantly alter its recreational use. At the southern end of the proposed transmission line, near Florence, the presence of existing transmission structures, as well as major roadways including U.S. Route 72, and other suburban development, increases visual compatibility for the construction of the proposed transmission line and prevents significant changes to the viewshed. The majority of the sensitive receptors within the foreground of the project area are located near Florence, where this existing development would either shield the transmission line from view or absorb most visual change. For visual receptors located at further distances, in the middleground and background, the proposed transmission line would be less visible and obtrusive as it would largely fall into an observer's view where objects are less distinguishable.

The human alterations already in place within the project area, including commercial development, roadways, and existing transmission system elements, currently contribute some visual discord with the natural landscape. These elements contribute to the landscape's ability to absorb negative visual change. Therefore, while the visual forms, colors, and textures of the landscape that make up the scenic attractiveness would be affected by the construction of the transmission line, it would remain common or ordinary (Table 3-9). Impacts to scenic integrity are anticipated to be greatest in the foreground along the proposed transmission line. At this distance, scenic integrity would be reduced from moderate to low, as visual alterations associated with the proposed transmission line (transmission structures, lines, and clear-cut ROW corridors that disrupt the tree canopy) would be dominant features on the landscape. However, there would be no change in the ratings for the middleground and background as the alterations associated with the transmission line would not be substantive enough to dominate the view from these distances (Table 3-9). Based on the criteria used for this analysis, the scenic value class for the affected environment after the proposed modifications would be reduced to fair in the foreground along the length of the proposed transmission line but would remain classified as good in the middleground. While the Action Alternative would contribute to a minor decrease in visual integrity of the landscape, the existing scenic class would not be reduced by two or more levels, which is the threshold of significance of impact to the visual environment. Therefore, visual impacts resulting from the implementation of the Action Alternative would be minor.

Table 3-9. Visual Assessment Ratings for Project Area Resulting from Action Alternative

	Resulting Landscape	
View Distance	**Scenic Attractiveness**	**Scenic Integrity**
Foreground	Common	Low
Middleground	Common	Moderate
Background	Common	Moderate

3.9.2. Noise

3.9.2.1. Affected Environment

Noise is unwanted or unwelcome sound usually caused by human activity and added to the natural acoustic setting of a locale. It is further defined as sound that disrupts normal activities or that diminishes the quality of the environment. Community response to noise is dependent on the intensity of the sound source, its duration, the proximity of noise-sensitive land uses, and the time of day the noise occurs (i.e., higher sensitivities would be expected during the quieter overnight periods).

Sound is measured in logarithmic units called decibels (dB). Given that the human ear cannot perceive all pitches or frequencies of sound, noise measurements are typically weighted to correspond to the limits of human hearing. This adjusted unit of measure is known as the A-weighted decibel (dBA) which filters out sound in frequencies above and below human hearing. A noise level change of 3 dBA or less is barely perceptible to average human hearing. However, a 5 dBA change in noise level is clearly noticeable. The noise level associated with a 10 dBA change is perceived as being twice as loud;

whereas the noise level associated with a 20 dBA change is four times as loud and would therefore represent a “dramatic change” in loudness.

To account for sound fluctuations, environmental noise is commonly described in terms of the equivalent sound level. The equivalent sound level is the constant noise level that conveys the same noise energy as the actual varying instantaneous sounds over a given period. Fluctuating levels of continuous, background, and/or intermittent noise heard over a specific period are averaged as if they had been a steady sound. The day-night sound level (L_{dn}), expressed in dBA, is the 24-hour average noise level with a 10-dBA correction penalty for the hours between 10 p.m. and 7 a.m. to account for the increased sensitivity of people to noises that occur at night. Typical background day-night noise levels for rural areas are anticipated to range between an L_{dn} of 35 and 50 dB, whereas higher-density residential and urban areas background noise levels range from 43 dB to 72 dB (EPA 1974). Common indoor and outdoor noise levels are listed in Table 3-10.

Table 3-10. Common Indoor and Outdoor Noise Levels

Common Outdoor Noises	Sound Pressure Levels (dB)	Common Indoor Noises
	110	Rock Band at 5 m (16.4 ft)
Jet Flyover at 300 m (984.3 ft)		
	100	Inside Subway Train (New York)
Gas Lawn Mower at 1 m (3.3 ft)		
	90	Food Blender at 1 m (3.3 ft)
Diesel Truck at 15 m (49.2 ft)		Garbage Disposal at 1 m (3.3 ft)
	80	Shouting at 1 m (3.3 ft)
Gas Lawn Mower at 30 m (98.4 ft)	70	Vacuum Cleaner at 3 m (9.8 ft)
Commercial Area		Normal Speech at 1 m (3.3 ft)
	60	Large Business Office
	50	Dishwasher Next Room
Quiet Urban Daytime		
	40	Small Theater, Large Conference Room
Quiet Urban Nighttime		Library
Quiet Suburban Nighttime		
	30	Bedroom at Night
Quiet Rural Nighttime		Concert Hall (Background)
	20	Broadcast and Recording Studio
	10	
		Threshold of Hearing
	0	

Source: Federal Highway Administration (FHWA), 2018

There are no federal, state, or locally established quantitative noise-level regulations specifying environmental noise limits for the proposed transmission line or the surrounding area. However, the EPA noise guideline recommends outdoor noise levels do not exceed Ldn of 55 dBA, which is sufficient to protect the public from the effect of broadband environmental noise in typical outdoor and residential areas. These levels are not regulatory goals but are "intentionally conservative to protect the most sensitive portion of the American population" with "an additional margin of safety" (EPA 1974). The U.S. Department of Housing and Urban Development considers an Ldn of 65 dBA or less to be compatible with residential areas (U.S. Department of Housing and Urban Development 1985).

3.9.2.2. Environmental Consequences

3.9.2.2.1. Alternative A – No Action

Under the No Action Alternative, TVA would not construct the proposed Florence-Iron City 161-kV Transmission Line or the Iron City 161-kV Switching Station or construct associated access roads. Therefore, there would be no impacts from noise under this alternative from TVA activities.

3.9.2.2.2. Alternative B – Action Alternative

Under the Action Alternative, construction activities of the proposed Florence-Iron City 161-kV Transmission Line and Iron City 161-kV Switching Station would last approximately six months and seven and a half months, respectively, and would generally be limited to daytime hours. During construction, noise would be generated by a variety of equipment including standard pick-up trucks, dump trucks, concrete trucks, feller-bunchers, bulldozers, excavators, graders, pile-drivers, augers, and rollers. Typical noise levels are expected to be 85 dBA or less at 50 feet from the construction equipment, except for pile-drivers which may produce noise levels of up to 95 dBA at 50 feet (Federal Highway Administration [FHWA] 2016). The actual observed noise would likely be lower in the field where vegetation and topography would cause further noise attenuation. Thus, typical construction noise would fall below the recommended EPA outdoor noise guideline of 55 dBA at all sensitive receptors. Additionally, pile driver use would be a short-term and relatively infrequent occurrence that would not contribute to typical background noise levels.

There is also a potential for indirect noise impacts associated with a temporary increase in traffic related to the workforce vehicle traffic, transport of construction equipment, and transport of spoil and borrow material. Roadway traffic noise is not usually a serious problem for people who live more than 500 feet from heavily traveled freeways or more than 100 to 200 feet from lightly traveled roads (FHWA 2011).

Due to the nature of the decibel scale and the attenuating effects of noise with distance, a doubling of traffic volume would result in an approximately 3 dBA increase in noise level, which would not normally be a perceptible noise increase (FHWA 2011).

During construction, operation, and maintenance of the proposed transmission line, equipment could generate noise above ambient levels (Appendix G). As all construction noise would be temporary in nature and limited to daytime hours, noise impacts from construction of the proposed transmission line would be minor.

Operational Noise

For similar reasons, noise related to periodic line maintenance is also expected to be insignificant. Transmission lines may produce minor noise during operation under certain atmospheric conditions.

Under certain wet weather conditions, high-voltage transmission lines may produce an audible low-volume hissing or crackling noise from corona discharge (the electrical breakdown of air into charged particles). Corona noise is composed of both broadband noise, characterized as a crackling noise, and pure tones, characterized as a humming noise. Under normal conditions, corona-generated noise is not audible, and during rain showers, the corona noise would likely not be readily distinguishable from background noise. During very moist, non-rainy conditions, such as heavy fog, the resulting corona noise may produce a very minor increase in background noise levels, but due to distance, it is not expected to result in perceptible changes in noise level at the closest sensitive receptors. Off of the ROW, corona noise is below the level that would interfere with speech.

3.10. Archaeological and Historic Resources

3.10.1. Affected Environment

Federal agencies are required by Section 106 of the National Historic Preservation Act and by NEPA to consider the possible effects of their proposed actions (or undertakings) on historic properties. The term “historic property” includes any historic or prehistoric site, district, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP) maintained by the National Park Service. “Undertaking” means any project, activity, or program that has the potential to have an effect on a historic property and that is under the direct or indirect jurisdiction of a federal agency or is licensed or assisted by a federal agency. To determine an undertaking’s possible effects on historic properties, a four-step review process is conducted.

These steps include:

- Initiation (defining the undertaking and the APE and identifying the parties to be consulted in the process).
- Identification of historic properties within the APE.
- Assessment of effects to historic properties.
- Resolution of adverse effects by avoidance, minimization, or mitigation.

To be eligible for listing on the NRHP if the cultural resource meets one of the following criteria:

- Criterion A: made a significant contribution to American history; for example, literature, ethnic heritage, health/medicine, and transportation.
- Criterion B: related to the life of significant persons; examples of NRHP properties nominated under Criterion B include George Washington’s Mt. Vernon estate.

- Criterion C: embodied distinctive characteristics of a type, period, or method of construction including works of a master or buildings that possess high artistic value.
- Criterion D: yielded important information about history or prehistory. This category is typically the most relevant criterion for archaeological resources. "Undertaking" means any project, activity, or program that has the potential to have an effect on a historic property and that is under the direct or indirect jurisdiction of a federal agency or is licensed or assisted by a federal agency.

During the Section 106 process, the agency must consult with the appropriate SHPO, federally recognized Indian tribes that have an interest in the undertaking, and any other party with a vested interest in the undertaking. If avoidance or minimization are not feasible, measures to mitigate the adverse effect must be taken.

TVA recommends that the APE for the current undertaking includes the following:

- The approximately 12.1 miles of 100-feet-wide and 1.2 miles of 175-feet-wide planned ROW occupying about 172.2 acres, 3.1 miles (approximately 7.9 acres) of planned access routes outside of the ROW, and the 80.2-acre area associated with the proposed Iron City Switching Station and temporary laydown area.
- All areas in which the project would be visible within a half-mile radius of the proposed transmission line and switching station.
- The de-energized transmission line constructed circa 1931 that currently occupies a portion of the ROW.

3.10.1.1. Archaeological Resources

A background and literature search found two archaeological resources (1LU623 and 1LU634) within the APE. Four cemeteries: Hopewell Cemetery, Huff Cemetery, Powell Cemetery, and Wilson Cemetery, are documented within the 0.5-mile background study area, although none of these were within the APE. TVA contracted with Tennessee Valley Archaeological Research (TVAR) to conduct a cultural resources survey of the 13.3-mile-long transmission line corridor, switching station parcel, and access routes to be used during construction and maintenance.

TVAR's archaeological survey resulted in the investigation of 40 cultural resources including 12 archaeological sites (1LU623, 1LU628, 1LU634, 1LU810-1LU818), and 28 isolated finds (IFs) (Table 3-11) (Butz et al. 2024a; Butz et al. 2024b; Butz et al. 2024c; Dison et al. 2024a; Dison et al. 2024b). Archaeological investigations were confined to the survey area, and it is possible that the archaeological sites were not fully delineated. For that reason, TVAR recommends that the NRHP status of the majority of investigated sites are unknown. Exceptions to this recommendation include is site 1LU814, which is recommended as eligible for NRHP listing, and site 1LU628, which was previously identified beyond the limits of the current survey, and which is unchanged as a result of the investigations. TVAR recommends the 28 IFs as ineligible for NRHP listing under Criteria A, B, and C.

Table 3-11. Recorded Archaeological Resources within the Area of Potential Effect

Archaeological Resource	Resource Type	NRHP Eligibility	TVAR Recommendation
1LU623	Lithic scatter, unknown temporal affiliation	Unknown	No further work
1LU628	Lithic scatter, unknown temporal affiliation	Not Eligible	No further work
1LU634	Early to Middle Archaic/Twentieth Century scatter	Unknown	No further work
1LU810	Lithic scatter, unknown temporal affiliation	Unknown	No further work
1LU811	Lithic scatter, unknown temporal affiliation	Unknown	Avoidance/additional work
1LU812	Lithic scatter, unknown temporal affiliation	Unknown	No further work
1LU813	Lithic scatter, unknown temporal affiliation	Unknown	Avoidance/additional work
1LU814	Woodland to Mississippian/Twentieth Century scatter	Eligible	Avoidance/additional work
1LU815	Lithic scatter, unknown temporal affiliation	Unknown	No further work
1LU816	Lithic scatter, unknown temporal affiliation	Unknown	No further work
1LU817	Lithic scatter, unknown temporal affiliation	Unknown	No further work
1LU818	Late Archaic to Early Woodland artifact scatter; historic dry stacked tabular limestone wall	Unknown	Avoidance/additional work
TN IF 1	Historic artifact isolate	Not eligible	No further work
TN IF 2	Historic and modern debris	Not eligible	No further work
TN IF 3	Historic and modern debris	Not eligible	No further work
TN IF 4	Historic and modern debris	Not eligible	No further work
AL IF 1	Historic artifact isolate	Not eligible	No further work
AL IF 2	Historic artifact isolate	Not eligible	No further work
AL IF 3	Historic artifact isolate	Not eligible	No further work
AL IF 4	Historic artifact isolate	Not eligible	No further work
AL IF 5	Historic artifact isolate	Not eligible	No further work
AL IF 6	Precontact lithic artifact isolate	Not eligible	No further work
AL IF 7	Historic and modern debris	Not eligible	No further work
AL IF 8	Precontact lithic artifact isolate	Not eligible	No further work
AL IF 9	Historic artifact isolate	Not eligible	No further work
AL IF 10	Precontact lithic artifact isolate	Not eligible	No further work
AL IF 11	Precontact lithic artifact isolate	Not eligible	No further work
AL IF 12	Historic and modern debris	Not eligible	No further work
AL IF 13	Historic and modern debris	Not eligible	No further work
AL IF 14	Quarried limestone blocks	Not eligible	No further work
AL IF 15	Precontact lithic artifact isolate	Not eligible	No further work
AL IF 16	Precontact lithic artifact isolate	Not eligible	No further work
AL IF 17	Precontact lithic artifact isolate	Not eligible	No further work
AL IF 18	Precontact lithic artifact isolate	Not eligible	No further work
AL IF 19	Historic roadbed	Not eligible	No further work
AL IF 20	Historic and modern debris	Not eligible	No further work
AL IF 21	Historic and modern debris	Not eligible	No further work
AL IF 22	Historic check dam	Not eligible	No further work
AL IF 23	Precontact lithic artifact isolate	Not eligible	No further work
AL IF 24	Precontact lithic artifact isolate	Not eligible	No further work

Due to an inability to yield important information about history or prehistory, as well as insufficient integrity, TVA recommends no additional work or avoidance at archaeological sites 1LU623, 1LU 628, 1LU634, 1LU810, 1LU812, and 1LU815 – 1LU817 as well as TN IFs 1-4 and AL IFs 1-24. However, sites 1LU811, 1LU813, 1LU814, and 1LU818 represent precontact and multicomponent sites that have the potential to yield important information concerning the precontact occupation of the area. TVA recommends the boundaries of sites 1LU811, 1LU813, 1LU814, and 1LU818 plus a 30-meter buffer be added to the exclusion area of the project site. While sites 1LU811, 1LU813, and 1LU818 and the 30-meter buffers could be avoided, potential impacts to site 1LU814 could be reduced but not avoided altogether. In order to assess potential adverse effects, limited Phase II

archaeological testing was conducted by TVAR within a portion of site 1LU814 in the location where potential impacts could not be avoided. As a result of the limited Phase II testing, no significant deposits with the potential to yield significant information were identified in the portions of the sites where potential impacts could not be avoided.

3.10.1.2. Architectural Resources

During the cultural resources study of the TL corridor, TVAR also conducted an architectural assessment of the APE. According to NRHP records, there are no NRHP-listed properties in Lawrence and Wayne counties, Tennessee or Lauderdale County, Alabama located within the APE. Two previously recorded architectural resources are located within the APE (Jackson Military Road and St. Florian Historic District), both of which are listed within the Alabama Register of Landmarks and Heritage (ARLH).

TVAR recorded 76 architectural resources (HS-1 and HS-2 in Tennessee and Lu00001 – Lu00074), of which two are recommended as eligible for listing in the NRHP under Criteria A (Lu00001) and Criteria A and C (HS-1) (Dison et al. 2024a; Dison et al. 2024b). TVAR recommends that the visual impact fails to prevent any of the resources found to be eligible for listing in the NRHP from conveying their respective areas of significance. Furthermore, TVAR recommends that the remaining 74 properties are considered ineligible for NRHP listing under Criteria A, B, or C.

Table 3-12. List of Recorded Architectural Resources within the Area of Potential Effect

Inventory Number	Date/Architectural Style	NRHP Eligibility
HS-1	1888 Nashville, Florence & Sheffield Railroad	Eligible
HS-2	1931 Iron City-Muscle Shoals Transmission Line (Tennessee portion)	Not Eligible
Lu00001	1817 Jackson Military Road/1916 Jackson Memorial Highway	Eligible
Lu00002	1931 Iron City-Muscle Shoals Transmission Line (Alabama portion)	Not Eligible
Lu00003	ca. 1872 St. Florian Historic District	Not Eligible
Lu00004	St. Florian – 1901 vernacular house	Not Eligible
Lu00005	St. Florian – 1956 St. Florian Gas Station	Not Eligible
Lu00006	St. Florian – 1964 Linear Ranch house	Not Eligible
Lu00007	St. Florian – ca. 1900 outbuilding	Not Eligible
Lu00008	St. Florian – 1934 Linear Ranch house	Not Eligible
Lu00009	St. Florian – ca. 1908 gable-front-and-wing house	Not Eligible
Lu00010	St. Florian – ca. 1958-1981 agricultural structures	Not Eligible
Lu00011	St. Florian – 1946 former milking parlor; residence	Not Eligible
Lu00012	ca. 1956-1978 Lakeside Highlands Subdivision	Not Eligible
Lu00013	Lakeside Highlands – ca. 1963 Linear Ranch house	Not Eligible
Lu00014	Lakeside Highlands – ca. 1965 Linear Ranch house	Not Eligible
Lu00015	Lakeside Highlands – 1963 Linear Ranch house	Not Eligible
Lu00016	Lakeside Highlands – ca. 1960 Linear Ranch house	Not Eligible
Lu00017	Lakeside Highlands – 1960 Linear Ranch house	Not Eligible
Lu00018	1956 Eastwood Subdivision	Not Eligible
Lu00019	Eastwood Subdivision – 1965 Tri-level Ranch house	Not Eligible
Lu00020	Eastwood Subdivision – 1960 Compact Ranch house	Not Eligible
Lu00021	Eastwood Subdivision – 1960 Compact Ranch house	Not Eligible
Lu00022	Eastwood Subdivision – 1960 Compact Ranch house	Not Eligible
Lu00023	Eastwood Subdivision – 1960 Compact Ranch house	Not Eligible
Lu00024	Eastwood Subdivision – 1960 Compact Ranch house	Not Eligible
Lu00025	Eastwood Subdivision – 1956 Compact Ranch house	Not Eligible
Lu00026	Eastwood Subdivision – 1958 Compact Ranch house	Not Eligible

Inventory Number	Date/Architectural Style	NRHP Eligibility
Lu00027	ca. 1900-1914 Powell Cemetery	Not Eligible
Lu00028	ca. 1834-1908 Wilson Cemetery	Not Eligible
Lu00029	ca. 1869-2023 Hopewell AME Church and Graveyard	Not Eligible
Lu00030	1955 vernacular house	Not Eligible
Lu00031	ca. 1900 vernacular house	Not Eligible
Lu00032	1926 Craftsman bungalow house	Not Eligible
Lu00033	1942 vernacular house	Not Eligible
Lu00034	1920 gable-front-and-wing house	Not Eligible
Lu00035	ca. 1950 agricultural barn	Not Eligible
Lu00036	1940 former gas station	Not Eligible
Lu00037	1946 saddlebag house	Not Eligible
Lu00038	1955 Rambling Ranch house	Not Eligible
Lu00039	1965 Linear Ranch house	Not Eligible
Lu00040	1951 Compact Ranch house	Not Eligible
Lu00041	1958 Bungalow Ranch house	Not Eligible
Lu00042	1968 Linear Ranch house	Not Eligible
Lu00043	1965 Linear Ranch house	Not Eligible
Lu00044	1954 Compact Ranch house	Not Eligible
Lu00045	ca. 1872 vernacular house	Not Eligible
Lu00046	1952 bungalow house	Not Eligible
Lu00047	1972 Linear Ranch house	Not Eligible
Lu00048	1963 Linear Ranch house	Not Eligible
Lu00049	1967 Linear Ranch house	Not Eligible
Lu00050	1968 Linear Ranch house	Not Eligible
Lu00051	1969 Linear Ranch house	Not Eligible
Lu00052	1969 Linear Ranch house	Not Eligible
Lu00053	1969 Linear Ranch house	Not Eligible
Lu00054	1966 Compact Ranch house	Not Eligible
Lu00055	1967 Linear Ranch house	Not Eligible
Lu00056	1972 vernacular house	Not Eligible
Lu00057	1963 Compact Ranch house	Not Eligible
Lu00058	ca. 1890 cable-front-and-wing house	Not Eligible
Lu00059	1947 vernacular house	Not Eligible
Lu00060	1940 Linear Ranch house	Not Eligible
Lu00061	1972 Linear Ranch house	Not Eligible
Lu00062	1948 vernacular bungalow house	Not Eligible
Lu00063	1955 vernacular L-shaped house	Not Eligible
Lu00064	1949 vernacular bungalow house	Not Eligible
Lu00065	1965 Bungalow Ranch house	Not Eligible
Lu00066	1966 linear vernacular house	Not Eligible
Lu00067	1959 Linear Ranch house	Not Eligible
Lu00068	1972 rectangular commercial building	Not Eligible
Lu00069	1958-1981 square commercial building	Not Eligible
Lu00070	1959 rectangular commercial building	Not Eligible
Lu00071	ca. 1906 Classical Revival house	Not Eligible
Lu00072	1953 vernacular bungalow house	Not Eligible
Lu00073	1955 vernacular house	Not Eligible
Lu00074	1960 Compact Ranch house	Not Eligible

3.10.2. Environmental Consequences

3.10.2.1. Alternative A – No Action

Under the No Action Alternative, existing land use would be expected to remain unchanged. Ground disturbing agricultural practices would continue to potentially impact intact cultural resources at the surface or within the first 8 to 10 inches of soil. However, no adverse effect to cultural resources would be anticipated from TVA actions.

3.10.2.2. Alternative B – Action Alternative

TVA, in consultation with the Alabama and Tennessee SHPOs and federally recognized Indian tribes, found that the project would not negatively impact any listed or eligible NRHP-listed archaeological or architectural sites. The SHPOs concurred with TVA's findings in letters dated July 30, 2024 (Tennessee) and August 22, 2024 (Alabama) (for the transmission line ROWs), November 15, 2024 (Tennessee) and December 11, 2024 (Alabama) (for the access routes), and December 11, 2024 (for the results of the Phase II testing and architectural survey) (Appendix A). TVA received comments from four federally recognized Indian tribes. TVA received concurrence for no adverse effect for the transmission line ROWs from the Eastern Shawnee Tribe of Oklahoma on September 9, 2024, and from The Chickasaw Nation on September 6, 2024. TVA received concurrence on the findings of the Phase II testing and access roads from The Chickasaw Nation on December 5, 2024, and from The Muscogee (Creek) Nation on December 11, 2024. Lastly, TVA received notice that the project lay outside The Choctaw Nation's area of interest on December 16, 2024.

Should previously undiscovered cultural resources be identified during Project Site construction or operations, a TVA archaeologist and consulting parties would be consulted before any further action is taken. Therefore, TVA finds that the undertaking i.e., implementing the Action Alternative, would have no adverse effect to historic properties.

3.11. Recreation, Parks, and Managed Areas

3.11.1. Affected Environment

This section describes recreational opportunities and natural areas near the proposed transmission line ROW. Managed areas include lands held in public ownership that are managed by an entity (e.g., TVA, USDA, USFS, State of Tennessee) to protect and maintain certain ecological and/or recreational features. Natural areas include ecologically significant sites; federal, state, or local park lands; national or state forests; wilderness areas; scenic areas; wildlife management areas; recreational areas; greenways; trails; Nationwide Rivers Inventory streams; and wild and scenic rivers. Ecologically significant sites are either tracts of privately owned land that are recognized by resource biologists as having significant environmental resources or identified tracts on TVA lands that are ecologically significant but not specifically managed by TVA's Natural Areas program.

TVA conducted a desktop level review of recreational resources within a 3-mile radius of the Florence-Iron City 161-kV Transmission Line project area (Table 3-13). Forty-six recreation areas were identified to be within a 3-mile radius, and 12 areas were identified to be less than a mile away from the project area. Three areas were identified to overlap with the project area: Shoal Creek Preserve, Blackberry Trail Golf Course, and Powell Cemetery. Some dispersed recreational activity such as hunting, nature observation, hiking, and walking for pleasure may occur on some of the lands within or near the proposed transmission line corridor and project related access routes.

Table 3-13. Recreation Areas within Three Miles of the Florence-Iron City 161-kV Transmission Line Project Area

Recreation Area	County	State	Distance/Direction from project area
Visitor Overlook	Colbert	AL	2.28 mi
Wilson Dam Waterfall	Colbert	AL	2.32 mi
TVA Rockpile Trail	Colbert	AL	2.4 mi

Recreation Area	County	State	Distance/Direction from project area
TVA Fleet Harbor Boat Ramp	Colbert	AL	2.44 mi
Rockpile Boat Ramp	Colbert	AL	2.55 mi
Steenson Hollow Marina	Colbert	AL	2.85 mi
Blackberry Trail Golf Course	Lauderdale	AL	0.0 mi - overlap
Shoal Creek Preserve Forever Wild Tract	Lauderdale	AL	0.0 mi - overlap
Powell Cemetery	Lauderdale	AL	0.05 mi - overlap
Creekside Camp	Lauderdale	AL	0.15 mi
Wilson Cemetery	Lauderdale	AL	0.31
Huff Cemetery	Lauderdale	AL	0.38 mi
St. Florian Park and Walking Track	Lauderdale	AL	0.50 mi
Oak Hill Cemetery	Lauderdale	AL	0.75 mi
Deibert Park	Lauderdale	AL	0.91 mi
Broadway Recreation Center	Lauderdale	AL	0.96 mi
Hart Equestrian Center Inc	Lauderdale	AL	1.0 mi
Veteran Park	Lauderdale	AL	1.0 mi
Florence Park n Rec Lakeside DGC	Lauderdale	AL	1.11 mi
Cedar Ridge Equestrian Center	Lauderdale	AL	1.2 mi
Veterans Memorial Park	Lauderdale	AL	1.37 mi
River Heritage Park	Lauderdale	AL	1.5 mi
Reynolds Cemetery	Lauderdale	AL	1.7 mi
Muscle Shoals Trap and Skeet	Lauderdale	AL	1.82 mi
Price Cemetery	Lauderdale	AL	1.82 mi
Panther Stadium	Lauderdale	AL	1.9 mi
Earle Trent Assembly	Lauderdale	AL	1.95 mi
Jones Hill Cemetery	Lauderdale	AL	1.95 mi
Shoals Creek School	Lauderdale	AL	2.0 mi
Piney Grove Cemetery	Lauderdale	AL	2.1 mi
Florence High School Fields	Lauderdale	AL	2.25 mi
Woodland Cemetery No. 1	Lauderdale	AL	2.3 mi
City of Florence Rest Stop	Lauderdale	AL	2.32
Tate Russell Cemetery	Lauderdale	AL	2.4 mi
Singing River Bridge	Lauderdale	AL	2.6 mi
Memorial Grove Park	Lauderdale	AL	2.74 mi
Martin Park	Lauderdale	AL	2.75 mi
Old Baptist/Pleasant Grove Cemetery	Lauderdale	AL	2.85 mi
Tom Braly Stadium	Lauderdale	AL	2.85 mi
Cox Creek Park	Lauderdale	AL	2.86 mi
Camp Westmore	Lauderdale	AL	2.9 mi
Waterfront Marina & Dry Storage	Lauderdale	AL	3.0 mi
Marina Mar	Lauderdale	AL	3.0 mi
Public Boat Launch	Lauderdale	AL	3.0 mi
Wade Cemetery	Wayne	TN	1.25 mi
Cedar Grove Cemetery	Wayne	TN	2.3 mi

A review of the TVA Regional Natural Heritage database identified 10 managed and natural areas within three miles of the proposed project area (Table 3-14).

Table 3-14. Managed and Natural Areas within Three Miles of the Proposed Project Area

Natural Area	Acres	County	State	Distance/Direction from project area
Shoal Creek Preserve Forever Wild Tract	303.31	Lauderdale	AL	overlap
Veterans Park	95.7	Lauderdale	AL	0.9 mi south
River Heritage Park	26.59	Lauderdale	AL	1.4 mi south
Tennessee River/Wilson Dam Nonessential Experimental Population	4692.18	Multiple	AL	1.4 mi south
Wilson Dam Tailwater Restricted Mussel Harvest Area	1365.5	Multiple	AL	1.4 mi south
Southeastern Cave Conservancy- Holly Creek Cave Preserve	16.29	Wayne	TN	2 mi northeast
Wilson Dam Reservation	245.41	Multiple	AL	2.1 mi south
Muscle Shoals National Recreational Trail	48.65	Multiple	AL	2.3 mi south
Muscle Shoals Reservation	2427.5	Multiple	AL	2.3 mi south
Cox Creek Park	26.08	Lauderdale	AL	2.7 mi west

3.11.2. Environmental Consequences

3.11.2.1. Alternative A – No Action

Under the No Action Alternative, the proposed project would not be implemented and no direct, indirect, or cumulative impacts from TVA project-related actions on natural areas or recreational areas would be anticipated.

3.11.2.2. Alternative B – Action Alternative

Under the Action Alternative, the Florence-Iron City transmission line would be built, utilizing a portion of existing transmission line ROW easement through the Shoal Creek Preserve, Blackberry Trail Golf Course, and Powell Cemetery. Minor noise, transportation, and visual impacts could occur during construction. TVA would coordinate with the Blackberry Trail Golf Course to ensure the safety of their golf cart/walking trail. The old de-energized TEPCO transmission line runs directly over this trail. Signage would be placed by TVA to warn pedestrians of the construction. The trail may need to be temporarily closed depending on the potential hazards presented during the project. While some

impacts to these areas are unavoidable, these are likely temporary and limited to the construction phase of this project, as this section of the proposed transmission line work would be on existing transmission line ROW. Once the old TEPCO steel towers are removed and new structures installed, the only impacts would be from future maintenance activities, which would be minimal. The proposed project could cause minor disruption to any dispersed outdoor recreation use patterns in the immediate vicinity of the transmission line ROW corridor. However, the extent of any such impacts should be minor and insignificant. In addition, BMPs would be implemented to minimize or avoid any impacts resulting from construction and operation. The remaining recreational areas are a sufficient distance from the project area that no direct or major impacts are expected.

Under the Action Alternative, the Florence-Iron City transmission line would be built, utilizing a portion of existing transmission line ROW through the Shoal Creek Preserve, a Forever Wild parcel. The Forever Wild properties are managed by the State Lands Division of the ADCNR. Impacts to this area could include clearing of trees, disturbance of the scenic and wild value of this area. TVA would coordinate with ADCNR to minimize impacts wherever possible. Any work to re-establish and maintain access roads and new transmission line structures added to this section of the transmission line may cause impacts to this area. As this section of the proposed work would be on an existing transmission line ROW, any impacts to this area should be temporary and limited to the construction phase of this project. Once the TEPCO structures are removed and the new structures installed, the only impacts would be from future maintenance activities, which would be minimal. The remaining natural areas are a sufficient distance from the project area that no direct or major impacts are expected.

3.12. Socioeconomics

3.12.1. Affected Environment

The proposed transmission line would extend from the existing Florence 46/161-kV Substation, 13.3 miles north to the proposed Iron City 161-kV Switching Station in Lawrence County. As detailed in Section 3.12.2.2, impacts associated with the proposed project consist of temporary disturbances during construction (i.e., noise, traffic, and fugitive dust) as well as long-term visual and property value impacts, all of which are limited to communities in the immediate vicinity of the project footprint. There would be no emissions or releases of air pollutants or hazardous materials during operation that would impact human health or welfare in the surrounding area. Thus, the study area for the socioeconomic analysis is limited to the 18 census block groups located in a one-mile radius of the centerline of the new transmission line (see Figure 3-2).

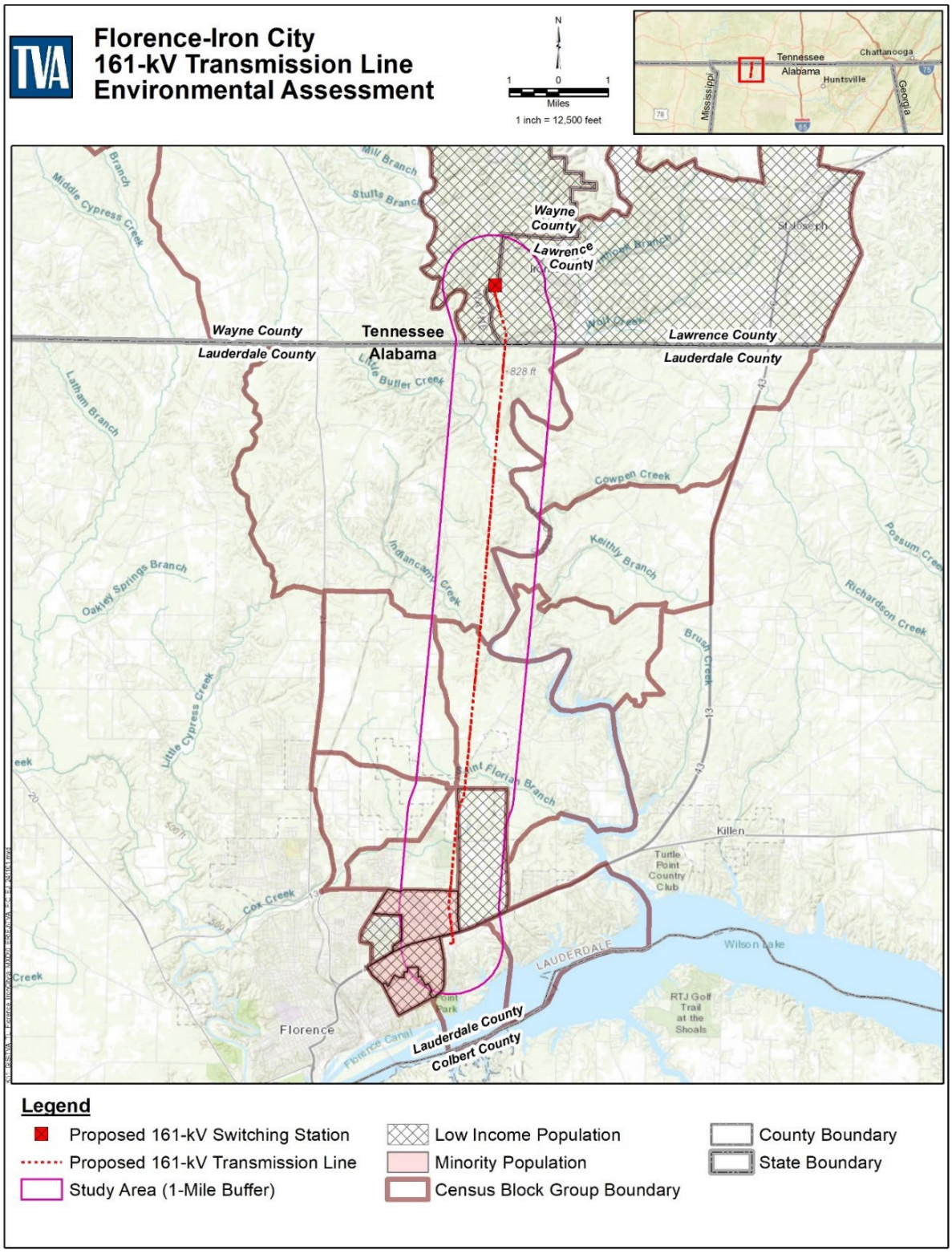

Figure 3-2. Low Income and Minority Populations Within the Study Area

As the study area spans Lauderdale, Lawrence, and Wayne counties, these three counties and the states of Alabama and Tennessee are included as appropriate secondary geographic areas of reference. Comparisons at multiple spatial scales provide a more detailed characterization of populations that may be affected by the proposed actions. Demographic and economic characteristics of populations within the study area were assessed using the most recent U.S. Census Bureau (USCB) data available, including 2020 Decennial Census counts (USCB 2020) for total population and racial characteristics, and 2018-2022 American Community Survey (ACS) 5-year estimates (USCB 2022) for the remaining datasets.

3.12.1.1. Demographic and Economic Conditions

Demographic and economic characteristics of the block groups that make up the study area and of the secondary reference geographies are summarized in Table 3-15. The study area has a resident population of 24,328 and is characterized by low- to moderate-density residential development. Between 2010 and 2020, the study area population declined by approximately 3 percent. Over the same period, the population Wayne County declined by approximately 5 percent while the population of Lauderdale and Lawrence counties grew by approximately 1 percent and 6 percent, respectively. The populations in the States of Alabama and Tennessee also increased by approximately 5 percent and 9 percent, respectively.

The majority of the population within the study area (approximately 85 percent) is white with approximately 15 percent minority populations. Minority groups in the study area include: Black or African American (6.2 percent), Hispanic or Latino (4.5 percent), persons who identify as two or more races (3.2 percent), Asian (1.0 percent), and small numbers (less than one percent) who are American Indian and Alaska Native, Native Hawaiian and other Pacific Islander, or identify as some other race. In the secondary comparison geographies, total minority populations (i.e., all non-white and Hispanic or Latino racial groups combined) comprise approximately 37 percent and 29 percent of the populations of Alabama and Tennessee, respectively, which is comparatively higher than the total minority population in Lauderdale, Lawrence, and Wayne counties (ranging from approximately 9 to 18 percent). (Table 3-15).

The nationwide poverty level is determined annually by the USCB and varies by the size of family and number of related children under 18 years of age. The 2023 USCB Poverty Threshold for an individual under the age of 65 is an annual income of $15,852, and for a family of four with two children it is an annual income of $30,900 (USCB 2023). The percentage of the study area population falling below the poverty level (approximately 11 percent) is lower than that of the surrounding counties (ranging from approximately 13 percent to 20 percent) and the states of Alabama and Tennessee (approximately 16 percent and 14 percent, respectively).

According to EPA, the effects of income on baseline health and other aspects of susceptibility are not limited to those below the poverty thresholds. For example, populations having an income level from one to two times the poverty level also have worse health overall than those with higher incomes (Centers for Disease Control and Prevention 2013).The average per capita income within the study area is $34,393, which is higher than that of the surrounding counties and largely consistent with the per capita income in the states of Alabama ($33,344) and Tennessee ($36,040). For purposes of this assessment, low-income individuals are those whose annual household income is less than two times the poverty level, and approximately 33 percent of the population in the study area is considered low income.

The civilian labor force within the study area is 11,625, with an unemployment rate of 5.0 percent. This unemployment rate is generally consistent with that of the reference geographies (Table 3-15).

Table 3-15. Demographic and Socioeconomic Characteristics[1]

	Study Area (18 Census Block Groups within 1 mile of Proposed Transmission Line)	Lauderdale County, Alabama	Lawrence County, Tennessee	Wayne County, Tennessee	State of Alabama	State of Tennessee
Population[1,2,3]						
Population, 2020	24,328	93,564	44,159	16,232	5,024,279	6,910,840
Population, 2010	25,111	92,709	41,869	17,021	4,779,736	6,346,105
Percent Change 2010-2020	-3.1%	0.9%	5.5%	-4.6%	5.1%	8.9%
Persons under 18 years, 2022	20.5%	19.4%	24.9%	18.1%	22.1%	22.0%
Persons 65 years and over, 2022	23.6%	20.1%	17.6%	19.0%	17.3%	16.7%
Racial Characteristics[1]						
Not Hispanic or Latino						
White alone, 2020[(a)]	84.7%	81.8%	91.4%	89.3%	63.1%	70.9%
Black or African American, 2020[(a)]	6.2%	9.8%	1.6%	5.4%	25.6%	15.7%
American Indian and Alaska Native, 2020[(a)]	0.3%	0.3%	0.2%	0.1%	0.5%	0.2%
Asian, 2020[(a)]	1.0%	0.8%	0.4%	0.2%	1.5%	1.9%
Native Hawaiian and Other Pacific Islander, 2020[(a)]	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
Some Other Race alone, 2020[(a)]	0.1%	0.2%	0.3%	0.3%	0.3%	0.3%
Two or More Races, 2020	3.2%	3.8%	3.6%	2.3%	3.7%	3.9%
Hispanic or Latino, 2020[(a)]	4.5%	3.3%	2.5%	2.3%	5.3%	6.9%
Income and Employment[3]						
Per capita income, 2022	$34,393	$32,678	$26,865	$26,538	$33,344	$36,040
Persons below poverty level, 2022	11.1%	13.3%	16.1%	19.6%	15.7%	14.0%
Persons below low-income threshold, 2022[(b)]	33.2%	32.4%	40.8%	40.4%	34.8%	32.6%
Civilian Labor Force, 2022	11,625	45,106	19,741	6,555	2,329,696	3,430,845
Percent Employed, 2022	95.0%	96.4%	93.7%	95.4%	94.8%	95.0%
Percent Unemployed, 2022	5.0%	3.6%	6.3%	4.6%	5.2%	5.0%

Source: 1. USCB 2010, 2. USCB 2020, 3. USCB 2022
(a) Includes persons reporting only one race; (b) Low-income threshold is defined as two times the poverty level

3.12.1.2. Community Facilities and Services

Community facilities and services include public or publicly funded facilities such as police protection and other emergency services (ambulance/fire protection), schools, hospitals and other health care facilities, libraries, churches, and community centers. To identify facilities and emergency services that could be potentially impacted by proposed project activities or emergency incidents along the length of the transmission line, the study area is identified as the service area of various providers, where applicable, or the area within a one-mile radius of the proposed project.

Based on a review of aerial imagery and online information including the U.S. Geological Survey (USGS) Geographic Names Information System (USGS 2023b), community facilities and services available within a one-mile radius of the proposed transmission line include 16 churches, one school, and six cemeteries. In addition, the project area is served by Florence Fire and Rescue, the Iron City Volunteer Fire Department, the Florence Police Department, and the Lauderdale County Sherriff's Department.

3.12.2. Environmental Consequences

3.12.2.1. Alternative A – No Action

Under the No Action Alternative, TVA would not construct the proposed 13.3-mile Florence-Iron City 161-kV Transmission Line or the Iron City 161-kV Switching Station. Therefore, there would be no change in local demographics, socioeconomic conditions, or community services in association with the proposed action.

3.12.2.2. Alternative B – Action Alternative

3.12.2.2.1. Demographic and Economic Impacts

Under the Action Alternative, the proposed ROW clearing and transmission line and switching station construction activities would occur over approximately 18 months and would entail the use of mobile crews comprised of approximately 30 contractors and/or full-time TVA staff. It is anticipated that most of these workers would be drawn from the TVA in-house labor force that currently resides in the region; however, some specialty workers and laborers not available within the area may be needed to support construction activities. Following construction, work crews would be present in the study area for occasional operation and maintenance activities. In both cases, given the relatively small workforce and that the majority of workers needed would likely be drawn from the existing labor force, impacts to demographics and local employment would be minor.

Potential economic impacts associated with the proposed action relate to direct and indirect effects of property acquisition, construction, and operations. Under the Action Alternative, the proposed Florence-Iron City 161-kV Transmission Line would span approximately 117 parcels, owned by 100 individual property owners. TVA already has custody and control of the easement on which the transmission line would be built, with the exception of the southernmost 2.5-mile segment (approximately 30 acres) which would be acquired from Florence Utilities. These easements give TVA the right to construct, operate, and maintain the transmission system across the property owners' lands. TVA expects to utilize new and/or existing access roads to access the ROW. TVA would also acquire 45.6 acres in fee for construction of the new 161-kV Switching Station and transmission line work. In each case, landowners are compensated for the value of such rights and properties. Furthermore, because TVA's existing ROW ranges from 125 feet to 175 feet wide in Alabama, TVA would abandon some of the ROW that exceeds the standard 100-foot width,

totaling approximately 47 acres. TVA would not charge property owners to cover the fair market value, or the administrative costs associated with ROW abandonment.

There are no known displacements required for development of the transmission line, switching station, or access roads. Given the relatively minor acquisitions, the direct local economic effect from the purchase of additional property or right-of-way easements would be minor relative to the total regional economy. Construction and maintenance activities would also result in minor but beneficial impacts to the local economy through the purchases of materials and supplies, potential procurement of contract workers or additional services, and expenditure of the wages earned by the transient workforce in the local communities.

There is also the potential for a decrease in property value for those parcels in the vicinity of the proposed transmission line or the new switching station. However, most of the new construction would take place along existing transmission ROWs and/or in undeveloped areas; residential properties have been avoided to the greatest extent possible. As most homes in the area already have views of existing transmission structures or are separated from these structures by a vegetated buffer, any effects to local property values would be minor.

The construction and operation of the proposed transmission line and switching station could result in minor temporary impacts such as increased traffic, noise, fugitive dust, and air emissions during the construction period. However, these impacts would be minor due to the considerable distance between the majority of residences and would not result in any substantial long-term impacts that would have a direct impact on human health or welfare.

In addition, implementation of the Action Alternative would ensure that the study area has a continuous, reliable source of electric power for its future load growth. The proposed transmission improvements would reduce overall line exposure by providing backup power supply and thus would increase power reliability of the existing Waynesboro, Loretto, and Crockett substations. The proposed project would also provide backup capability to the City of Florence and create additional transmission capacity which supports load growth and economic development in the Florence area.

3.12.2.2.2. Community Facilities and Services

Direct impacts to community facilities occur when a community facility is displaced or access to the facility is altered. Neither the construction or operation of the transmission line, switching station, or associated access roads would result in the displacement of community facilities or impede access to any facilities. Therefore, there would be no direct impacts to community facilities or services under the Action Alternative.

Indirect impacts occur when a proposed action or project results in a population increase that would generate greater demands for services and/or affect the delivery of such services. As the proposed construction and maintenance would not result in notable impacts to local demographics, increased demands for services such as schools, churches, and healthcare facilities are not anticipated. In the event of an emergency along the ROW, local law enforcement, fire, and/or EMS response would likely be required. The project area is served by Florence Fire and Rescue, the Iron City Volunteer Fire Department, the Florence Police Department, and the Lauderdale County Sherriff's Department, any of which could respond in the event of an emergency. As the adjacent communities provide a network of emergency services, and emergencies along the transmission line are

anticipated to be a rare occurrence, implementation of the Action Alternative would not have a notable impact on the demand for emergency services in the area.

3.13. Long-term and Cumulative Impacts

The presence of the proposed transmission line and the proposed switching station would present long-term visual effects to the mostly rural character of the local area. However, the proposed line would traverse mostly rural areas except for a concentration of residential and commercial development along the southern portion of the proposed transmission line beginning at the existing Florence 46/161-kV Substation in the City of Florence. On the approximately 4.2-mile section of the transmission line where the proposed structures would replace the de-energized line on the existing Colbert FP-Lawrenceburg 161-kV ROW, the transmission line would not be especially prominent in the local landscape due to the presence of the existing structures. Likewise, the remaining nine miles of the transmission line would consist of new structures and would pose a long-term encumbrance on the affected properties, but the proposed route would utilize an existing TVA ROW easement that is currently unoccupied. At the northern terminus, TVA would construct a 400-foot loop line on new 100-foot-wide ROW into the proposed TVA 161-kV Switching Station, located west of Iron City, Tennessee. Various agricultural land uses could be practiced within the ROW, but any timber production within the ROW would be foregone for the life of the transmission line.

The availability of a reliable power supply is one factor in improving the overall infrastructure in the local area, which over time could make the area more attractive to additional commercial and residential development. However, the extent and degree of such development depends on a variety of factors and cannot be predicted accurately. Cumulative impacts of the construction, maintenance, and operation of the proposed transmission line have been examined to the extent practicable in resource sections above. Thus, residential and commercial growth of this mainly rural area would be a minor, long-term and cumulative consequence of the proposed transmission system improvements.

3.13.1. Postconstruction Effects

3.13.1.1. Electric and Magnetic Fields

Transmission lines, like all other types of electrical wiring, generate both electric and magnetic fields (i.e., EMFs). The voltage on the conductors of a transmission line generates an electric field that occupies the space between the conductors and other conducting objects such as the ground, transmission line structures, or vegetation. A magnetic field is generated by the current (i.e., the movement of electrons) in the conductors. The strength of the magnetic field depends on the current, the design of the line, and the distance from the line.

The fields from a transmission line are reduced by mutual interference of the electrons that flow around and along the conductors and between the conductors. The result is even greater dissipation of the low energy. Most of this energy is dissipated on the ROW, and the residual very low amount is reduced to background levels near the ROW or energized equipment.

Magnetic fields can induce currents in conducting objects. Electric fields can create static charges in ungrounded, conducting materials. The strength of the induced current or charge under a transmission line varies with: (1) the strength of the electric or magnetic field, (2) the size and shape of the conducting object, and (3) whether the conducting object is grounded. Induced currents and charges can cause shocks under certain conditions by making contact with objects in an electric or magnetic field.

The proposed transmission line has been designed to minimize the potential for such shocks. This is done, in part, by maintaining sufficient clearance between the conductors and objects on the ground. Stationary conducting objects, such as metal fences, pipelines, and highway guardrails that are near enough to the transmission lines to develop a charge (typically these would be objects located within the ROW) would be grounded by TVA to prevent them from being a source of shocks.

Under certain weather conditions, high-voltage transmission lines, such as the proposed 161-kV, may produce an audible low-volume hissing or crackling noise (Appendix G). This noise is generated by the corona resulting from the dissipation of energy and heat as high voltage is applied to a small area. Under normal conditions, corona-generated noise is not audible. The noise may be audible under some wet conditions, but the resulting noise level away from the ROW would be well below the levels that can produce interference with speech. Corona is not associated with any adverse health effects in humans or livestock.

Other public interests and concerns have included potential interference with AM radio reception, television reception, satellite television, and implanted medical devices. Interference with radio or television reception is typically due to unusual failures of power line insulators or poor alignment of the radio or television antenna and the signal source. Both conditions are readily correctable.

Implanted medical devices historically had a potential for power equipment strong-field interference when they came within the influence of low-frequency, high-energy workplace exposure. However, older devices and designs (i.e., those beyond five to 10 years old) have been replaced with different designs and different shielding that prevent potential for interference from external field sources up to and including the most powerful magnetic resonance imaging medical scanners. Unlike high-energy radio frequency devices that can still interfere with implanted medical devices, low-frequency, and low-energy powered electric or magnetic devices no longer potentially interfere (Journal of the American Medical Association 2007).

Research has been done on the effects of EMFs on animal and plant behavior, growth, breeding, development, reproduction, and production. Research has been conducted in the laboratory and under environmental conditions, and no adverse effects or effects on health or the above considerations have been reported for the low-energy power frequency fields (World Health Organization [WHO] 2007a). Effects associated with ungrounded, metallic objects' static charge accumulation and with discharges in dairy facilities have been found when the connections from a distribution line meter have not been properly installed on the consumer's side of a distribution circuit.

There is some public concern as to the potential for adverse health effects that may be related to long-term exposure to EMF. A few studies of this topic have raised questions about cancer and reproductive effects on the basis of biological responses observed in cells or in animals or on associations between surrogate measures of power line fields and certain types of cancer. Research has been ongoing for several decades.

The consensus of scientific panels reviewing this research is that the evidence does not support a cause-and-effect relationship between EMFs and any adverse health outcomes (e.g., American Medical Association 1994; National Research Council 1997; National Institute of Environmental Health Sciences 2002). Some research continues on the statistical association between magnetic field exposure and a rare form of childhood leukemia known as acute lymphocytic leukemia. A recent review of this topic by the WHO

(International Association for Research on Cancer 2002) concluded that this association is very weak, and there is inadequate evidence to support any other type of excess cancer risk associated with exposure to EMFs.

TVA follows medical and health research related to EMFs, along with media coverage and reports that may not have been peer reviewed by scientists or medical personnel. No controlled laboratory research has demonstrated a cause-and-effect relationship between low-frequency electric or magnetic fields and health effects or adverse health effects even when using field strengths many times higher than those generated by power transmission lines. Statistical studies of overall populations and increased use of low-frequency electric power have found no associations (WHO 2007b).

Neither medical specialists nor physicists have been able to form a testable concept of how these low-frequency, low-energy power fields could cause health effects in the human body where natural processes produce much higher fields. To date, there is no agreement in the scientific or medical research communities as to what, if any, electric or magnetic field parameters might be associated with a potential health effect in a human or animal. There are no scientifically or medically defined safe or unsafe field strengths for low-frequency, low-energy power substation or line fields.

The current and continuing scientific and medical communities' position regarding the research and any potential for health effects from low-frequency power equipment or line fields is that there are no reproducible or conclusive data demonstrating an effect or an adverse health effect from such fields (WHO 2007c). In the U.S., national organizations of scientists and medical personnel have recommended no further research on the potential for adverse health effects from such fields (American Medical Association 1994; U.S. Department of Energy 1996; National Institute of Environmental Health Sciences 1998).

Although no federal standards exist for maximum EMF field strengths for transmission lines, two states (New York and Florida) do have such regulations. Florida's regulation is the more restrictive of the two with field levels being limited to 150 milligauss at the edge of the ROW for lines of 230-kV and less. The expected magnetic field strengths at the edge of the proposed ROW would fall well within these standards. Consequently, the construction and operation of the proposed transmission line connectors are not anticipated to cause any significant impacts related to EMF.

EMFs would be produced along the length of the proposed transmission line. The strength of the fields within and near the ROW varies with the electric load on the line and with the terrain. Nevertheless, EMF strength attenuates rapidly with distance from the line and is usually equal to local ambient levels at the edge of the ROW. Thus, public exposure to EMFs would be minimal, and no significant impacts from EMFs are anticipated.

3.13.1.2. Lightning Strike Hazard

TVA transmission lines are built with overhead ground wires that lead a lightning strike into the ground for dissipation. Thus, a safety zone is created under the ground wires at the top of structures and along the line, for at least the width of the ROW. The NESC is strictly followed when installing, repairing, or upgrading TVA lines or equipment. Transmission line structures are well grounded, and the conductors are insulated from the structure. Therefore, touching a structure supporting a transmission line poses no inherent shock hazard.

3.13.1.3. Transmission Structure Stability

TVA transmission lines are designed to meet standards specified by the NESC. TVA designs their transmission lines such that a risk analysis of seismic hazards specifically for transmission line construction is not necessary. NESC states that as long as the design meets the wind and ice loading conditions that would create the most effect on the line, the transmission line would provide sufficient capacity to withstand seismic loading.

Steel, single-pole and H-frame structures similar to those shown in Figure 2-2 would be used for the proposed 161-kV transmission line. These structures have demonstrated a good safety record. They are not prone to rot or crack like wooden poles, nor are they subject to substantial storm damage due to their low cross-section in the wind.

Additionally, all TVA transmission structures are examined visually at least once a year. Thus, the proposed structures do not pose any significant physical danger. For this reason, TVA does not typically construct barricades or fences around structures.

3.14. Unavoidable Adverse Environmental Impacts

The following unavoidable effects would result from implementing the proposed actions as described under the Action Alternative in Section 2.1.2.

- Clearing associated with construction of the proposed transmission line could result in a small amount of localized siltation.
- Trees would not be permitted to grow within the transmission line ROW or to a determined height adjacent to the ROW that would endanger the transmission line. In areas where the ROW would traverse forested areas, this would cause a change in the visual character of the immediate area and would segment some forested areas.
- Clearing and construction would result in the disruption and/or loss of some plant and wildlife, and the permanent loss of about 47.27 acres of forested habitat.
- Any burning of cleared material would result in some short-term air pollution. ROW construction would involve tree clearing and conversion of 0.89 acres of forested wetland to emergent, meadow like wetland habitat for the perpetuity of the transmission line's existence.
- The proposed transmission line would result in minor, long-term visual effects on the landscape in the immediate local area.

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

Land within the ROW of the proposed transmission line would be committed to use for electrical system needs for the foreseeable future. The proposed ROW would support the 161-kV transmission line (see Figure 1-1), with use of existing access roads outside the ROW. Agricultural uses of the ROW could and would likely continue. However, periodic clearing of the ROW would preclude forest management within the ROW for the operational life of the transmission line. These losses of long-term productivity with respect to timber production and as wildlife habitat are minor both locally and regionally.

3.16. Irreversible and Irretrievable Commitments of Resources

Irreversible commitments of resources are those uses of resources that cannot be reversed. An example of an irreversible commitment is the mining and use of an ore, which once mined, cannot be replaced. Irretrievable commitments of resources are those that may occur over a period of time but that may be recovered. For example, filling a wetland area for a parking lot would irretrievably commit the property for as long as the parking lot remains.

The materials used for construction of the proposed transmission line would be committed for the life of the line. Some materials, such as ceramic insulators and concrete foundations, may be irrevocably committed, but the metals used in equipment, conductors, and supporting steel structures could be recycled. The useful life of steel-pole transmission structures or laced-steel towers is expected to be at least 60 years. Thus, recyclable materials would be irretrievably committed until they are eventually recycled.

The ROW used for the transmission line would constitute an irretrievable commitment of onsite resources, such as wildlife habitat, forest resources, and forested wetlands in that the approximate previous land use and land cover could be returned upon retirement of these facilities. In the interim, compatible uses of the ROW for the transmission line could continue.

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Appendix A – Coordination & Consultation Correspondence

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ALABAMA HISTORICAL COMMISSION

Lisa D. Jones
Executive Director
State Historic Preservation Officer

468 South Perry Street
Montgomery, Alabama 36130-0900

Tel: 334-242-3184
Fax: 334-242-1083

December 11, 2024

Steve Cole
TVA
400 West Summit Hill Drive
Knoxville, TN 35209

Re: AHC 24-1281
Florence - Iron City Transmission Line Project
Lauderdale County

Dear Mr. Cole:

Upon review of the cultural resources assessments and the report for limited Phase II archaeological investigations at site 1LU814, we find that we agree with your agency's determination of no adverse effect to historic properties provided that the avoidance stipulations of your submission are followed as currently planned. Should project plans change, please reinitiate consultation with our office for this undertaking.

Consultation with the State Historic Preservation Office does not constitute consultation with Tribal Historic Preservation Offices, other Native American tribes, local governments, or the public. If archaeological materials are encountered during construction, the procedures codified at 36 CFR 800.13(b) will apply. Archaeological materials consist of any items, fifty years old or older, which were made or used by man. These items include but are not limited to, stone projectile points (arrowheads), ceramic sherds, bricks, worked wood, bone and stone, metal, and glass objects. The federal agency or the applicant receiving federal assistance should contact our office immediately. If human remains are encountered, the provisions of the Alabama Burial Act (Code of Alabama 1975, §13A-7-23.1, as amended; Alabama Historical Commission Administrative Code Chapter 460-X-10 Burials) should be followed. This stipulation shall be placed on the construction plans to ensure contractors are aware of it.

We appreciate your commitment to helping us preserve Alabama's historic archaeological and architectural resources. Should you have any questions, please contact Eric Sipes at 334.230.2667 or Eric.Sipes@ahc.alabama.gov. Have the AHC tracking number referenced above available and include it with any future correspondence.

Sincerely,

Lee Anne Hewett

Lee Anne Hewett
Deputy State Historic Preservation Officer

LAH/EDS/lah

From: TN Help <tnhelp@service-now.com>
Sent: Friday, November 15, 2024 2:58 PM
To: Beliles, Emily
Cc: Babin, Mark Holden
Subject: Florence - Iron City 161-KV Transmission Line, CRMS 60018987968 - Project # SHPO0005372

TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON PIKE
NASHVILLE, TENNESSEE 37243-0442
OFFICE: (615) 532-1550
www.tnhistoricalcommission.org

11-15-2024 13:57:01 CST

Dr. Steve Cole
Tennessee Valley Authority

RE: Tennessee Valley Authority (TVA), Florence - Iron City 161-KV Transmission Line, CRMS 60018987968, Project#: SHPO0005372, , Lawrence County, Wayne County, TN

Dear Dr. Steve Cole:

In response to your request, we have reviewed the archaeological resources survey report and accompanying documentation submitted by you regarding the additional access route for the above-referenced undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. This Act requires federal agencies or applicants for federal assistance to consult with the appropriate State Historic Preservation Office before they carry out their proposed undertakings. The Advisory Council on Historic Preservation has codified procedures for carrying out Section 106 review in 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

Considering the information provided, we concur that no historic properties eligible for listing in the National Register of Historic Places will be affected by this undertaking. If project plans are changed or archaeological remains are discovered during project construction, please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act. Please provide your Project # when submitting any additional information

regarding this undertaking. Questions or comments may be directed to Jennifer Barnett, who drafted this response, at Jennifer.Barnett@tn.gov, +16156874780.

Sincerely,

E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

Ref:MSG16279746_BGDVij7vm9fnhWsJ6IX

Babin, Mark Holden

From:	Sipes, Eric <Eric.Sipes@ahc.alabama.gov>
Sent:	Friday, August 23, 2024 8:57 AM
To:	Babin, Mark Holden
Cc:	Cole, Steve C; Trupp, Leanne; McBride, Amanda
Subject:	RE: AHC 2024-1281, Florence to Iron City Transmission Line Project

Honestly, if you are still completing the identification level effort, if you wanted to roll the limited Phase II into a revised report along with the architectural survey, that would be fine.

Thanks,
Eric

From: Babin, Mark Holden <mhbabin@tva.gov>
Sent: Friday, August 23, 2024 7:40 AM
To: Sipes, Eric <Eric.Sipes@ahc.alabama.gov>
Cc: Cole, Steve C <sccole0@tva.gov>
Subject: RE: AHC 2024-1281, Florence to Iron City Transmission Line Project

Hi Eric,

That is correct, the architectural section is being revised and the version included in the draft available for your review is subject to change. TVA has received the draft with the updated architectural section, and we are currently reviewing that draft.

Would it be preferable to consult on the findings of the architectural survey prior to the completion of the Phase II survey or wait until the results of the Phase II testing are available to consult on that as well as the architectural survey?

Best,

Mark Babin

Archaeologist
Cultural Resources
400 W Summit Hill Drive
WT 11A-K
Knoxville, TN 37902
901.569.6535 (m)
mhbabin@tva.gov

TENNESSEE VALLEY

1

From: Cole, Steve C <sccole0@tva.gov>
Sent: Thursday, August 22, 2024 4:42 PM
To: Babin, Mark Holden <mhbabin@tva.gov>
Subject: FW: AHC 2024-1281, Florence to Iron City Transmission Line Project

Mark,

Take a look at Eric's response and then feel free to answer directly back to him and cc me.

Thanks,

Steve

Steve C. Cole
Manager, Cultural Reviews--Energy
Cultural Resources
External Strategy & Regulatory Oversight

TVA TENNESSEE VALLEY
W. 865-824-8450 E. sccole0@tva.gov
400 West Summit Hill Drive, Knoxville, TN 37902

From: Sipes, Eric <Eric.Sipes@ahc.alabama.gov>
Sent: Thursday, August 22, 2024 4:27 PM
To: Cole, Steve C <sccole0@tva.gov>
Cc: Trupp, Leanne <leanne.trupp@ahc.alabama.gov>; McBride, Amanda <Amanda.McBride@ahc.alabama.gov>
Subject: AHC 2024-1281, Florence to Iron City Transmission Line Project

Steve,

We have completed our review of TVAR's report for the above referenced transmission line. We generally agree with the findings of the report, but have a question about your letter that indicates that architectural section is being revised

– Is that correct? There was an architectural survey provided in the report and we want to be sure that we are commenting on the correct version.

In terms of the archaeology, it looks like they did a good job and I agree with their recommendations. The proposed limited testing methodology as site 1LU814 looks fine if they need to go ahead and get started on that.

As soon as I get your response on the architectural section, we will finalize our letter response.

Thanks,
Eric

Eric D. Sipes
Assistant State Archaeologist
Alabama Historical Commission
468 S. Perry Street
Montgomery, AL 36130-0900
Ph 334-230-2667
Eric.Sipes@ahc.alabama.gov

ALABAMA HISTORICA COMMISSI

3

Babin, Mark Holden

From: TN Help <tnhelp@service-now.com>
Sent: Tuesday, July 30, 2024 3:54 PM
To: Beliles, Emily
Cc: Cole, Steve C; Babin, Mark Holden
Subject: Florence - Iron City 161-KV Transmission Line, CRMS 60018987968 - Project # SHPO0005372

TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON PIKE
NASHVILLE, TENNESSEE 37243-0442
OFFICE: (615) 532-1550
www.tnhistoricalcommission.org

2024-07-30 14:50:51 CDT

Dr. Steve Cole
Tennessee Valley Authority

RE: Tennessee Valley Authority (TVA), Florence - Iron City 161-KV Transmission Line, CRMS 60018987968, Project#: SHPO0005372, , Lawrence County, Wayne County, TN

Dear Dr. Steve Cole:

Pursuant to your request, this office has reviewed documentation concerning the above-referenced undertaking. Our review of and comment on your proposed undertaking are among the requirements of Section 106 of the National Historic Preservation Act. This Act requires federal agencies or applicants for federal assistance to consult with the appropriate State Historic Preservation Office before they carry out their proposed undertakings. The Advisory Council on Historic Preservation has codified procedures for carrying out Section 106 review in 36 CFR 800 (Federal Register, December 12, 2000, 77698-77739).

Based on the information provided, we concur that the Nashville, Florence & Sheffield Railroad/Louisville & Nashville Railroad is eligible. We further concur that the project as currently proposed will not adversely affect this historic property.

This office has no objection to the implementation of this project as currently planned. If project plans are changed or previously unevaluated archaeological resources are discovered during project

construction, please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act. Include the Project # if you need to submit any additional information regarding this undertaking. Questions and comments may be directed to Casey Lee, who drafted this response, at Casey.Lee@tn.gov, +16152533163. We appreciate your cooperation.

Sincerely,

E. Patrick McIntyre, Jr.
Executive Director and
State Historic Preservation Officer

Ref:MSG14811454_6ROZXCUfYjGpOOo5Zm2

Appendix B – U.S. District Court for the Eastern District of Tennessee, Sherwood v. TVA, No. 3:12-CV-156-TAV-HBG

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UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF TENNESSEE

DONNA W. SHERWOOD, et al.,	)	
	)	
Plaintiffs,	)	
	)	
v.	)	No.: 3:12-CV-156-TAV-HBG
	)	
TENNESSEE VALLEY AUTHORITY,	)	
	)	
Defendant.	)	

INJUNCTION ORDER

For the reasons discussed in the Memorandum Opinion and Order entered contemporaneously with this Injunction Order, and for good cause being shown, it is hereby ordered, adjudged, and decreed as follows:

IT IS ORDERED that TVA is **ENJOINED** from further implementing the transmission line right-of-way vegetation management practice that has come to be known in this litigation as the "15-foot rule" until TVA has prepared and published an environmental impact statement pursuant to the National Environmental Policy Act ("NEPA"), 42 U.S.C. §§ 4321–4370m12. TVA shall submit a request for dissolution of the injunction after completion of the procedural steps necessary to comply with NEPA. Plaintiffs will then have the opportunity to state their position with respect to the dissolution of the injunction.

IT IS FURTHER ORDERED that the terms of this injunction will remain in effect until the Court grants TVA's request for dissolution of the injunction.

IT IS FURTHER ORDERED that TVA will maintain buffer zones on the edges of its rights-of-way as described in TVA's 1997 and 2008 Line Maintenance Manuals:

a. When re-clearing 500-kV transmission lines on ROWs that are 200 feet wide, TVA will re-clear 150 feet, that is, 75 feet from centerline to outside edges, leaving a 25-foot buffer zone on each side.

b. On the more recently purchased 500-kV transmission line ROWs where 175 feet is all that is purchased, TVA will re-clear 150 feet, that is, 75 feet from centerline to outside edges, leaving a 12.5-foot buffer zone on each side.

c. When re-clearing 161-kV transmission lines, the structure type and height will determine the width.

i. On multiple-pole structures and single- and double-circuit steel tower lines where TVA has 150 feet of easement, TVA will re-clear 100 feet, that is, 50 feet from centerline to outside edges, leaving a 25-foot buffer zone on each side. Where TVA only has 100 feet of ROW, the entire 100 feet is re-cleared.

ii. On lines that utilize single-pole structures where TVA has an easement of 75 feet, the entire 75 feet will be re-cleared.

iii. On 69-kV transmission lines, re-clearing will be accomplished.

d. On easements with multiple transmission lines, the "centerline to outside edges" will apply to the transmission line nearest the outside boundary.

TVA will leave the existing trees in the wire zone so long as they do not pose an immediate hazard to the transmission lines.

TVA may remove or trim any trees in the wire zone of the right-of-way, or in the buffer zones of the right-of-way, or any danger tree outside the right-of-way, in accordance with its contract rights, that it deems to present an immediate hazard to its transmission lines.

In using the term "re-clearing" in this Order the Court is simply utilizing the terminology that TVA has used in its Line Maintenance Manuals and is making no determination as to whether TVA either has or has not cleared the right-of-way previously.

IT IS FURTHER ORDERED that where TVA has previously allowed a given landowner to trim his or her own trees, TVA shall continue to do so, except that TVA will have the right to immediately remove or trim any tree that it deems to present an immediate hazard to its transmission lines.

The Court accepts TVA's representations that it has budgeted $15 million for its yearly vegetation management and $14 million for vegetation management during Fiscal Year 2018 through 2020. TVA shall report its quarterly and cumulative annual spending levels to plaintiffs when those figures are reasonably available through its accounting department.

IT IS FURTHER ORDERED that TVA shall post a copy of this Order and any subsequent substantive Order in a prominent location on its website to inform the public and in particular the landowners on the right-of-way that TVA has been enjoined from further implementing the 15-foot rule, and to inform the public and landowners as to the practices that TVA is being ordered to follow pursuant to this Order.

IT IS FURTHER ORDERED that TVA is required to pay plaintiffs' reasonable attorney's fees and costs in this litigation related to the NEPA and mootness issues pursuant to the Equal Access to Justice Act ("EAJA") with reasonableness to be determined by the Court in accordance with the EAJA if the parties cannot agree on the amount.

TVA will inform the Court within **thirty (30) days** after entry of this Order of the measures taken to inform TVA employees and contractors involved in transmission line right-of-way vegetation management of the terms of this injunction.

If a party seeks to modify any provision of the injunction, the parties must first meet and confer, in order to attempt to reach agreement before applying to the Court.

The Court retains continuing jurisdiction to enforce this Order through contempt or otherwise, to clarify the injunction should the need arise, to determine whether the injunction should be dissolved, and for such other proceedings as may be appropriate.

IT IS SO ORDERED.

s/ Thomas A. Varlan
CHIEF UNITED STATES DISTRICT JUDGE

Appendix C – Transmission Environmental Protection Procedures Right-Of-Way Vegetation Management Guidelines (Rev. (9) February 2022)

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Transmission Environmental Protection Procedures
Right-Of-Way Vegetation Management Guidelines

1.0 Overview

A. The Tennessee Valley Authority (TVA) must manage the vegetation on its rights-of-way and easements to ensure emergency maintenance access and routine access to structures, switches, conductors, and communications equipment. In addition, TVA must maintain adequate clearance, as specified by the National Electrical Safety Code, between conductors and tall growing vegetation and other objects. This requirement applies to vegetation within the right-of-way (ROW) as well as to trees located off the right-of-way.

B. Each year TVA assesses the conditions of the vegetation on and along its rights-of-way. This is accomplished by aerial inspections, ground inspections, periodic field inspections, aerial photography, LiDAR data and information from TVA personnel, property owners andthe general public. TVA utilizes this data to evaluate vegetation clearances and identifies vegetation on and off ROW that does or could potentially pose a risk to reliability.

C. TVA transmission foresters develop a vegetation re-clearing plan that is specific to each line segment and is based on terrain conditions, species mix, growth, and density.

2.0 Right-of-Way Management Methods

A. TVA takes an Integrated Vegetation Management (IVM) approach that is based on a carefully planned, multi-dimensional strategy developed in consultation with forestry and habitat experts. Integrated vegetation management aims to improve safety and prevent power outages by creating healthy and self-sustaining ecosystems in ROWs while ensuring compliance with regulatory standards (NERC 2006). These ecosystems foster beneficial, attractive and low-maintenance habitat while discouraging tall, woody species and other, more benign forms of vegetation can thrive. Integrated vegetation management encourages early successional native habitats that pose less threat to power reliability yet offer safe havens for desirable plants and animals.By combining selective use of herbicides with physical removal, integrated vegetation management can more thoroughly eradicate unsuitable vegetation and allow more compatible species to fill in, making it more difficult for tall-growing trees to re-establish.

TVA executes its transmission vegetation maintenance on a 3-year cycle based on data that is acquired by various inspection methods. LiDAR, ground inspection andaerial inspection data are utilized to evaluate the next year's scheduled work to determine the annual vegetation maintenance work scope. LiDAR technology provides a detailed vegetation threat analysis that can be used to assess risk as well as prioritize vegetation management work plans. This detailed analysis supports TVA's efforts to target incompatible species as well as promote the growth of compatible vegetation. This precision management approach is effective in reducing overall environmental impact by limiting work to specific areas of incompatibility.

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B. TVA uses a variety of herbicides specific to the species present with a variety of possible application techniques. The method most often implemented is selective application from the ground with backpack sprayers or vehicle-mounted sprayers. However, other techniques and methods, such as those described in section 3.0, may be utilized when circumstances dictate. Any herbicides used are applied in accordance with applicable state and federal laws and regulations. Only herbicides registered with the United States Environmental Protection Agency (USEPA) are used.

C. In very steep terrain, in sensitive environmental areas, in extensive wetlands, at stream banks, and in sensitive property owner land use areas, hand clearing may be utilized. Hand clearing is recognized as one of the most hazardous occupations documented by the Occupational Health and Safety Administration.

D. TVA does not encourage tree re-clearing by individual property owners because of the high hazard potential of hand clearing, possible interruptions of the line, and electrical safety considerations for untrained personnel that might do the work.

E. Mechanical mowers not only cut the tall saplings and seedlings on the right-of-way, it also shatters the stump and the supporting near-surface root crown. The tendency of resistant species to re-sprout from the root crown and shattered stumps can produce a multi-stem dense stand in the immediate area. Repeated use of mowers on short cycle re-clearing with many original stumps re-growing in the above manner can create a single species thicket or monoculture. With the original large root system and multiple stems, the resistant species can produce re-growth at the rate of 5-10 feet in a year. In years with high rainfall, the growth can reach 12-15 feet in a single year. These dense, monoculture stands can become nearly impenetrable for even large tractors. Such stands have low diversity, little wildlife food or nesting potential, and become a property owner concern. Selective herbicide application may be used to control monoculture stands.

3.0 Herbicide Program

A. TVA has worked with universities (such as Mississippi State University, University of Tennessee, Purdue University and others), chemical manufacturers, other utilities, U.S. Department of Transportation, U.S. Fish and Wildlife Service (USFWS), and U.S. Forest Service (USFS) personnel to explore options for vegetation control. The results have provided strong recommendations to use species-specific, low volume herbicide applications in more situations. Research, demonstrations, and other right-of-way programs show a definite improvement of rights-of-way treated with selective low-volume applications of new herbicides using a variety of application techniques and timing. Table 1 below identifies herbicides currently used on TVA rights-of-way.Table 2 identifies pre-emergent herbicides currently being used on bare ground areas on TVA rights-of-way and in substations. Table 3 identifies TGRs that may be used on tall trees that have special circumstances that require trimming on a regular cycle, e.g., restrictions on complete removal. The rates of application utilized are those listed on the U.S. Environmental Protection Agency (USEPA) approved label and consistent with utility standard practice throughout the Southeast.

Table 1 - Herbicides Currently Used on TVA Rights-of-Way

Trade Name	Active Ingredient	Label Signal Word
Accord/Accord XRT II	Glyphosate/Liquid	Caution
Arsenal	Imazapyr/Liquid/Granule	Caution
Chopper	Imazapyr/RTU	Caution
Clearstand	Imazapyr/Metsulfuron Methyl/Liquid	Caution
Escort	Metsulfuron Methyl/Dry Flowable	Caution
Garlon 4 Ultra	Triclopyr/Liquid	Caution
Habitat	Imazapyr/Liquid	Caution
Krenite S	Fosamine Ammonium	Caution
Milestone VM	Aminopyralid/Liquid	Caution
Pathfinder II	Triclopyr/RTU	Caution
Polaris	Imazapyr/Liquid	Caution
Rodeo	Glyphosate/Liquid	Caution
Roundup	Glyphosate/Liquid	Caution
Roundup Pro	Glyphosate	Caution
Stalker	Imazapyr/Liquid	Caution
Streamline	Aminocyclopyrachlor/ Metsulfuron Methyl/Liquid	Caution
Transline	Clopyralid/Liquid	Caution
Viewpoint	Imazapyr/Aminocyclopyrachlor/ Metsulfuron Methyl/Liquid	Caution

Table 2 - Pre-Emergent Herbicides Currently Used for Bare Ground Areas TVA Rights-of-Way

Trade Name	Active Ingredients	Label Signal Word
Arsenal 5G	Imazapyr/Granule	Caution
Sahara	Diuron/Imazapyr	Caution
SpraKil SK-26	Tebuthiuron/Diuron/Granules	Caution
SpraKil S-5	Tebuthiuron/Granules	Caution
Topsite	Diuron/Imazapyr	Caution

Table 3 - Tree Growth Regulators (TGRs) Currently Used on TVA Rights-of-Way

Trade Name	Active Ingredients	Label Signal Word
Profile 2SC	TGR-paclobutrazol	Caution
TGR	Flurprimidol	Caution

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B. The herbicides listed in Table 1 and 2 and TGRs listed in Table 3 have been evaluated in extensive studies in support of registration applications and label requirements. Many have been reviewed in the USFS vegetation management environmental impact statements (EISs), and those evaluations are incorporated here by reference (USFS 1989a, 1989b, 2002a, and 2002b). Electronic copies can be accessed at https://cdxnodengn.epa.gov/cdx-enepa-public/action/eis/search. The result of these reviews has been a consistent finding of limited environmental impact beyond that of control of the target vegetation. All the listed herbicides have been found to be of low environmental toxicity when applied by trained applicators that are following the label and registration procedures, including prescribed measures, such as buffer zones, to protect threatened and endangered species.

C. Low volume herbicide applications are recommended since research demonstrates much wider plant diversity after such applications. There is better ground erosion protection and more wildlife food plants and cover plants develop. In most situations, there is increased development of wild flowering plants, pollinator plants and shrubs. In conjunction with herbicides, the diversity and density of low-growing plants provide control of tall-growing species through competition.

D. Herbicides are used in place of rotary mowing to avoid damage to nesting and tunneling wildlife. This method retains ground cover year around with a better mix of food species and associated high- protein insect populations for birds in the right seasons. Most also report less damage to soils (even when compared with rubber-tired equipment).

E. Best Management Practices (BMPs) governing application of herbicides are contained within *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Transmission Construction and Maintenance Activities* (TVA 2017) which is incorporated by reference. Herbicides can be liquid, granular, or powder and can be applied aerially or by ground equipment and may be selectively applied or broadcast, depending on the site requirements, species present, and condition of the vegetation.Water quality considerations include measures taken to keep herbicides from reaching streams whether by direct application or through runoff of or flooding by surface water. "Applicators" must be trained, licensed, and follow manufacturers' label instructions, USEPA guidelines, and respective state regulations and laws.

F. When herbicides are used, their potential adverse impacts are considered in selecting the compound,formulation, and application method. Herbicides that are designated "Restricted Use" by USEPA require application by or under the supervision of applicators certified by the respective state control board. Applications are done either by TVA or by contractors in accordance with the following guidelines identified in the TVA BMP manual (TVA 2017):

1. The sites to be treated are selected and application directed by the appropriate TVA official.
2. A pre-flight walking or flying inspection is made within 72 hours prior to applying herbicides aerially. This inspection ensures that no land use changes have occurred, that sensitive areas are clearly identified to the pilot, and that buffer zones are maintained.
3. Aerial application of liquid herbicides will normally not be made when surface wind speeds exceed 5 miles per hour, in areas of fog, or during periods of temperature inversion.

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4. Pellet application will normally not be made when the surface wind speeds exceed 10 miles per hour or on frozen or water saturated soils.
5. Herbicide application should follow manufacturers' label specifications.
6. Application during unstable, unpredictable, or changing weather patterns is avoided. Equipment and techniques are used that are designed to ensure maximum control of the spray swath with minimum drift.
7. Herbicides are not applied to surface water or wetlands unless specifically labeled for aquatic use. Filter and buffer strips will conform at least to federal and state regulations and any label requirements. The use of aerial or broadcast application of herbicides is not allowed within a streamside management zone (SMZ) adjacent to perennial streams, ponds, and other water sources containing sensitive aquatic resources. Hand application of aquatic use herbicides are used only selectively for use within SMZs containing sensitive aquatic resources.
8. For aerial applications, buffers and filter strips (200 feet minimum width) are maintained next to agricultural crops, gardens, farm animals, orchards, apiaries, horticultural crops, and other valuable vegetation.
9. Herbicides are not applied in the following areas or times: (a) in city, state, and national parks or forests or other special areas without written permission and/or required permits; (b) off the right-of-way; and (c) during rainy periods or during the 48-hour interval prior to rainfall predicted with a 20 percent or greater probability by local forecasters when soil active herbicides are used.

G. TVA currently uses primarily low volume applications of foliar and basal applications, e.g., Accord (Glyphosate), Arsenal (Imazapyr), Clearstand (Imazapyr/ Metsulfuron Methyl), Milestone VM (Aminopyralid) and Streamline (Aminocyclopyrachlor / Metsulfuron Methyl).

4.0 Benefits

A. Proper maintenance—including vegetation management—of the ROW and its supporting facilities is crucialto ensuring the reliable transmission of affordable electrical power. Unmanaged and poorly maintained vegetation can cause electricity outages, wildfires, soil erosion, and water quality issues. Utility companies that adopt long-term IVM approaches often benefit from significant vegetation management cost savings, which can be reflected in customer rates.

B. ROW also provides important wildlife habitats. As wildlife habitats in the United States are lost to development, these ROWs become increasingly important. The IVM approach can create natural, diverse, and sustaining ecosystems, such as a meadow transition habitat. A variety of wildlife species (including threatened and endangered species) consider these habitats home, such as butterflies, songbirds, small mammals, and deer. These habitats also encourage the growth of native plant species and can increase plant diversity.

C. Invasive and exotic species are often a problem on the ROW, and, consequently, the surrounding land. IVM techniques (such as selective herbicide application) can minimize this problem, while ensuring native and endangered species are not affected.

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5.0 References

Integrated Vegetation Management (IVM) on Rights-of-Way Fact Sheet. (2012, May) Retrieved from http://www.epa.gov/pestwise/htmlpublications/row_fact_sheet.html

Tennessee Valley Authority. 2017. A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities, Revision 3.Edited by G. Behel, S. Benefield, R. Brannon, C. Buttram, G. Dalton, C. Ellis, C. Henley, T. Korth, T. Giles, A. Masters, J. Melton, R. Smith, J.Turk, T. White, R. Wilson. Chattanooga, TN.: Retrieved from <https://www.tva.com/Energy/Transmission-System/Transmission-System-Projects>.

U.S. Forest Service. 1989a. Vegetation Management in the Coastal Plain/Piedmont Final Environmental Impact Statement, Volumes I and II. Southern Region Management Bulletin R8-MB-23, January 1989. Atlanta, Ga.: USDA Forest Service.

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———. 2002b. Vegetation Management in the Coastal Plain/Piedmont Final Environmental Impact Statement Supplement. Southern Region Management Bulletin R8-MB-98A, October 2002. Atlanta, Ga.: USDA Forest Service.

Appendix D – Stream Crossings Along the Proposed Transmission Line and Access Roads

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Appendix D - Stream Crossings within the Proposed Florence-Iron City 161-kV Transmission Line

Sequence ID	Stream Type	Streamside Management Zone Category	Stream Name	Field Notes	Coordinates*	
					Begin	End
S001	Perennial	Category A (50 ft)	Unnamed tributary to Shoal Creek	4-foot-wide x 1-foot-wide channel. Aquatic vegetation and snails present. Fish observed. Spring fed.	35.0119 -87.6066	35.0117 -87.6061
S002	Intermittent	Category A (50 ft)	Unnamed tributary to Shoal Creek	3-foot-wide x 1-foot-wide. Channel. Stream dissipates and goes subsurface	35.0053 -87.6049	35.0053 -87.6047
S003	Intermittent	Category A (50 ft)	Unnamed tributary to Butler Creek	Forested, flowing, gravel/sand substrate, 2-foot-wide by 2-foot-wide channel, salamanders	34.9907 -87.6061	34.9906 -87.6064
S004	Perennial	Category A (50 ft)	Unnamed tributary to Butler Creek	Perennial spring, flowing, crayfish	34.9774 -87.6075	34.9774 -87.6077
S005	Perennial	Category B (75 ft)	Butler Creek	Large perennial stream	34.97 -87.6085	34.9701 -87.6081
S006	Perennial	Category A (50 ft)	Unnamed tributary to Butler Creek	Perennial, flowing bed rock substrate fish present	34.9693 -87.6082	34.9692 -87.6086
S007	Intermittent	Category A (50 ft)	Unnamed tributary to Shoal Creek	2-foot-wide x 1-foot-wide channel. Rocky substrate	34.9485 -87.6103	34.9483 -87.6107
S008	Perennial	Category A (50 ft)	Unnamed tributary to Shoal Creek	12-foot-wide x 3-foot-wide channel. Fish observed	34.9462 -87.611	34.946 -87.6106
S009	Perennial	Category A (50 ft)	Unnamed tributary to Shoal Creek	3-foot-wide x 1-foot-wide channel. Rocky substrate. Aquatic snails and aquatic vegetation present	34.9384 -87.6118	34.9381 -87.6114
S010	Perennial	Category A (50 ft)	Indiancamp Creek	Large stream fish present	34.9183 -87.614	34.9187 -87.6135
S011	Perennial	Category A (50 ft)	Lawson Branch	Fish present	34.9133 -87.6145	34.9133, -87.6142
S012	Perennial	Category A (50 ft)	Jones Branch	Large stream fish present	34.9062 -87.615	34.9061 -87.6154
S013	Intermittent	Category A (50 ft)	Unnamed tributary to Saint Florian Branch	Intermittent 1-foot-wide x 1-foot-wide flowing	34.8905 -87.617	34.8905 -87.6172
S014	Perennial	Category A (50 ft)	Saint Florian Branch.	8-foot-wide x 1-foot-wide channel.	34.8762 -87.6189	34.8763 -87.6185

Sequence ID	Stream Type	Streamside Management Zone Category	Stream Name	Field Notes	Coordinates*	
					Begin	End
S015	Intermittent	Category A (50 ft)	Unnamed tributary to Wilson Creek	2-foot-wide x 1-foot-wide channel. Fed by pond	34.8684, -87.6209	34.869, -87.6201
S016	Perennial	Category A (50) ft	Unnamed tributary to Wilson Creek	4-foot-wide x 1-foot-wide channel.	34.8587 -87.6224	34.8583 -87.6228
S017	Perennial	Category A (50 ft)	Wilson Creek	5-foot-wide x 1-foot-wide channel.	34.8568, -87.623	34.8566 -87.6225
S018	Intermittent	Category A (50 ft)	Unnamed tributary to Wilson Creek	3-foot-wide x 1-foot-wide channel. Clay substrate	34.8494 -87.6233	34.8494 -87.6238
S019	Intermittent	Category A (50 ft)	Unnamed tributary to Wilson Creek	3-foot-wide x 1-foot-wide channel. Clay substrate	34.8461 -87.6241	34.8459 -87.6237
S020	Intermittent	Category A (50 ft)	Unnamed tributary to Wilson Creek	2-foot-wide x 1-foot-wide channel. Clay substrate. Algae and wetland vegetation present	34.8441 -87.6246	34.8435 -87.624
P001	Pond	Category A (50 ft)		Farm pond	34.951 -87.61	34.951 -87.61
P002	Pond	Category A (50 ft)		Pond	34.8998 -87.6159	34.8998 -87.6159
P003	Pond	Category A (50 ft)		Pond	34.8904 -87.6171	34.8904 -87.6171
P004	Pond	Category A (50 ft)		Farm pond	34.8704 -87.6199	34.8704 -87.6199

*Denotes extent of reach assessed.

Appendix E – TVA Bat Strategy Project Review Form

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Project Review Form - TVA Bat Strategy *(06/2019)*

*This form should **only** be completed if project includes activities in Tables 2 or 3 (STEP 2 below). This form is not required if project activities are limited to Table 1 (STEP 2) or otherwise determined to have no effect on federally listed bats. If so, include the following statement in your environmental compliance document (e.g., add as a comment in the project CEC): "Project activities limited to Bat Strategy Table 1 or otherwise determined to have no effect on federally listed bats. Bat Strategy Project Review Form NOT required." This form is to assist in determining required conservation measures per TVA's ESA Section 7 programmatic consultation for routine actions and federally listed bats.*[1]

Project Name: Florence-Iron City 161-kV Transmission Line **Date:** Mar 21, 2023

Contact(s): Jessica Lyon **CEC#:** **Project ID:** 431218

Project Location (City, County, State): Florence, AL (Lauderdale County); Iron City, TN (Lawrence County)

Project Description:

TVA to build 13.3-miles 161kV transmission line from Florence, AL 46/161kV station to the new TVA Iron City, TN 161kV substation. Existing de-energized structures in current ROW easement will be retired/removed. TVA to install new TL on unoccupied TVA ROW easement. TVA to construct the new Iron City, TN substation.

SECTION 1: PROJECT INFORMATION - ACTION AND ACTIVITIES

STEP 1) Select TVA Action. If none are applicable, contact environmental support staff, Environmental Project Lead, or Terrestrial Zoologist to discuss whether form (i.e., application of Bat Programmatic Consultation) is appropriate for project:

☐ 1 Manage Biological Resources for Biodiversity and Public Use on TVA Reservoir Lands	☐ 6 Maintain Existing Electric Transmission Assets
☐ 2 Protect Cultural Resources on TVA-Retained Land	☐ 7 Convey Property associated with Electric Transmission
☐ 3 Manage Land Use and Disposal of TVA-Retained Land	■ 8 Expand or Construct New Electric Transmission Assets
☐ 4 Manage Permitting under Section 26a of the TVA Act	☐ 9 Promote Economic Development
☐ 5 Operate, Maintain, Retire, Expand, Construct Power Plants	☐ 10 Promote Mid-Scale Solar Generation

STEP 2) Select all activities from Tables 1, 2, and 3 below that are included in the proposed project.

TABLE 1. Activities with no effect to bats. Conservation measures & completion of bat strategy project review form NOT required.

☐ 1. Loans and/or grant awards	☐ 8. Sale of TVA property	☐ 19. Site-specific enhancements in streams and reservoirs for aquatic animals
☐ 2. Purchase of property	☐ 9. Lease of TVA property	☐ 20. Nesting platforms
☐ 3. Purchase of equipment for industrial facilities	☐ 10. Deed modification associated with TVA rights or TVA property	☐ 41. Minor water-based structures (this does not include boat docks, boat slips or piers)
☐ 4. Environmental education	☐ 11. Abandonment of TVA retained rights	☐ 42. Internal renovation or internal expansion of an existing facility
☐ 5. Transfer of ROW easement and/or ROW equipment	☐ 12. Sufferance agreement	■ 43. Replacement or removal of TL poles
☐ 6. Property and/or equipment transfer	☐ 13. Engineering or environmental planning or studies	■ 44. Conductor and overhead ground wire installation and replacement
☐ 7. Easement on TVA property	☐ 14. Harbor limits delineation	☐ 49. Non-navigable houseboats

Project Review Form - TVA Bat Strategy *(06/2019)*

TABLE 2. Activities not likely to adversely affect bats with implementation of conservation measures. Conservation measures and completion of bat strategy project review form REQUIRED; review of bat records in proximity to project NOT required.		
■ 18. Erosion control, minor	☐ 57. Water intake - non-industrial	☐ 79. Swimming pools/associated equipment
☐ 24. Tree planting	☐ 58. Wastewater outfalls	☐ 81. Water intakes – industrial
☐ 30. Dredging and excavation; recessed harbor areas	☐ 59. Marine fueling facilities	☐ 84. On-site/off-site public utility relocation or construction or extension
☐ 39. Berm development	☐ 60. Commercial water-use facilities (e.g., marinas)	☐ 85. Playground equipment - land-based
☐ 40. Closed loop heat exchangers (heat pumps)	☐ 61. Septic fields	☐ 87. Aboveground storage tanks
☐ 45. Stream monitoring equipment - placement and use	☐ 66. Private, residential docks, piers, boathouses	☐ 88. Underground storage tanks
☐ 46. Floating boat slips within approved harbor limits	☐ 67. Siting of temporary office trailers	☐ 90. Pond closure
☐ 48. Laydown areas	☐ 68. Financing for speculative building construction	☐ 93. Standard License
☐ 50. Minor land based structures	☐ 72. Ferry landings/service operations	☐ 94. Special Use License
☐ 51. Signage installation	☐ 74. Recreational vehicle campsites	☐ 95. Recreation License
☐ 53. Mooring buoys or posts	☐ 75. Utility lines/light poles	☐ 96. Land Use Permit
☐ 56. Culverts	☐ 76. Concrete sidewalks	

Table 3: Activities that may adversely affect federally listed bats. Conservation measures AND completion of bat strategy project review form REQUIRED; review of bat records in proximity of project REQUIRED by OSAR/Heritage eMap reviewer or Terrestrial Zoologist.		
■ 15. Windshield and ground surveys for archaeological resources	■ 34. Mechanical vegetation removal, includes trees or tree branches > 3 inches in diameter	☐ 69. Renovation of existing structures
☐ 16. Drilling	☐ 35. Stabilization (major erosion control)	☐ 70. Lock maintenance/ construction
■ 17. Mechanical vegetation removal, does not include trees or branches > 3" in diameter (in Table 3 due to potential for woody burn piles)	■ 36. Grading	☐ 71. Concrete dam modification
☐ 21. Herbicide use	☐ 37. Installation of soil improvements	☐ 73. Boat launching ramps
■ 22. Grubbing	☐ 38. Drain installations for ponds	☐ 77. Construction or expansion of land-based buildings
☐ 23. Prescribed burns	■ 47. Conduit installation	☐ 78. Wastewater treatment plants
☐ 25. Maintenance, improvement or construction of pedestrian or vehicular access corridors	☐ 52. Floating buildings	☐ 80. Barge fleeting areas
☐ 26. Maintenance/construction of access control measures	☐ 54. Maintenance of water control structures (dewatering units, spillways, levees)	☐ 82. Construction of dam/weirs/ levees
☐ 27. Restoration of sites following human use and abuse	☐ 55. Solar panels	☐ 83. Submarine pipeline, directional boring operations
☐ 28. Removal of debris (e.g., dump sites, hazardous material, unauthorized structures)	☐ 62. Blasting	☐ 86. Landfill construction
☐ 29. Acquisition and use of fill/borrow material	■ 63. Foundation installation for transmission support	☐ 89. Structure demolition
☐ 31. Stream/wetland crossings	■ 64. Installation of steel structure, overhead bus, equipment, etc.	☐ 91. Bridge replacement
☐ 32. Clean-up following storm damage	■ 65. Pole and/or tower installation and/or extension	☐ 92. Return of archaeological remains to former burial sites
■ 33. Removal of hazardous trees/tree branches		

STEP 3) Project includes one or more activities in Table 3? ◉ **YES (Go to Step 4)** ○ **NO (Go to Step 13)**

Project Review Form - TVA Bat Strategy *(06/2019)*

STEP 4) Answer questions *a* through *e* below (applies to projects with activities from Table 3 ONLY)

a) Will project involve continuous noise (i.e., ≥ 24 hrs) that is greater than 75 decibels measured on the A scale (e.g., loud machinery)?
- (•) **NO** (NV2 does not apply)
- ( ) **YES** (NV2 applies, subject to records review)

b) Will project involve entry into/survey of cave?
- (•) **NO** (HP1/HP2 do not apply)
- ( ) **YES** (HP1/HP2 applies, subject to review of bat records)

c) If conducting **prescribed burning (activity 23)**, estimated acreage: [ ] and timeframe(s) below; [■] **N/A**

STATE	SWARMING	WINTER	NON-WINTER	PUP
GA, KY, TN	[ ] Oct 15 - Nov 14	[ ] Nov 15 - Mar 31	[ ] Apr 1 - May 31, Aug 1- Oct 14	[ ] Jun 1 - Jul 31
VA	[ ] Sep 16 - Nov 15	[ ] Nov 16 - Apr 14	[ ] Apr 15 - May 31, Aug 1 – Sept 15	[ ] Jun 1 - Jul 31
AL	[ ] Oct 15 - Nov 14	[ ] Nov 15 - Mar 15	[ ] Mar 16 - May 31, Aug 1 - Oct 14	[ ] Jun 1 - Jul 31
NC	[ ] Oct 15 - Nov 14	[ ] Nov 15 - Apr 15	[ ] Apr 16 - May 31, Aug 1 - Oct 14	[ ] Jun 1 - Jul 31
MS	[ ] Oct 1 - Nov 14	[ ] Nov 15 - Apr 14	[ ] Apr 15 - May 31, Aug 1 – Sept 30	[ ] Jun 1 - Jul 31

d) Will the project involve vegetation piling/burning?
- (•) **NO** (SSPC4/ SHF7/SHF8 do not apply)
- ( ) **YES** (SSPC4/SHF7/SHF8 applies, subject to review of bat records)

e) If **tree removal (activity 33 or 34)**, estimated amount: 47.27 (•) **ac** ( ) **trees** ( ) **N/A**

STATE	SWARMING	WINTER	NON-WINTER	PUP
GA, KY, TN	[■] Oct 15 - Nov 14	[ ] Nov 15 - Mar 31	[■] Apr 1 - May 31, Aug 1- Oct 14	[ ] Jun 1 - Jul 31
VA	[ ] Sep 16 - Nov 15	[ ] Nov 16 - Apr 14	[ ] Apr 15 - May 31, Aug 1 – Sept 15	[ ] Jun 1 - Jul 31
AL	[ ] Oct 15 - Nov 14	[ ] Nov 15 - Mar 15	[ ] Mar 16 - May 31, Aug 1 - Oct 14	[ ] Jun 1 - Jul 31
NC	[ ] Oct 15 - Nov 14	[ ] Nov 15 - Apr 15	[ ] Apr 16 - May 31, Aug 1 - Oct 14	[ ] Jun 1 - Jul 31
MS	[ ] Oct 1 - Nov 14	[ ] Nov 15 - Apr 14	[ ] Apr 15 - May 31, Aug 1 – Sept 30	[ ] Jun 1 - Jul 31

If warranted, does project have flexibility for bat surveys (May 15-Aug 15): ( ) **MAYBE** ( ) **YES** (•) **NO**

**** For **PROJECT LEADS** whose projects will be reviewed by a Heritage Reviewer (Natural Resources Organization only), **STOP HERE**. Click File/ Save As, name form as "ProjectLead_BatForm_CEC-or-ProjectIDNo_Date", and submit with project information. Otherwise continue to Step 5. ****

SECTION 2: REVIEW OF BAT RECORDS (applies to projects with activities from Table 3 ONLY)

STEP 5) Review of bat/cave records conducted by Heritage/OSAR reviewer?

(•) **YES** ( ) **NO** (Go to Step 13)

Info below completed by:
- [ ] **Heritage Reviewer** (name) [ ] Date [ ]
- [ ] **OSAR Reviewer** (name) [ ] Date [ ]
- [■] **Terrestrial Zoologist** (name) Rob Stinson Date [ ]

Gray bat records: [ ] None [ ] Within 3 miles* [ ] Within a cave* [ ] Within the County

Indiana bat records: [ ] None [ ] Within 10 miles* [ ] Within a cave* [ ] Capture/roost tree* [ ] Within the County

Northern long-eared bat records: [ ] None [ ] Within 5 miles* [ ] Within a cave* [ ] Capture/roost tree* [ ] Within the County

Virginia big-eared bat records: [ ] None [ ] Within 6 miles* [ ] Within the County

Caves: [ ] None within 3 mi [ ] Within 3 miles but > 0.5 mi [ ] Within 0.5 mi but > 0.25 mi* [ ] Within 0.25 mi but > 200 feet* [ ] Within 200 feet*

Bat Habitat Inspection Sheet completed? ( ) **NO** ( ) **YES**

Amount of SUITABLE habitat to be removed/burned (may differ from STEP 4e): [ ] (( ) **ac** ( ) **trees)*** ( ) **N/A**

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STEP 6) Provide any additional notes resulting from Heritage Reviewer records review in Notes box below then . . . . . Go to Step 13

Notes from Bat Records Review (e.g., historic record; bats not on landscape during action; DOT bridge survey with negative results):

STEPS 7-12 To be Completed by Terrestrial Zoologist (if warranted):

STEP 7) Project will involve:

- ☐ Removal of suitable trees within 0.5 mile of P1-P2 Indiana bat hibernacula or 0.25 mile of P3-P4 Indiana bat hibernacula or any NLEB hibernacula.
- ☐ Removal of suitable trees within 10 miles of documented Indiana bat (or within 5 miles of NLEB) hibernacula.
- ☒ Removal of suitable trees > 10 miles from documented Indiana bat (> 5 miles from NLEB) hibernacula.
- ☐ Removal of trees within 150 feet of a documented Indiana bat or northern long-eared bat maternity roost tree.
- ☐ Removal of suitable trees within 2.5 miles of Indiana bat roost trees or within 5 miles of Indiana bat capture sites.
- ☐ Removal of suitable trees > 2.5 miles from Indiana bat roost trees or > 5 miles from Indiana bat capture sites.
- ☐ Removal of documented Indiana bat or NLEB roost tree, if still suitable.
- ☐ N/A

STEP 8) Presence/absence surveys were/will be conducted: ○ **YES** ◉ **NO** ○ **TBD**

STEP 9) Presence/absence survey results, on _____ ○ **NEGATIVE** ○ **POSITIVE** ◉ **N/A**

STEP 10) Project ◉ **WILL** ○ **WILL NOT** require use of Incidental Take in the amount of 15.02 ◉ **acres or** ○ **trees** proposed to be used during the ○ **WINTER** ■ **VOLANT SEASON** ○ **NON-VOLANT SEASON** ○ **N/A**

STEP 11) Available Incidental Take (prior to accounting for this project) as of Apr 11, 2024

TVA Action	Total 20-year	Winter	Volant Season	Non-Volant Season
8 Expand or Construct New Electric Transmission Assets		4,118.07	1,279.72	1,404.83

STEP 12) Amount contributed to TVA's Bat Conservation Fund upon activity completion: $ 7,510 OR ○ **N/A**

TERRESTRIAL ZOOLOGISTS, after completing SECTION 2, review Table 4, modify as needed, and then complete section for Terrestrial Zoologists at end of form.

SECTION 3: REQUIRED CONSERVATION MEASURES

STEP 13) Review Conservation Measures in Table 4 and ensure those selected are relevant to the project. If not, manually override and uncheck irrelevant measures, and explain why in ADDITIONAL NOTES below Table 4.

Did review of Table 4 result in ANY remaining Conservation Measures in **RED**?

- ○ **NO** (Go to Step 14)
- ◉ **YES** (STOP HERE; Submit for Terrestrial Zoology Review. Click File/Save As, name form as "ProjectLead_BatForm_CEC-or-ProjectIDNo_Date", and submit with project information).

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Table 4. TVA's ESA Section 7 Programmatic Bat Consultation Required Conservation Measures

The Conservation Measures in Table 4 are automatically selected based on your choices in Tables 2 and 3 but can be manually overridden, if necessary. To Manually override, press the button and enter your name.

Manual Override

Name: Rob Stinson

Check if Applies to Project	Activities Subject To Conservation Measure	Conservation Measure Description
		NV1 - Noise will be short-term, transient, and not significantly different from urban interface or natural events (i.e., thunderstorms) that bats are frequently exposed to when present on the landscape.
		TR1* - Removal of potentially suitable summer roosting habitat during time of potential occupancy has been quantified and minimized programmatically. TVA will track and document alignment of activities that include tree removal (i.e., hazard trees, mechanical vegetation removal) with the programmatic quantitative cumulative estimate of seasonal removal of potential summer roost trees for Indiana bat and northern long-eared bat. Project will therefore communicate completion of tree removal to appropriate TVA staff.
		TR4* - Removal of suitable summer roosting habitat within potential habitat for Indiana bat or northern long-eared bat will be tracked, documented, and included in annual reporting. Project will therefore communicate completion of tree removal to appropriate TVA staff.
		TR9 - If removal of suitable summer roosting habitat occurs when bats are present on the landscape, a funding contribution (based on amount of habitat removed) towards future conservation and recovery efforts for federally listed bats would be carried out. Project can consider seasonal bat presence/absence surveys (mist netting or emergence counts) that allow for positive detections without resulting in increased constraints in cost and project schedule. This will enable TVA to contribute to increased knowledge of bat presence on the landscape while carrying out TVA's broad mission and responsibilities.

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	SSPC1 (**Transmission only**) - Transmission actions and activities will continue to Implement A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities. This focuses on control of sediment and pollutants, including herbicides. Following are key measures: ○ BMPs minimize erosion and prevent/control water pollution in accordance with state-specific construction storm water permits. BMPS are designed to keep soil in place and aid in reducing risk of other pollutants reaching surface waters, wetlands and ground water. BMPs will undertake the following principles: • Plan clearing, grading, and construction to minimize area and duration of soil exposure. • Maintain existing vegetation wherever and whenever possible. • Minimize disturbance of natural contours and drains. • As much as practicable, operate on dry soils when they are least susceptible to structural damage and erosion. • Limit vehicular and equipment traffic in disturbed areas. Keep equipment paths dispersed or designate single traffic flow paths with appropriate road BMPs to manage runoff. • Divert runoff away from disturbed areas. • Provide for dispersal of surface flow that carries sediment into undisturbed surface zones with high infiltration capacity and ground cover conditions. • Prepare drainage ways and outlets to handle concentrated/increased runoff. • Minimize length and steepness of slopes. Interrupt long slopes frequently. • Keep runoff velocities low and/or check flows. • Trap sediment on-site. • Inspect/maintain control measures regularly & after significant rain. • Re-vegetate and mulch disturbed areas as soon as practical. ○ Specific guidelines regarding sensitive resources and buffer zones: • Extra precaution (wider buffers) within SMZs is taken to protect stream banks and water quality for streams, springs, sinkholes, and surrounding habitat. • BMPs are implemented to protect and enhance wetlands. Select use of equipment and seasonal clearing is conducted when needed for rare plants; construction activities are restricted in areas with identified rare plants. • Standard requirements exist to avoid adverse impacts to caves, protected animals, unique/ important habitat (e.g., cave buffers, restricted herbicide use, seasonal clearing of suitable habitat).
	SSPC2 - Operations involving chemical/fuel storage or resupply and vehicle servicing will be handled outside of riparian zones (streamside management zones) in a manner to prevent these items from reaching a watercourse. Earthen berms or other effective means are installed to protect stream channel from direct surface runoff. Servicing will be done with care to avoid leakage, spillage, and subsequent stream, wetland, or ground water contamination. Oil waste, filters, other litter will be collected and disposed of properly. Equipment servicing and chemical/fuel storage will be limited to locations greater than 300-ft from sinkholes, fissures, or areas draining into known sinkholes, fissures, or other karst features.
	SSPC7 - Clearing of vegetation **within a 200-ft radius of documented caves** will be limited to hand or small machinery clearing only (e.g., chainsaws, bush-hog, mowers). This will protect potential recharge areas of cave streams and other karst features that are connected hydrologically to caves.
	L1 - Direct temporary lighting away from suitable habitat during the active season.
	L2 - Evaluate the use of outdoor lighting during the active season and seek to minimize light pollution when installing new or replacing existing permanent lights by angling lights downward or via other light minimization measures (e.g., dimming, directed lighting, motion-sensitive lighting).

[1]Bats addressed in consultation (02/2018), which includes gray bat (listed in 1976), Indiana bat (listed in 1967), northern long-eared bat

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(listed in 2015), and Virginia big-eared bat (listed in 1979).

Hide All Unchecked Conservation Measures

- (•) HIDE
- ( ) UNHIDE

Hide Table 4 Columns 1 and 2 to Facilitate Clean Copy and Paste

- (•) HIDE
- ( ) UNHIDE

NOTES (additional info from field review, explanation of no impact or removal of conservation measures).

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STEP 14) Save completed form (Click File/Save As, name form as "ProjectLead_BatForm_CEC-or-ProjectIDNo_Date") in project environmental documentation (e.g. CEC, Appendix to EA) AND send a copy of form to batstrategy@tva.gov
Submission of this form indicates that Project Lead/Applicant:

Jessica Lyon (name) is (or will be made) aware of the requirements below.

- Implementation of conservation measures identified in Table 4 is required to comply with TVA's Endangered Species Act programmatic bat consultation.
- TVA may conduct post-project monitoring to determine if conservation measures were effective in minimizing or avoiding impacts to federally listed bats.

For Use by Terrestrial Zoologist Only

☒ Terrestrial Zoologist acknowledges that Project Lead/Contact (name) Jessica Lyon has been informed of any relevant conservation measures and/or provided a copy of this form.

☒ For projects that require use of Take and/or contribution to TVA's Bat Conservation Fund, Terrestrial Zoologist acknowledges that Project Lead/Contact has been informed that project will result in use of Incidental Take 15.02 ◉ ac ○ trees and that use of Take will require $ 7,510 contribution to TVA's Conservation Fund upon completion of activity (amount entered should be $0 if cleared in winter).

For Terrestrial Zoology Use Only. Finalize and Print to Noneditable PDF.

Appendix F – Floodplains Crossings Along the Proposed Transmission Line, Switching Station, and Access Roads

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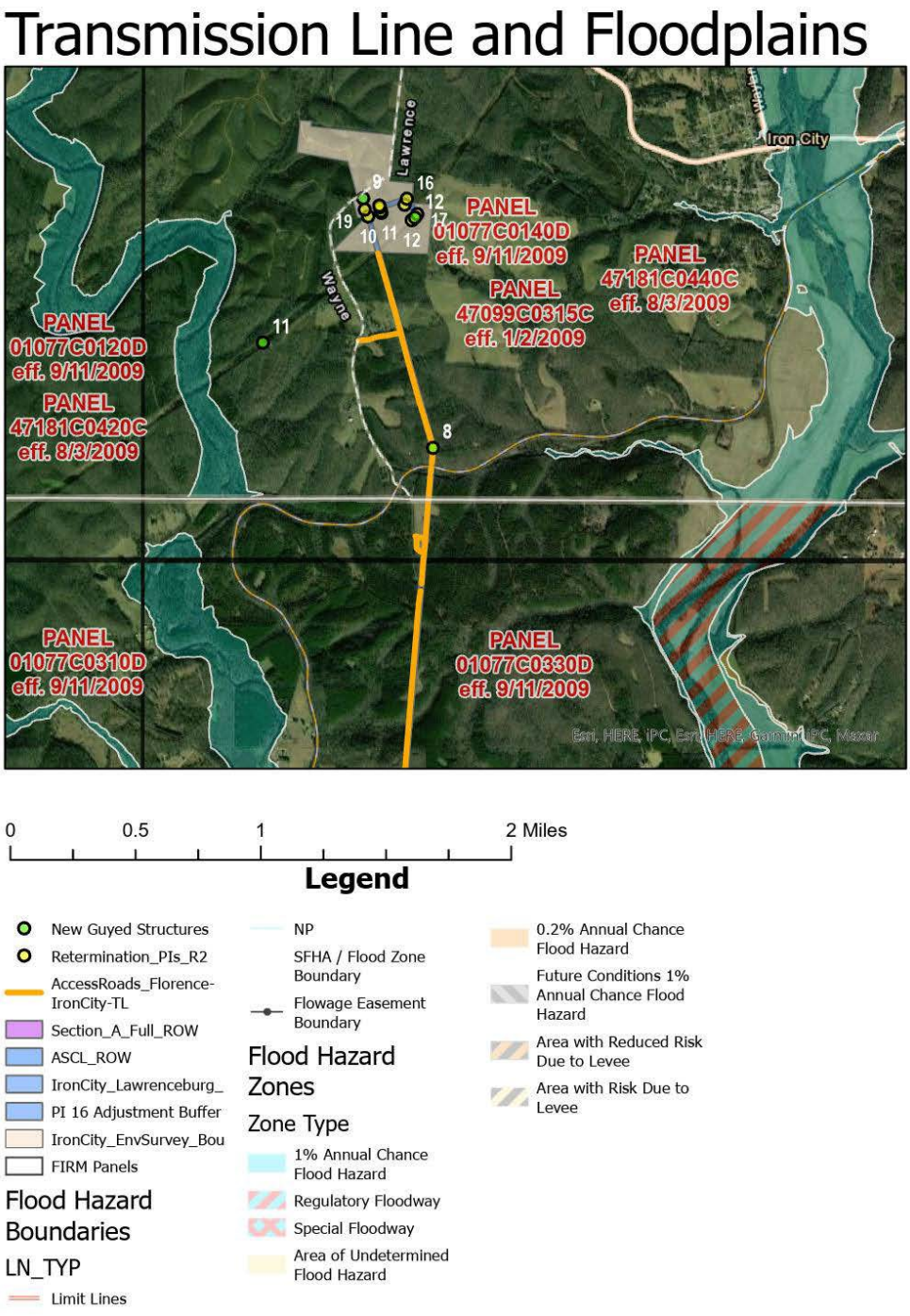


Figure 7-1

Figure D-7-1. Locations where the project crosses 100-year floodplains

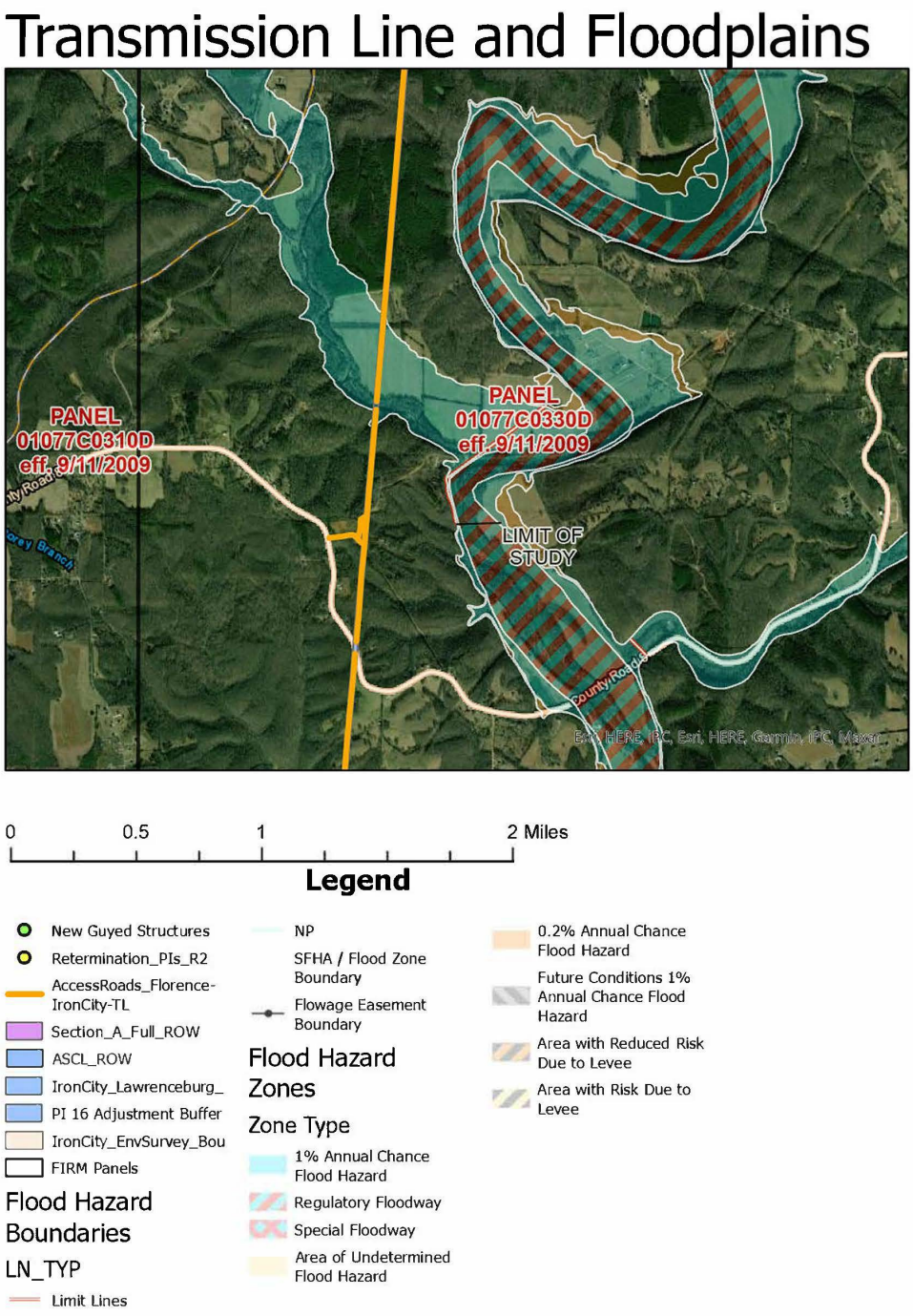


Figure 7-2

Figure D-7-2. Locations where the project crosses 100-year floodplains

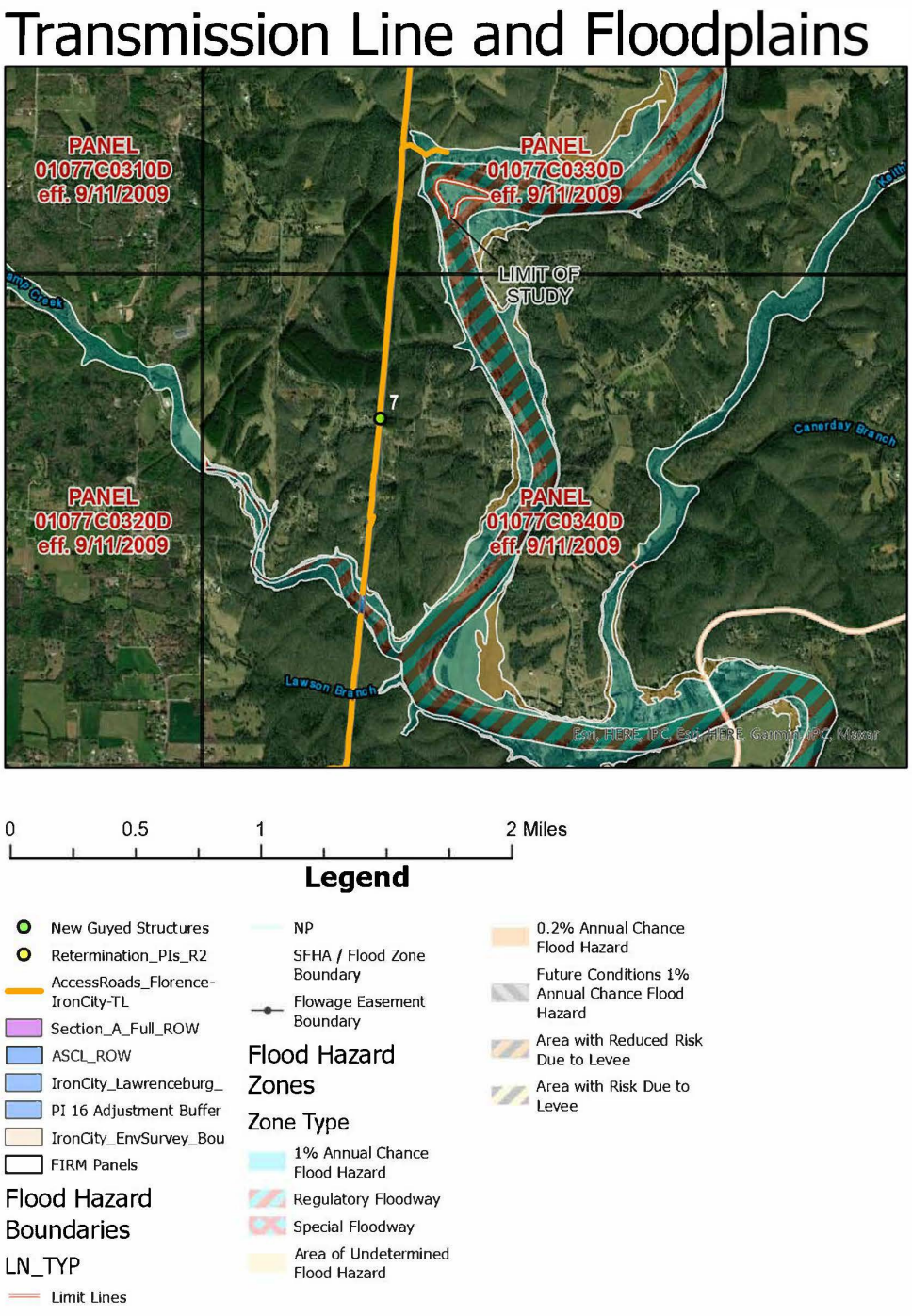


Figure 7-3

Figure D-7-3. Locations where the project crosses 100-year floodplains

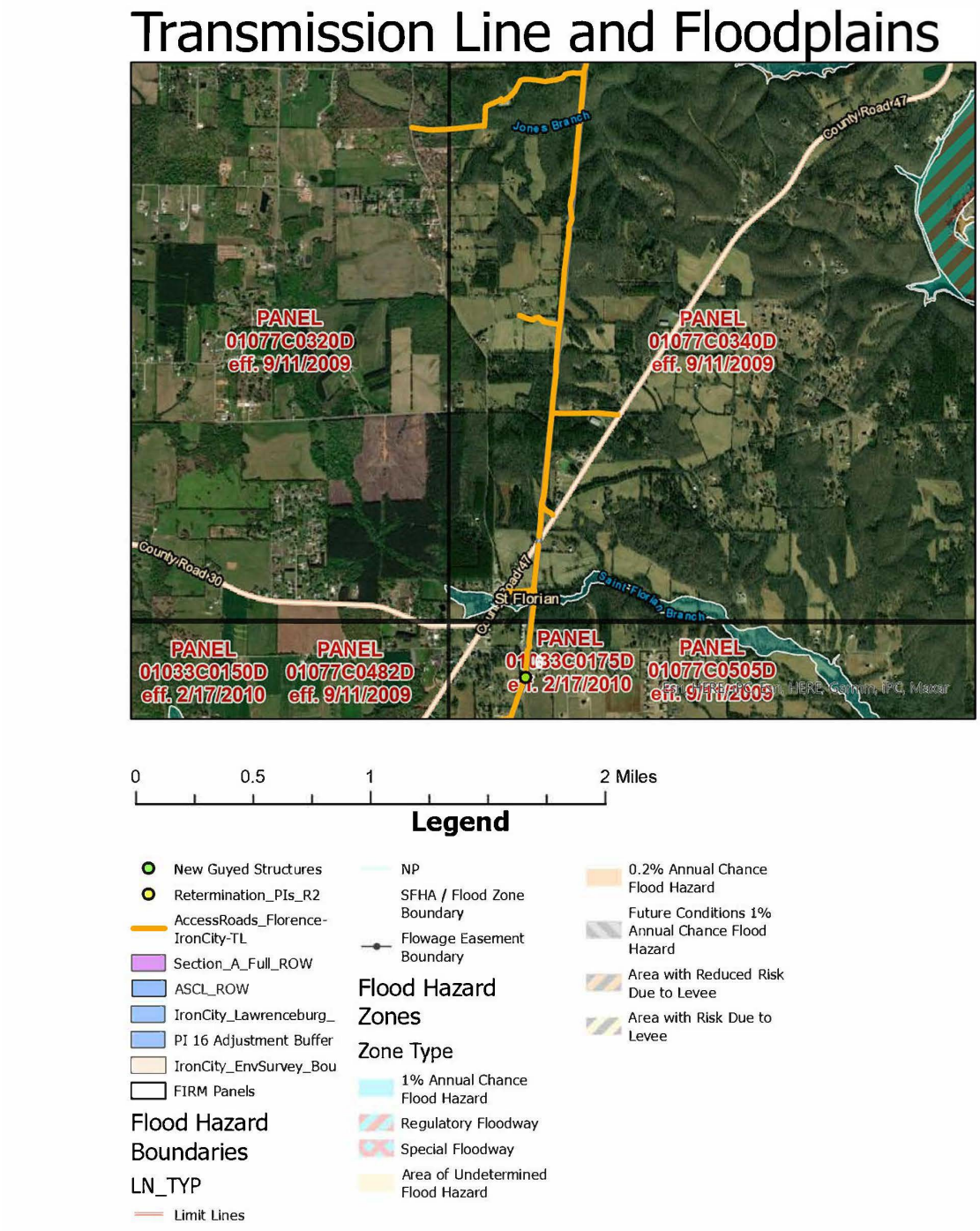
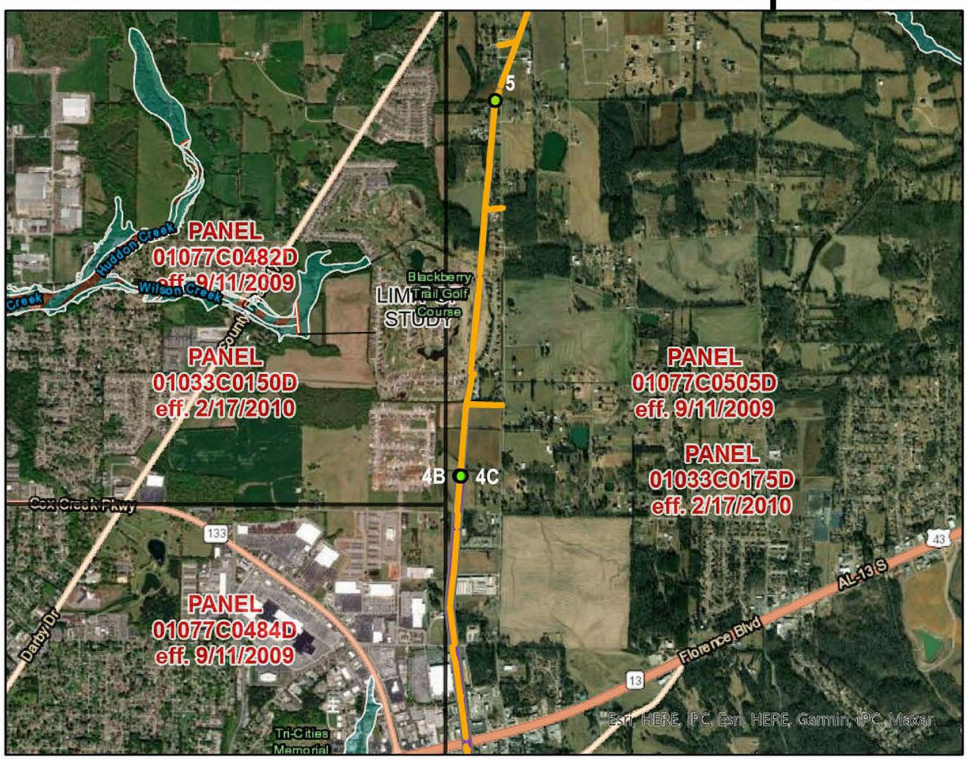


Figure 7-4

Figure D-7-4. Locations where the project crosses 100-year floodplains

Transmission Line and Floodplains



0 0.5 1 2 Miles

Legend

- New Guyed Structures
- Retermination_PIs_R2
- AccessRoads_Florence-IronCity-TL
- Section_A_Full_ROW
- ASCL_ROW
- IronCity_Lawrenceburg_
- PI 16 Adjustment Buffer
- IronCity_EnvSurvey_Bou
- FIRM Panels

Flood Hazard Boundaries

LN_TYP

- Limit Lines
- NP
- SFHA / Flood Zone Boundary
- Flowage Easement Boundary

Flood Hazard Zones

Zone Type

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Special Floodway
- Area of Undetermined Flood Hazard
- 0.2% Annual Chance Flood Hazard
- Future Conditions 1% Annual Chance Flood Hazard
- Area with Reduced Risk Due to Levee
- Area with Risk Due to Levee

Figure 7-5

Figure D-7-5. Locations where the project crosses 100-year floodplains

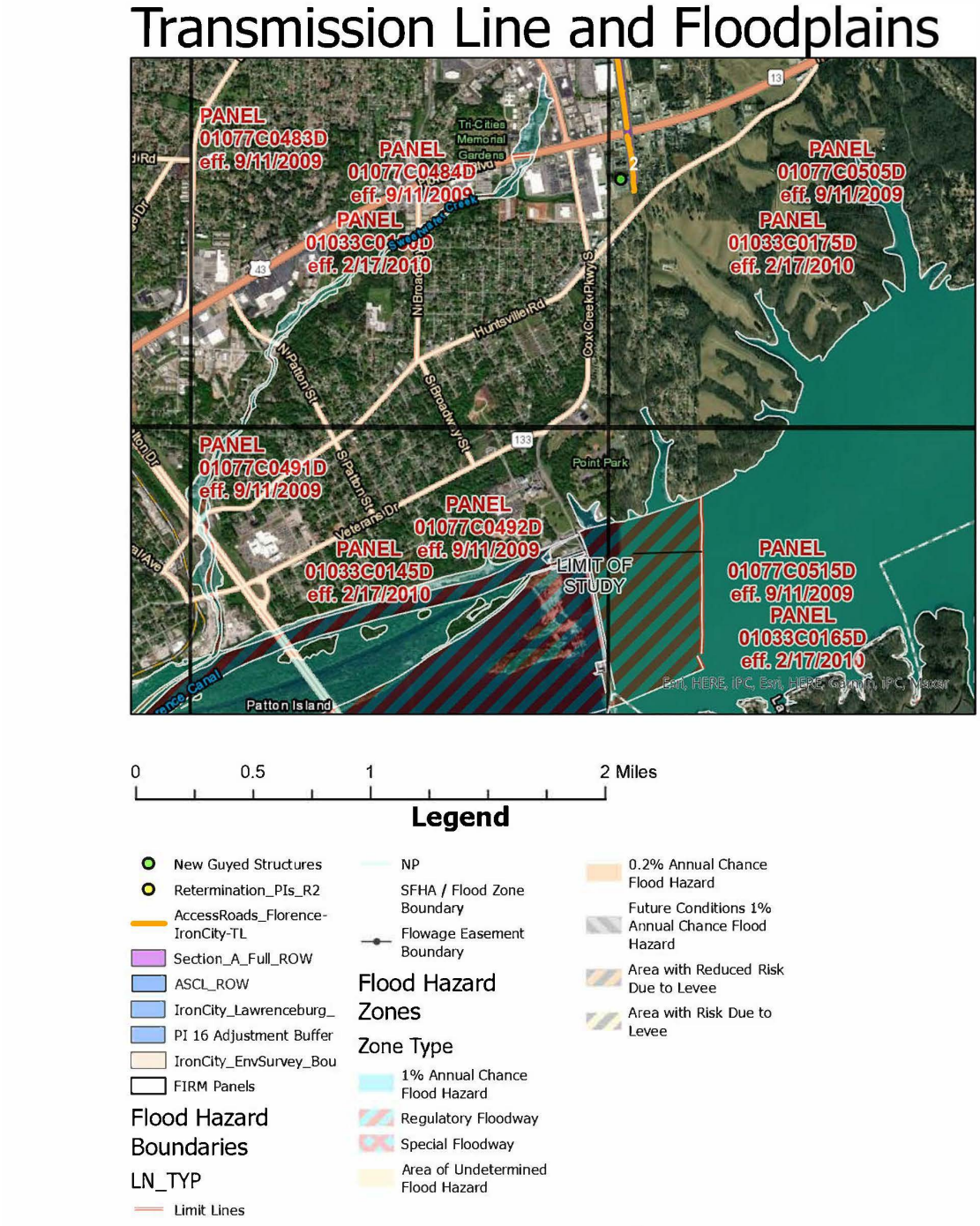


Figure 7-6

Figure D-7-6. Locations where the project crosses 100-year floodplains

Appendix G – Noise During Transmission Line Construction and Operation

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Appendix G - Noise During Transmission Line and Substation Construction and Operation

At high levels, noise can cause hearing loss; at moderate levels, noise can interfere with communication, disrupt sleep, and cause stress; and at low levels, noise can cause annoyance. Noise is measured in decibels (dB), a logarithmic unit, so an increase of 3 dB is just noticeable, and an increase of 10 dB is perceived as a doubling of sound level. Because not all noise frequencies are perceptible to the human ear, A-weighted decibels (dBA), which filter out sound in frequencies above and below human hearing, are typically used in noise assessments.

Both the U.S. Environmental Protection Agency (EPA) and the Department of Housing and Urban Development (HUD) have established noise guidelines. EPA guidelines are based on an equivalent day/night average sound level (DNL), which is a 24-hour average sound level with 10 dB added to hours between 10 p.m. and 7 a.m., since people are more sensitive to nighttime noise. USEPA recommends a guideline of DNL less than 55 dBA to protect the health and well-being of the public with an adequate margin of safety. HUD guidelines use an upper limit DNL of 65 dBA for acceptable residential development and an upper limit DNL of 75 dBA for acceptable commercial development. TVA generally uses the USEPA guideline of 55 dBA DNL at the nearest residence and 65 dBA at the property line in industrial areas to assess the noise impact of a project. In addition, TVA considers the Federal Interagency Committee on Noise (FICON) 1992 recommendation that a 3-dB increase indicates possible impact, requiring further analysis when the existing DNL is 65 dBA or less.

Annoyance from noise is highly subjective. The FICON used population surveys to correlate annoyance and noise exposure (FICON 1992). Table G-1 gives estimates of the percentage of typical residential populations that would be highly annoyed from a range of background noise and the average community reaction description that would be expected.

Table G-1. Estimated Annoyance from Background Noise (FICON 1992)

Day/Night Level (dBA)	Percent Highly Annoyed	Average Community Reaction
75 and above	37	Very severe
70	25	Severe
65	15	Significant
60	9	Moderate
55 and below	4	Slight

For comparative purposes, typical background DNLs for rural areas range from about 40 dBA in undeveloped areas to 48 dBA in mixed residential/agricultural areas (Cowan 1993). Noise levels are typically higher in higher-density residential and urban areas. Background noise levels greater than 65 dBA can interfere with normal conversations, requiring people to speak in a raised voice to carry on a normal conversation.

Construction Noise

Construction noise impacts would vary with the number and specific types of equipment on the job, the construction methods, the scheduling of the work, and the distance to sensitive noise receptors such as houses. Typical construction activities for a transmission line are described in Section 2.2. Maximum noise levels generated by the various pieces of construction equipment typically range from about 70 to 85 dBA at 50 feet (Bolt et al. 1971). An exception would be the use of track drills for building roads and installing foundations in rocky areas; track drills have a typical maximum noise level of 98 dBA at 50 feet. Use of track drills is not expected to be widespread.

Project-related construction noise levels would likely exceed background noise levels by more than 10 dBA at distances from within 500 feet in developed areas to over 1,000 feet in rural areas with little development. These distances are without the use of track drills; drilling activities could increase the distances by an additional 500 feet. A 10-dBA increase would be perceived as a large increase over the existing noise level and could result in annoyance to adjacent residents. The residential noise level guideline of 55 dBA could also be temporarily exceeded for residences near construction activities.

Construction activities would be limited to daylight hours. Because of the sequence of construction activities, construction noise at a given point along the transmission line connections would be limited to a few periods of a few days each. The temporary nature of construction would reduce the duration of noise impacts on nearby residents.

Operational Noise

Transmission lines can produce noise from corona discharge, which is the electrical breakdown of air into charged particles. Corona noise is composed of both broadband noise, characterized as a crackling noise, and pure tones, characterized as a humming noise. Corona noise is greater with increased voltage and is also affected by weather. It occurs during all types of weather when air ionizes near irregularities, such as nicks, scrapes, dirt, and insects on the conductors. During dry weather, the noise level is low and often indistinguishable off the ROW from background noise. In wet conditions, water drops collecting on the conductors can cause louder corona discharges.

For 500-kV transmission lines, this corona noise when present, is usually about 40-55 dBA. The maximum recorded corona noise has been 60-61 dBA (TVA unpublished data). During rain showers, the corona noise would likely not be readily distinguishable from background noise. During very moist, non-rainy conditions, such as heavy fog, the resulting small increase in the background noise levels is not expected to result in annoyance to adjacent residents.

Periodic maintenance activities, particularly vegetation management, would produce noise comparable to that of some phases of transmission line construction. This noise, particularly from bush-hogging or helicopter operation, would be loud enough to cause some annoyance. It would, however, be of very short duration and very infrequent occurrence.

Literature Cited

Bolt, Beranek, and Newman Inc. 1971. Noise From Construction Equipment and Operations, Building Equipment, and Home Appliances. U.S. Environmental Protection Agency Report NTID300.1. Protection Agency Report NTID300.1.

Cowan, J. P. 1993. Handbook of Environmental Acoustics. Wiley, New York.

Federal Interagency Committee on Noise (FICON). 1992. Federal Agency Review of Selected Airport Noise Analysis Issues. Fort Walton Beach, Fla.: Spectrum Sciences and Software Inc.

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