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# CALHOUN, GEORGIA – AREA POWER SYSTEM IMPROVEMENTS

## **ENVIRONMENTAL ASSESSMENT**

**Gordon and Whitfield Counties, Georgia**

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## ACRONYMS, ABBREVIATIONS, AND GLOSSARY OF TERMS USED

<b>Acre</b>	A unit measure of land area equal to 43,560 square feet
<b>access road</b>	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
<b>APE</b>	Area of potential effects
<b>BMP</b>	Best management practice or accepted construction practice designed to reduce environmental effects
<b>circuit</b>	A section of conductors (three conductors per circuit) capable of carrying electricity to various points
<b>conductors</b>	Cables that carry electrical current
<b>CWA</b>	Clean Water Act
<b>danger tree</b>	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
<b>DCH</b>	Designated critical habitat
<b>EA</b>	Environmental Assessment
<b>easement</b>	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
<b>EMF</b>	Electromagnetic field
<b>endangered species</b>	A species in danger of extinction throughout all or a significant part of its range
<b>EO</b>	Executive Order
<b>ephemeral stream</b>	Watercourses or ditches that only have water flowing after a rain event; also called a wet-weather conveyance
<b>ESA</b>	Endangered Species Act
<b>extant</b>	In existence; still existing; not destroyed or lost
<b>feller-buncher</b>	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
<b>FPPA</b>	Farmland Protection Policy Act
<b>GA-EPPC</b>	Georgia Exotic Plant Pest Council
<b>GDNR</b>	Georgia Department of Natural Resources
<b>GDOT</b>	Georgia Department of Transportation
<b>GIS</b>	Geographic Information System
<b>groundwater</b>	Water located beneath the ground surface in the soil pore spaces or in the pores and crevices of rock formations
<b>guy</b>	A cable connecting a structure to an anchor that helps support the structure

<b>hydric soil</b>	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
<b>hydrophytic vegetation</b>	Aquatic and wetland plants that have developed physiological adaptations allowing a greater tolerance to saturated soil conditions including with limited or absence of oxygen
<b>I-</b>	Interstate
<b>kV</b>	Symbol for kilovolt (1 kV equals 1,000 volts)
<b>load</b>	That portion of the entire electric power in a network consumed within a given area; also synonymous with “demand” in a given area
<b>LPC</b>	Local power company
<b>MOA</b>	Memorandum of Agreement
<b>MOU</b>	Memorandum of Understanding
<b>MSA</b>	Metropolitan Statistical Area
<b>NEPA</b>	National Environmental Policy Act
<b>NERC</b>	North American Electric Reliability Corporation
<b>NESC</b>	National Electric Safety Code
<b>NGEMC</b>	North Georgia Electric Membership Corporation
<b>NGRC</b>	Northwest Georgia Regional Commission
<b>NHPA</b>	National Historic Preservation Act
<b>NOAA</b>	National Oceanic and Atmospheric Administration
<b>NRHP</b>	National Register of Historic Places
<b>outage</b>	An interruption of the electric power supply to a user
<b>PA</b>	Programmatic Agreement
<b>PI</b>	Point of intersection at which two straight transmission line sections intersect to form an angle
<b>riparian</b>	Related to or located on the banks of a river or stream
<b>ROW</b>	Right-of-way, a corridor containing a transmission line
<b>runoff</b>	That portion of total precipitation that eventually enters a stream or river
<b>SHPO</b>	State Historic Preservation Officer
<b>SMZ</b>	Streamside management zone
<b>SR</b>	State Route
<b>structure</b>	A pole or tower that supports a transmission line
<b>substation</b>	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
<b>surface water</b>	Water collecting on the ground or in a stream, river, lake, or wetland; it is naturally lost through evaporation and seepage into the groundwater
<b>switch</b>	A device used to complete or break an electrical connection
<b>threatened species</b>	A species likely to become endangered within the foreseeable future
<b>TL</b>	Transmission line

<b>TVA</b>	Tennessee Valley Authority
<b>TVAR</b>	Tennessee Valley Archaeological Research
<b>TVARAM</b>	TVA Rapid Assessment Method, a version of the Ohio Rapid Assessment Method for categorizing wetlands, designed specifically for the TVA region
<b>US</b>	U. S. Highway
<b>USACE</b>	U. S. Army Corps of Engineers
<b>USDA</b>	U. S. Department of Agriculture
<b>USEPA</b>	U. S. Environmental Protection Agency
<b>USFS</b>	U. S. Forest Service
<b>USFWS</b>	U. S. Fish and Wildlife Service
<b>USGS</b>	U. S. Geological Survey
<b>wetland</b>	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
<b>WHO</b>	World Health Organization
<b>WMA</b>	Wildlife Management Area



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## CHAPTER 1

### 1.0 PURPOSE OF AND NEED FOR ACTION

#### 1.1 Proposed Action – Improve Power Supply

The Tennessee Valley Authority (TVA) proposes to improve the existing power supply in the Dalton and Calhoun, Georgia area. TVA's proposal would construct, operate, and maintain a new 19.2-mile transmission line (TL) between North Georgia Electric Membership Corporation's (NGEMC) Swamp Creek 115-kilovolt (kV) Substation and their Fuller 115-kV Substation (Figure 1-1). The proposed TL would provide a second power supply between TVA's Center Point and Moss Lake 230- kV substations. TVA would also purchase a 1.3-mile section of right-of-way (ROW) to accommodate a future 230-kV TL connection to the Center Point 230-kV Substation (Figure 1-1). The proposed TL would be completed by December 2017.

TVA's proposal would utilize double-pole, double-circuit structures for the 115-kV TL and two switch structures - one in the existing Center Point-Swamp Creek 115-kV TL ROW, and one within the proposed new 0.7 mile 100-foot-wide ROW. Short, permanent roads would be constructed to facilitate access to these switches.

The proposed project would require approximately 370 acres of mostly 150-foot-wide ROW, including about 317 acres of new ROW and 53 acres of existing ROW. Roughly 24 acres of the new ROW would be utilized in the future for a 230-kV connection to Center Point Substation.

TVA would also install a new transformer in their Moss Lake 230-kV Substation, and communications equipment at their Moss Lake and Center Point 230-kV substations. The TVA map board display at TVA's System Operations Center and Regional Operations Center would be updated to reflect the new facilities. To accommodate NGEMC's expansion of their Fuller Substation, TVA would modify their existing Moss Lake-Fuller 115-kV TL in the vicinity of the substation property, within existing TL ROW.

#### 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). The standards state that the TVA transmission system must be able to survive single-failure events while continuing to serve customer loads<sup>1</sup> with adequate voltage and no overloaded facilities while maintaining adequate TL clearances as required by the National Electric Safety Code (NESC).

The Calhoun, Georgia area is supplied power by TVA through NGEMC, but also by Georgia Power through local power companies (LPCs). TVA's power system currently operates as a radial TL (i.e., electric load supplied by a single source) from the Center Point 230-kV Substation south of Dalton to the Moss Lake 230-kV Substation on the east side of Calhoun. The existing 115-kV system supplies six 115-kV substations in an arc around Calhoun from the Swamp Creek Substation west of Center Point, around the east side of

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<sup>1</sup> "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.

Calhoun to the Fuller Substation on the southwest (Figure 1-1). Without a connection to another power source this radial electric power system that currently supplies these substations is at risk of losing the ability to serve approximately 70,000 homes.

In order to improve the electric reliability in the Calhoun and Dalton area, TVA plans to provide a second TL connection between the Center Point and Moss Lake 230-kV substations. This new TL must come from a different direction than the current power supply to eliminate the risk of outages to both TLs by a single storm, failure, or accident event, and create a backup supply system. TVA proposes to construct a 19.2-mile TL between the Swamp Creek and Fuller substations (Figure 1-1). The combination of existing transmission lines and the proposed TL would provide a second routed power supply between Center Point and Moss Lake substations (Figure 1-1). TVA would also purchase about 1.3 miles of ROW to accommodate long-term provisions for a 230-kV TL connection to the Center Point Substation. This proposal would strengthen the area power system by providing backup supply to both the Center Point and Moss Lake Substations, as well as several NGEMC substations.

Unless action is taken, the increasing power loads caused by commercial and residential growth in the project area would result in overloaded transformers and other electrical equipment damage or failure. Overloading a TL can cause alternating heating and cooling of the conductor material thus weakening the TL over time. Overloading can also cause a TL to sag in excess of design criteria, resulting in inadequate clearance between the TL and the ground. If a transformer and/or TL fails, the result is a power outage.

To ensure the Calhoun and Dalton area in Whitfield and Gordon counties are supplied with a continuous, reliable source of electric power, TVA needs to provide additional electric service to the area. Additionally, TVA needs to plan for reasonably foreseeable load growth in the area. The construction of a new TL and purchase of future ROW would meet these needs by:

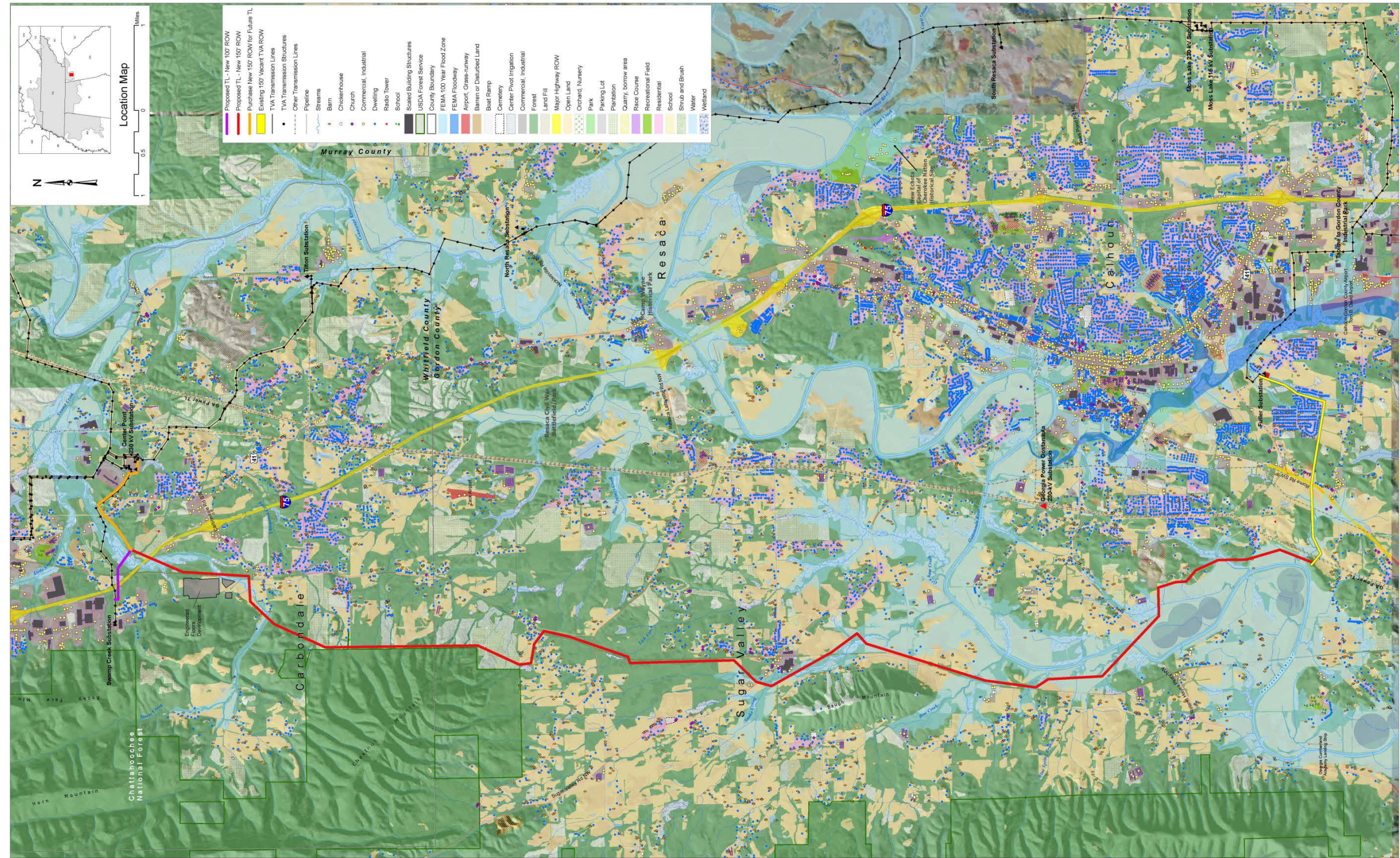
- Relieving the electrical load on the Center Point-Moss Lake No.1 TL by providing another power source;
- Creating a power supply system that would provide electricity from at least one source at all times;
- Allowing TVA to meet the reliability criteria established by the NERC.

### **1.3 Decisions to be Made**

The primary decision before TVA is whether to construct a new TL between NGEMC's Swamp Creek 115-kV Substation in Whitfield County and their Fuller 115-kV Substation in Gordon County, and purchase ROW for a future connection to the Center Point Substation in Gordon and Whitfield Counties, Georgia. If the proposed action is taken, other secondary decisions are involved. These include the following considerations.

- Timing of the proposed improvements;
- Most suitable route for a proposed 115-kV TL power supply; and
- Determination of any necessary mitigation and/or monitoring to meet TVA standards and to minimize the potential for damage to environmental resources.

Figure 1-1 Proposed Transmission Line for the Calhoun Area Power System Improvements in Gordon and Whitfield Counties, Georgia





## 1.4 Related Environmental Reviews or Documentation

In 2015, TVA completed the Integrated Resource Plan (TVA 2015a) that provides a direction for how TVA will meet the long-term energy needs of the Tennessee Valley region. This document and the associated Supplemental Environmental Impact Statement evaluate scenarios that could unfold over the next 20 years. It discusses ways that TVA can meet future electricity demand economically while supporting TVA's equally important mandates for environmental stewardship and economic development across the Valley. This report indicated that a diverse portfolio is the best way to deliver low-cost, reliable electricity. TVA released the accompanying Final Supplemental Environmental Impact Statement for TVA's Integrated Resource Plan in July 2015 (TVA 2015b).

In 2007, TVA completed the Center Point-Moss Lake 230/115-kV TL and Moss Lake Substation Environmental Assessment (EA). This EA evaluated a 15.5-mile TL connecting TVA's Center Point Substation to a new Moss Lake Substation. TVA also provided a short TL connection between the new TL and NGEMC's Tilton Substation. The project addressed NGEMC's overloading and reliability issues occurring at their facilities in Whitfield and Gordon counties.

## 1.5 Scoping Process and Public Involvement

TVA contacted federal and state agencies, as well as federally recognized Native American tribes, concerning the proposed project.

- Absentee Shawnee Tribe of Oklahoma
- Alabama-Coushatta Tribe of Texas
- Alabama-Quassarte Tribal Town
- Cherokee Nation
- Chickasaw Nation
- Eastern Band of Cherokee Indians
- Eastern Shawnee Tribe of Oklahoma
- Georgia Department of Natural Resources (GDNR) - Historic Preservation Division
- Georgia Department of Transportation (GDOT)
- Georgia State Representatives
- Georgia State Senators
- Kialegee Tribal Town
- Mayor of Calhoun
- Muscogee (Creek) Nation of Oklahoma
- Poarch Band of Cherokee Indians
- Seminole Nation of Oklahoma
- Shawnee Tribe
- 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)
- U. S. Forest Service (USFS)

TVA developed a public communication plan that included a Web site with information about the project, a map of the alternative routes, and numerous feedback mechanisms. Due to the large number of alternative routes and property owners potentially affected by the proposed project, TVA held two open houses in Georgia. The 517 property owners who could potentially be affected by any of the route alternatives, along with a total of 13 public officials, were asked for comments and invited to the open houses. TVA used local news outlets and notices placed in the local newspapers to notify other interested members of the

public of the open houses. The Calhoun open house on September 17, 2013 was attended by 119 people, and 68 people attended the open house in Dalton on September 19, 2013.

At the open houses, TVA presented maps with a network of alternative TL routes, comprised of 38 different TL segments to the public for comment (see Figure 1-2).

The interest of those who attended the open houses pertained to the effects of the proposed TL to the individual landowners, including impacts on development and/or property values. Some individuals also questioned the need for the project. Landowners also voiced concerns relative to impacts of the proposed TL on public health, visual quality, and natural, historical, and cultural resources.

A 30-day public review and comment period was held following the last open house, where TVA accepted public comments on the alternative TL routes and other issues. A toll-free phone number and facsimile number were made available to facilitate comments for those who did not want to submit comments by e-mail or U. S. mail. During the comment period, numerous landowners contacted TVA to express their concerns, most of which were similar to those voiced at the open house.

In December 2013, public involvement during the open houses and the 30-day comment period resulted in revisions to the alternative route segments. Several segments in the Carbondale area were deleted because of conflicts with new developments planned or occurring in the area. TVA added three new alternative route segments (39, 40 and 41) to change the approach to the Center Point Substation and expand the possibilities for a connection to Swamp Creek Substation.

Several alternative segments were deleted at the southern end of the project area after an on-site inspection to determine a preferred route for crossing existing TLs. Minor route segment changes were made to better accommodate planned land uses or mitigate potential route concerns.

The resulting network of alternatives was considered in TVA's analysis and is shown in Figure 1-3. Following analysis, TVA announced a preferred route to the public in February 2014. Letters were sent to affected property owners and information was provided to the public through TVA's Web site.

As a result of information obtained following the announcement of the preferred route from both public and agency comments, and from environmental field surveys, TVA made additional route adjustments to the preferred TL (Figure 1-1). These adjustments are described in Section 2.4.



Figure 1-2 Alternate Route Segments for the Proposed Calhoun Power Supply Upgrades in Gordon and Whitfield Counties, Georgia

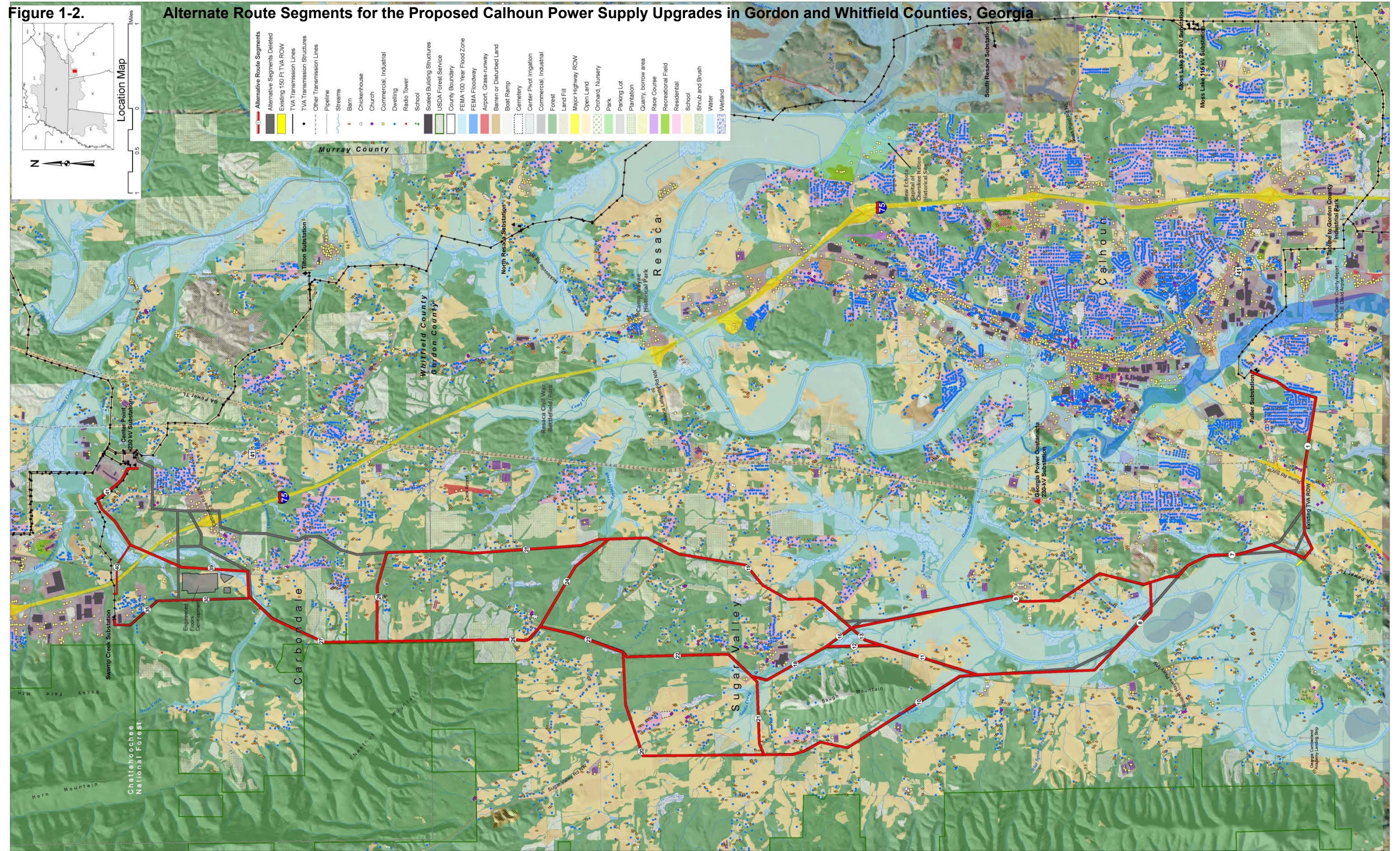
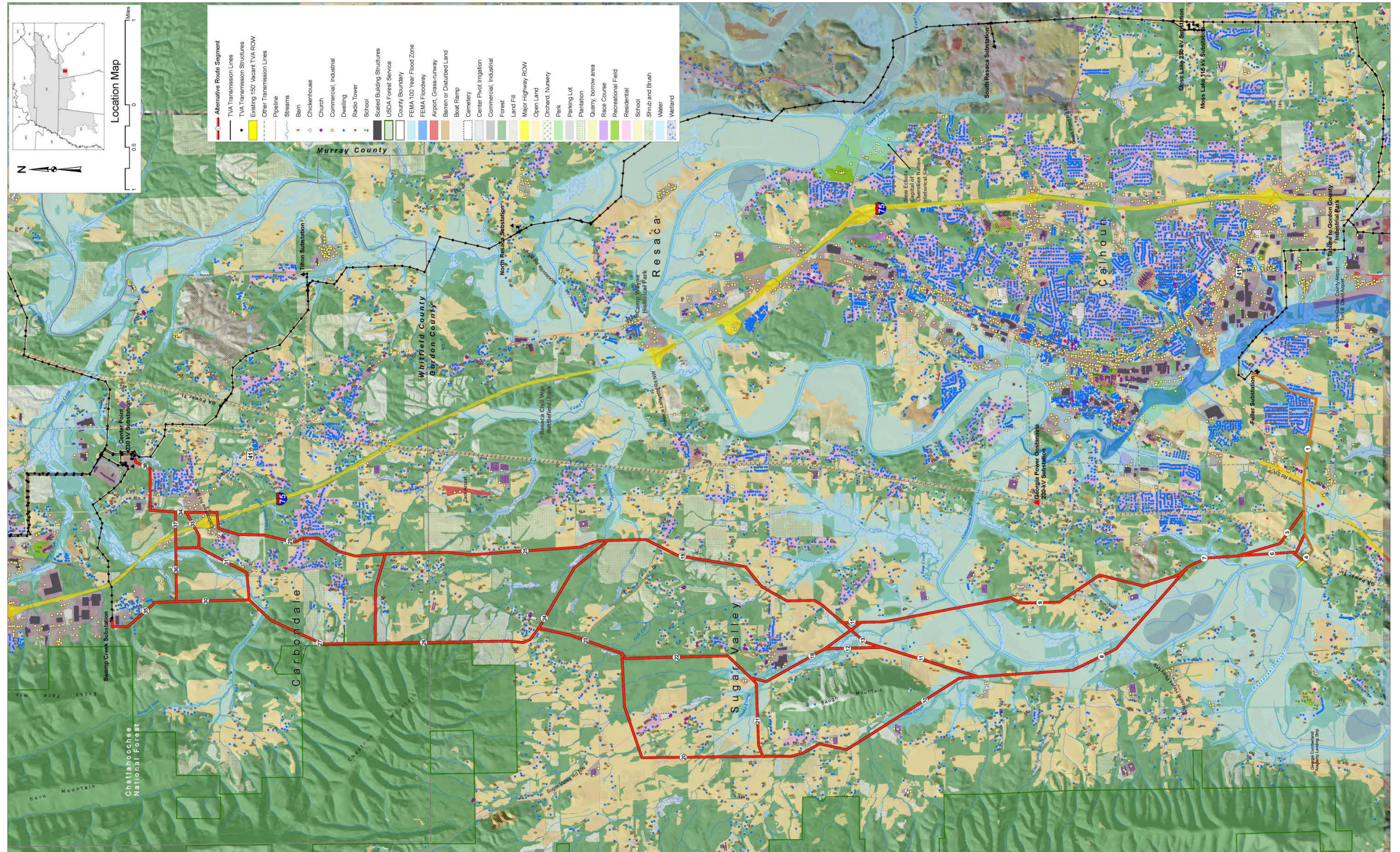


Figure 1-3 Alternate Route Segments Included in TVA's Analysis for the Proposed Calhoun Power Supply Upgrades in Gordon and Whitfield Counties, Georgia



## 1.6 Issues to be Addressed

TVA prepared this EA to comply with the National Environmental Policy Act (NEPA) and regulations promulgated by the Council of Environmental Quality and TVA to implement NEPA. The EA will investigate the construction, operation, and maintenance of a new TL as well as the purchase of ROW for this purpose, 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 as well as comments received during the scoping period.

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

TVA's action would satisfy the requirements of Executive Order (EO) 11988 (Floodplain Management), EO 11990 (Protection of Wetlands), EO 12372 (Intergovernmental Review), EO 12898 (Environmental Justice), 13112 (Invasive Species), 13653 (Preparing the U. S. for the Impacts of Climate Change), and applicable laws including the Farmland Protection Policy Act (FPPA), the National Historic Preservation Act (NHPA), the Endangered Species Act (ESA), the Clean Air Act, and the Clean Water Act (CWA). Correspondence received from agencies related to this review and coordination is included in Appendix A.

## 1.7 Necessary Federal Permits and Licenses

A permit would be required from the State of Georgia for the discharge of construction site storm water associated with the construction of the TL. TVA would prepare the required erosion and sedimentation control plans and coordinate them with the appropriate state and local authorities. A permit may also be required for burning trees and other combustible materials removed during construction of the proposed TL. A Section 401 Water Quality Certification would be obtained from the State of Georgia for any 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. A permit would be obtained from the GDOT for crossing state highways or federal interstates during TL construction.

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## CHAPTER 2

### 2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

As described in Chapter 1, TVA proposes to provide an additional power supply to the Dalton and Calhoun, Georgia area. A description of the proposed Action Alternative is provided below in Section 2.1.2. Additional background information about construction, operation, and maintenance of a TL is also provided and would be applicable regardless of the location of the proposed facilities.

This chapter has six major sections:

1. A description of alternatives;
2. A description of the construction, operation, and maintenance of the proposed TL;
3. An explanation of the TL siting process;
4. A comparison of anticipated environmental effects by alternative;
5. Identification of mitigation measures; and
6. 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 purchase of easements for ROW and the construction, operation, and maintenance of the proposed TL.

#### 2.1.1 The No Action Alternative – TVA Does Not Provide an Additional Power Supply to the Calhoun and Dalton Area

Under the No Action Alternative, TVA would not construct the proposed TL or purchase additional ROW for a future TL connection. As a result, the TVA power system in the Dalton and Calhoun area would continue to operate under the current conditions, increasing the risk for substation and TL overloading, loss of service, and occurrences of violations of NERC reliability criteria. TVA's ability to continue to provide reliable service to address economic development and anticipated residential and commercial growth in the area would also not be improved.

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 an Additional Power Supply to the Calhoun and Dalton Area

Under the Action Alternative, TVA would construct, operate, and maintain approximately 19.2 miles of new TL between NGEMC's Swamp Creek 115-kV Substation, located south of Dalton, and their Fuller Substation, located on the south side of Calhoun (Figure 1-1). The TL would use about 2.9 miles of existing 150-foot-wide ROW (the yellow route segment on Figure 1-1) near Calhoun. The remaining 16.3 miles would be built on new ROW. Approximately 15.6 miles of this ROW (the red route segment on Figure 1-1) would be 150-

foot-wide and the remaining 0.7 miles, located near the Swamp Creek Substation (the purple route segment on Figure 1-1), would be 100-foot-wide.

The proposed 115-kV TL would connect to TVA's existing Center Point-Swamp Creek 115-kV TL just outside NGEMC's Swamp Creek 115-kV Substation in Whitfield County, and extend to TVA's existing Fuller-Moss Lake 115-kV TL just outside of NGEMC's Fuller 115-kV Substation in Gordon County. These connections located in the Dalton and Calhoun areas would create the Center Point-Moss Lake No. 2 115-kV TL. The new TL would be designed and constructed using double-pole, double-circuit structures to accommodate long-term provisions for a 230-kV connection to the Center Point Substation. Conductor would be strung on one side to accommodate the 115-kV TL for the proposed project. The other side would be strung, if needed, in the future for the 230-kV TL.

Under the Action Alternative, TVA would also purchase a 1.3 mile ROW (the orange route segment on Figure 1-1) in Carbondale for the purpose of siting and constructing a 230-kV TL connection to the Center Point 230-kV Substation at a future date, if and when it is needed. The 150-foot-wide ROW comprises 24 acres. The proposed new TL would require the installation of two switch structures - one in the existing Center Point-Swamp Creek 115-kV TL ROW, and one within the proposed new 0.7 mile 100-foot-wide ROW. The purchasing of minor amounts of ROW for this purpose is a categorically excluded action as identified in TVA Instruction IX Environmental Review, Section 5.2.17. The effects of constructing, operating, and maintaining a TL along this ROW would be considered when it has been determined that this action is needed. As such the effects of a new TL on this section of ROW are not considered as part of this EA.

The proposed project would require approximately 370 acres of ROW, including about 317 acres of new ROW and 53 acres of existing ROW. Temporary access roads would be identified for use during construction and maintenance of the proposed TL.

To facilitate the operation of the proposed 19.2 mile TL, TVA would install a new transformer in their Moss Lake 230-kV Substation, and communications equipment at their Moss Lake and Center Point 230-kV substations. The TVA map board displays at TVA's System Operations Center and Regional Operations Center in Chattanooga would be updated to reflect the new facilities.

To accommodate NGEMC's expansion of their Fuller Substation, TVA would modify their existing Moss Lake-Fuller 115-kV TL in the vicinity of the substation property, within existing TL ROW.

Additional information describing implementation of the proposed Action Alternative and how the most suitable TL route was determined is provided below in Sections 2.2 through 2.4.

### **2.1.3 Alternatives Considered but Eliminated From Further Discussion**

During the development of this proposal, other alternatives were considered. However, upon further study, TVA determined that these alternatives were not feasible for the reasons provided below.

#### **2.1.3.1 Build a New 230-kV Interconnection with Georgia Power**

Under this alternative, TVA would construct approximately 7 miles of 230-kV TL from TVA's Moss Lake 230-kV Substation to Georgia Power's Oostanaula 230-kV Substation. TVA

would provide and install the 230-kV breakers and any associated equipment necessary for the interconnection. This plan would also require the future construction of approximately 11.5 miles of 115-kV TL from the Center Point Substation to the Sugar Valley area.

While this alternative seems feasible, it makes TVA's system reliant upon Georgia Power's system to serve its load. This would infringe upon TVA's original commitments to NGEMC. Additionally, this could make TVA's customers reliant on Georgia Power, a non-responsible party, in the case of an emergency where TVA could not meet the power demand. Finally, the connection to the Oostanaula Substation is not economically feasible, as there is limited space within that substation to accommodate another connection. For these reasons, this alternative was eliminated from further consideration.

### **2.1.3.2 Build a New 230-kV Transmission Line Parallel to Center Point-Moss Lake No. 1 Transmission Line**

Under this alternative, TVA would construct a second TL parallel to their existing Center Point-Moss Lake No. 1 TL. This 230-kV TL would be approximately 20 miles long and, like the proposed Action Alternative, would connect TVA's Center Point 230-kV Substation to their Moss Lake 230-kV Substation. TVA would install a new 230-kV breaker in the Moss Lake 230-kV Substation, build a new bay, and install a new breaker in the Center Point 230-kV Substation. This plan would also require the future construction of approximately 11.5 miles of 115-kV TL to the Sugar Valley Delivery Point.

While this alternative would provide an additional 230-kV power source to the Dalton and Calhoun areas, this option would not provide backup power supplies to NGEMC's Moss Lake, Gordon County, and Fuller 115-kV Substations (i.e., they would remain on a radial feed, because the parallel TLs could both be taken down by a single storm, failure, or accident event). In addition, this alternative requires the future construction of approximately 11.5 miles of TL that the proposed Action Alternative does not. For these reasons, this alternative was eliminated from further consideration.

### **2.1.3.3 Underground Utility Lines**

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

Power lines can be buried. However, most buried TLs tend to be low-voltage distribution lines (TLs that are 13-kV or less) rather than high-voltage TLs, 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, some TLs require armor casings for safety reasons. Burying higher voltage TLs in the 69-kV, 115-kV, and 230-kV range requires extensive excavation as these TLs 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 TLs must be maintained for routine inspection and maintenance.

Although buried TLs 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 TLs may require excavation, and the precise location of problem areas can be difficult to determine.

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

## **2.2 Construction, Operation, and Maintenance of the Proposed Transmission Line**

### **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 TL 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 purchase easements from landowners for the proposed new ROW. These easements would give TVA the right to clear the ROW and to construct, operate, and maintain the TL, as well as remove “danger trees” adjacent to the ROW. Danger trees include any trees that are 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 TL. 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 TL or create a hazardous situation.

Because of the need to maintain adequate clearance between tall vegetation and TL 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<sup>2</sup>. 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, in order to limit ground disturbance.

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<sup>2</sup> 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.



TVA utilizes standard practices for ROW clearing and construction activities. These guidance and specification documents (listed below) are provided on the TVA's Transmission System Projects Web page and are taken into account when considering the effects of the proposed Action Alternative (TVA 2016a). TVA transmission projects also utilize best management practices (BMP) as identified in Muncy (2012) 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,* and
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 Transmission Construction and Maintenance Activities* (hereafter referred to as "Muncy 2012").

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 Clean Air Act, project activities would be in conformity with the requirements under the State Implementation Plan for attaining air quality standards.

Following clearing and construction, vegetative cover on the ROW would be restored to its condition prior to construction, to the extent practicable. TVA would utilize appropriate seed mixtures as described in Muncy (2012) 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 and in Muncy (2012). 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.

### **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 TLs are located on the ROW wherever possible and are designed to avoid severe slope conditions and to minimize stream crossings. Access roads are typically about 12- to 16-foot wide and are surfaced with dirt, mulch, or gravel. Permanent access roads located within the TL ROW would be required to access the switches.

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<sup>3</sup> 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.

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<sup>3</sup> Ephemeral streams are also known as wet-weather conveyances or streams that run only following a rainfall.

Additional applicable ROW clearing and environmental quality protection specifications are listed in *TVA ROW Clearing Specifications, Environmental Quality Protection Specifications for Transmission Line Construction* (TVA 2016a) and *Transmission Construction Guidelines Near Streams* (Muncy 2012).

### **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 an area typically five acres in size; relatively flat; well drained; previously cleared; preferably graveled and fenced; preferably 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 TL. 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 TL would utilize mostly double-steel poles; single-steel poles would be used in the 0.7 mile single-circuit section near the Swamp Creek Substation. Examples of these structure types are shown in Figures 2-1 and 2-2. Structure heights would vary according to the terrain but would range between 90- and 115-feet above ground.



**Figure 2-1. Typical Double Steel-Pole Structures, Double-Circuit Transmission Line**

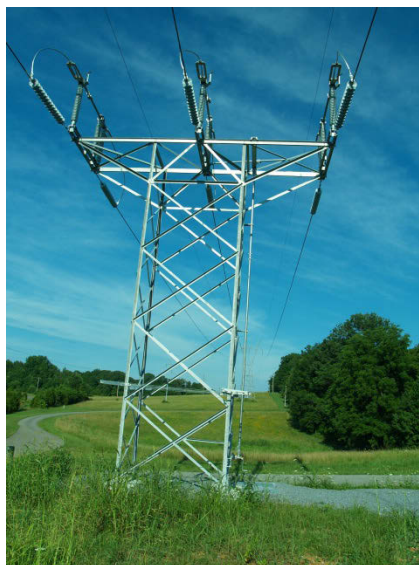


**Figure 2-2. Typical Single Steel-Pole Structure**

Three conductors (the cables that carry the electrical current) are required to make up a single-circuit in alternating-current TLs. For a 115-kV or 230-kV TL, each single-cable conductor is attached to porcelain insulators that are either suspended from the structure cross arms or attached directly to the structure. A smaller overhead ground wire or wires are attached to the top of the structures.

Poles at angles (angle points) in the TL may require supporting screw, rock, or log-anchored guys. Some angle structures may be self-supporting poles, 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.

Switch structures are necessary to periodically isolate sections of a TL for maintenance or in the event of an unplanned outage. A 50-foot tall structure would be installed in the existing Center Point-Swamp Creek 115-kV TL ROW, and a 35-foot tall structure would be placed within the proposed new 0.7 mile 100-foot-wide ROW. These structures are similar to that shown in Figure 2-3.



**Figure 2-3. Typical Transmission Line Switch Structure**

Equipment used during the construction phase would include trucks, truck-mounted augers, and drills, excavator, 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 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 TL 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 Operation and Maintenance**

#### **2.2.2.1 Inspection**

Periodic inspections of TLs are performed by helicopter aerial surveillance 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 TL 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.

#### **2.2.2.2 Vegetation Management**

Management of vegetation along the ROW would be necessary to ensure access to structures and to maintain an adequate distance between TL 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 minimum ground clearance of 24 feet for a 115-kV TL at the

maximum TL operating temperature. Vegetation management along the ROW would consist of two different activities: felling of 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 three to five year cycles.

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 TL, 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 (USEPA) are used. A list of the herbicides currently used by TVA in ROW management is presented in TVA's *Transmission Environmental Protection Procedures Right-Of-Way Vegetation Management Guidelines*, (TVA 2016a). This list may change over time as new herbicides are developed or new information on presently approved herbicides becomes available.

### **2.2.2.3 Structure Replacement**

Other than vegetation management within ROWs, only minor maintenance work is generally required as TL structures and other components (e.g., conductor, insulators, arms, etc.) typically last several decades. In the event that 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 process of siting the proposed TLs followed the basic steps used by TVA to determine a TL route. These include the following steps:

- Determine the potential existing power sources to supply the TL
- Define the study area;
- Collect data to minimize potential impacts to cultural and natural features;
- Identify general route segments producing potential routes;
- Locate potential tap points;
- Gather public input;
- Incorporate public input into the final selection of the TL route.

### **2.3.1 Definition of the Study Area**

The study area was determined primarily by the geographic boundaries of the existing TVA and NGEMC power system. As described in Sections 1.2 and 2.1.3.2, route alternatives parallel to the existing Center Point-Moss Lake No. 1 TL would not meet the project needs. Beginning at the Center Point 230-kV Substation, this north-south TL runs relatively close to the east side of Resaca and Calhoun. As such the opportunities for new TL routes to the east are limited by existing infrastructure and occur all in the western portion of the study area. Hence, the Center Point-Moss Lake No. 1 TL roughly defined the eastern boundary of the study area. The northern boundary was established by the general location of the two northern substation termination points (Center Point 230-kV and Swamp 115-kV Creek substations) and the existing TL connecting these substations. Similarly, the southern boundary was defined by the Fuller 115-kV Substation and a vacant TVA TL ROW leading west from this substation that could potentially be utilized for the project. The western boundary of the study area was roughly determined by the Chattahoochee National Forest.

### **2.3.2 Description of the Study Area**

The Center Point 230-kV and Swamp Creek 115-kV substations are in the southern part of Whitfield County. The City of Calhoun is located in Gordon County and is connected by Interstate 75 (I-75) and U. S. Highway (US) 41 to Atlanta (50 miles south), Dalton (20 miles north), and Chattanooga (40 miles north). The close proximity of these cities have made Calhoun a site for popular discount shopping malls. The Calhoun-Gordon County Airport (Tom B. David Field) serves the area and the industrial park on the south side of Calhoun. There are two other private airfields in the study area (see Figure 1-1).

TVA's Center Point-Moss Lake No. 1 TL is located on the east side of the study area and runs north-south roughly parallel to US 41, I-75, and the Oostanaula River. The Swamp Creek Substation is about two miles west of Center Point Substation on a radial TL of its own.

The steep mountain slopes of Rocky Face, Chestnut Mountain, and Horn Mountain form a scenic western skyline in the western portion of the study area. Baugh Mountain is a steep stand-alone prominence at the foot of Horn Mountain west of Calhoun. Most of the steeper parts of the mountains are owned by the USFS; forming the Chattahoochee National Forest and the Johns Mountain Wildlife Management Area (WMA).

The significant Cherokee and Civil War history of this study area merits respect in the location process. The Resaca Civil War battlefield park lies in a small valley with a relatively confined viewshed. The goal for routing is to avoid direct or visual impacts on this park and to avoid or minimize any other direct impacts to specific historical resources, such as the nearby Camp Wayne. Similarly, the views from the Cherokee Indian Memorial area at Damascus, north of Calhoun, should be unaffected by this new TL and the historical areas of New Echota would not be part of any new route.

The study area immediately north of the community of Carbondale has been selected as the site for a large manufacturing facility (Engineered Floors) that is scheduled to open in 2017. Site development would involve the relocation of Dug Gap Road toward the base of Rocky Face Mountain. In order to serve this industry, a new Georgia Power 115-kV TL will be extended to a new substation near the north end of the new plant development.

The study area south of Carbondale--between the foot of the Chestnut Mountain and the Oostanaula River--is relatively rural. The Old Rome-Dalton Road runs through this valley,

as does one of the early railroad lines that connected Atlanta and Chattanooga. The small community of Sugar Valley is located on the railroad at the east side of Baugh Mountain. Pivot-irrigated farm fields occupy some of the Oostanaula floodplains in the southern study area. Extensive privately owned pine plantations in the northern study area supplement the local forest products industry.

### **2.3.3 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 TL study included design drawings for area TLs, data collected into a geographic information system (GIS), including U. S. Geological Survey (USGS) digital line graphs, and Gordon and Whitfield County 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).

Additionally, during December 2012, TVA took new aerial color orthophotography of the study area. These images were geo-referenced to produce an accurate image of the Earth by removing the distortions caused by camera tilt and topographic relief displacements, and then digitized for use in the GIS. This aerial photography was then interpreted to obtain land use and land cover data, such as forests, agriculture, pivot irrigation systems, wetlands, houses, barns, commercial and industrial buildings, churches, and cemeteries.

Data were 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 TL route that would best meet project needs, which included avoiding or reducing potential environmental impacts.

Calculations from aerial photographs, tax maps, and other sources included the number of road crossings, stream crossings, and property parcels. The aerial photography, GIS-based map, and other maps and drawings were supplemented by reconnaissance throughout the study area by TVA, including a TL siting engineer and environmental staff.

### **2.3.4 Establishment and Application of Siting Criteria**

TVA uses a set of evaluation criteria that represent opportunities and constraints for development of alternative TL routes. These criteria include factors such as existing land use, ownership patterns, environmental features, cultural resources, and visual quality. Cost is also an important factor, with engineering considerations, materials, and ROW acquisition costs being the most important elements. Identifying feasible TL routes involves weighing and balancing these criteria and application is flexible. TVA can, and does, deviate from the criteria; making adjustments as specific conditions dictate.

Each of the TL route options was evaluated according to criteria related to engineering, social, and environmental concerns. Specific criteria are described below. For each feature identified as occurring along a proposed route option, specific considerations related to these features were identified and scored. In the evaluation, a higher score means a bigger constraint or obstacle for locating a TL. For example, a greater number of streams crossed, a longer TL route length, or a greater number of historic resources affected would produce a higher, more unfavorable score.

- **Engineering and Constructability Criteria** include considerations such as terrain (steeper slopes can present major challenges for design and construction), total length of the TL route, pivot-irrigation systems (existing and planned, which can create operational challenges for both the irrigation system and the TL), number of primary and secondary road crossings, the presence of pipeline and TL crossings, and total TL cost.
- **Social Criteria** include the total acreage of new ROW, number of affected property parcels, public comments, consideration of visual aesthetics, and proximity to schools, houses, commercial or industrial buildings, and barns.
- **Environmental Criteria** include the number of forested acres within the proposed ROW, the number of open water crossings, the number of floodplain or floodway crossings, the presence of wetlands, rare species habitat, sinkholes, and sensitive stream crossings (i.e., those supporting endangered or threatened species), the number of perennial and intermittent stream crossings, and the presence of archaeological and historic sites, churches, and cemeteries.

A tally of the number of occurrences for each of the individual criteria was calculated for each potential alternative route. Next, a normalized ranking of alternative routes was performed for each individual feature based on each route's value as it related to the other alternative routes. Weights reflecting the severity of potential effects were then developed for each individual criterion. These criterion-specific weights were multiplied by the individual alternative rankings to create a table of weighted rankings. The weighted rankings for each alternative were then added to develop overall scores of each alternative route by engineering, social, environmental, and overall total. For each of these categories, a ranking of each alternative route was calculated based on the relationship between the various route's scores.

These rankings made it possible to recognize which routes would have the least and the greatest impact on engineering, social, and environmental resources based on the data available at this stage in the siting process. Finally, the scores from each category were combined into an overall score. The alternative route options were then rank ordered by their overall scores.

### **2.3.5 Development of General Route Segments and Potential Transmission Line Routes**

As described in Section 2.3.3, the collected data were analyzed to develop possible TL route segments that would best meet the project needs while avoiding or reducing conflict with constraints and by using identified opportunities.

The straight-line distance between the identified power sources (Center Point 230-kV and Fuller 115-kV substations) is about 14 miles. That distance, along with the constraints listed below, limited the number of practicable alternative corridors that could be identified and studied for the project.

As stated in Section 1.2, the purpose of this project is to improve the reliability of the local power supply system by minimizing the possibility that all power supply sources could be lost at the same time. To meet this need the intent of the proposed project is to build a new TL from a different direction than the existing TVA TLs that currently supply the project area. This would create a power supply system that would be more robust in its ability to



provide power from at least one source at all times. The power supply needs for the project area reason against any effort to locate a new TL parallel to the existing Center Point-Moss Lake No.1 TL, where both TLs could be taken down by a single storm, failure or accident event. As stated in Sections 2.3.1, constraints to the east side of Resaca and Calhoun limited new TL opportunities; whereas, the new TL routes in the western portion of the study area were possible.

All new TL route possibilities were presumed to use as much as practical of the existing vacant ROW leading west from Fuller Substation. A new TL in this corridor could connect to either the 230-kV TL at the Fuller Substation (already built from Moss Lake Substation), to the 115-kV TL serving the Fuller Substation, or to both TLs. The existing 150-foot-wide ROW crosses two parallel Georgia Power TLs and the Oostanaula River. The ROW ends just west of the river in a farm field utilizing large pivot-irrigation equipment. To avoid the pivot-irrigation, the remainder of any new route would turn north.

The corridor of the Georgia Power TL runs roughly north-and-south on the west side of Calhoun and Resaca. It runs to the east of TVA's Center Point Substation. Georgia Power's 230-kV Oostanaula Substation is on the west side of the City of Calhoun. Since an interconnection at Oostanaula Substation is possible, though not a preferred consideration, route possibilities to reach this substation were studied. No routes parallel to the Georgia Power TL were possible because of the close adjacent urban development along the TL corridor. For TVA to cross the Georgia Power TL, TVA must carefully consider the engineering issues of TL separations, phase clearances, etc.

Potential TL routes from Fuller Substation to Center Point Substation would cross I-75 in the northern part of the study area. A large property lying between I-75 and the Center Point 230-kV Substation is an industrial park. One industry has been recently developed at the park, and a large cellular communications tower occupies part of the property. Some portions of the I-75 corridor are liberally furnished with permanent billboards influence routing possibilities since it is not feasible to remove the billboards or go over them. GDOT has plans underway for the I-75 and Carbondale Road interchange to provide longer ramps.

TVA did not consider any TL routes on Chattahoochee National Forest property. Most maps showing the forest boundary depict the official "declaration boundary" that describes U. S. Department of Agriculture (USDA) purchase authority boundaries; however, the actual federal ownership of land is the only managed and regulated land. That distinction between boundaries opens the area west of the Old Rome-Dalton Road to the steeper mountain areas constituting the actual National Forest property for possible route consideration.

The important Cherokee and Civil War history of this study area merits respect in the location process. The Resaca Civil War battlefield park lies in a small valley with a relatively confined view-shed. Potential TL routes would attempt to avoid direct or visual impacts on this park and to avoid or minimize any other direct impacts to specific historical resources, such as the nearby Camp Wayne.

The new TL would be required to avoid potential conflicts with the Federal Aviation Administration (FAA)-regulated air space of the three airports in this study area. GIS analysis and modeling of the restricted air-space allows complete avoidance by projected alternative TL routes.

Parts of the study area are farm fields irrigated by rotating center-pivot systems. These systems present challenges with TL design such as the need for taller structures and change in pivot pattern. The vacant, 150-foot-wide ROW from the Fuller Substation to the Oostanaula River ends at such a field. The new TL would have to turn toward the north and leave the existing ROW short of the river; thus, requiring a new river crossing.

One of TVA's primary objectives when selecting TL route alternatives was minimizing impacts to forested wetlands. Sites with previously mapped wetlands and/or with potential for unmapped wetlands were derived based on existing GIS data to aid the location process.

Using the siting criteria identified in Section 2.3.4 and the identified termination points in Section 2.3.1, a total of 38 potential TL route segments were developed and presented at the two open houses (Figure 1-2).

### **2.3.5.1 Changes Made to Route Segments Following Open Houses**

As mentioned in Section 1.5, information was received during and after the open houses that allowed TVA to refine the proposed TL route segments in effort to minimize potential impacts.

These changes led to the modification of some TL route segments and the elimination of others. Table 2-1 and the information below summarizes the qualitative analysis of the TL route alternatives, taking into account social, environmental, and engineering factors, as well as input gathered from property owners at the open houses. This information was used in the development of the alternative TL route segments to be included in TVA's final analysis.

Segments 1, 2, and 4 are parts of the existing ROW, segmented by study possibilities for crossing two Georgia Power TLs with a new TVA TL using Segments 3, 5, or 6. Upon field review with the underlying property owner and TVA TL design engineers, Segments 3, 5, and 6 were eliminated from the study in favor of a slightly modified alternative Segment 7. This change makes the most use of the existing ROW, and thus combines Segments 2 and 4 into Segment 1 for the larger route evaluation. Segment 7 modifications facilitate the Georgia Power TL crossing, avoid direct stream impacts, and position the route advantageously between the owner's hayfield and cornfield uses. This segment has no other alternatives, and the TL route would branch to either Segment 8 or 9 to continue northward. Segments 2 through 5 were eliminated from further consideration.

Segment 8 needed adjustment east of the Oostanaula River to avoid disruption of a planned pivot-irrigation system having 12-inch pipe already in the ground for a water supply. This adjustment and an adjustment of a part of Segment 9 were needed to avoid a planned 30-foot building at the corner of a house lot. The segment was modified to cross vacant house lots instead. On the west side of Oostanaula River the segment was adjusted to reduce TL exposure to floodwater events.

Segment 9 south of Oostanaula River was strongly opposed by landowners. There are Civil War related homes and battlefield in the immediate area. Segment 9 north of the Oostanaula River is mostly within the 100-year floodplain, and was also opposed by several owners who live in the area. A slight modification from a property line into adjacent flood land pasture would reduce property line tree clearing impacts potentially affecting the

mountain views of one resident. This change would join Segment 9 directly to Segment 16, and eliminate Segments 14, 15, and 17.

Segment 10, west of Baugh Mountain, would go through a marshy area where construction would be problematic. The wetland situation is compounded by beaver-ponding of the local stream system. The TL route would pass a complex of chicken houses in which a TL ROW would block any potential expansions. No route adjustment was feasible to avoid these issues.

Segments 11 and 12 parallel the railroad northward toward the Sugar Valley community with no noted opposition. Segment 12 would cross a large wetland. Segment 13 veers eastward across the same wetland.

Segments 16 and 18 parallel Smoke Creek in its floodplain northward toward Sugar Valley and past a factory building, with no noted opposition, concerns, or demands for adjustment.

Segment 19 crosses four roads with residential development. A number of owners along this segment voiced objection, and two individuals have plans for houses directly in the proposed path of the TL. No route modifications were feasible for this segment.

Segments 20 and 21 were opposed for the potential visual impacts on mountain views, for impacts to a very old family farm, and plans for a new home on the same farm directly in the path of the proposed TL on Segment 21. Segment 22 mostly parallels the railroad, but also crosses two farm fields. Segment 23 parallels the railroad toward the Hill City community. No route modifications were feasible for these segments.

Segment 24 crosses large forested land parcels. TVA received no stated opposition to this parcel.

Segment 25 occupies terrain with limited air space clearance from the Zack Airport. Structure heights would have to be carefully controlled in the TL design for the area controlled by the FAA.

Segment 26 passes through a narrow gap in the residential community of Hill City and was opposed by a few small farm owners that would be crossed. The segment was modified to combine two angles into one. The segment also crosses a softball field and a few pecan orchard trees. Two potential historical structures are located in the vicinity, but would not be directly affected by the route. Beyond this neighborhood the route crosses a private pine plantation property adjacent to the Chattahoochee National Forest.

Segment 27 crosses private property partially adjacent to the national forest. Land in this area has been in families for generations and there was mild opposition to the route that would clear some of the largest, oldest trees. Toward the northern part of this segment, the route crosses steep mountain foothills, and would require the use of a long, existing access road.

The northern end of the proposed TL project is in the Carbondale community where a number of transportation, residential, business, industrial, and utility development plans are under way. These include:

- The construction of a large Engineered Floors factory,
- The relocation of Lower Dug Gap Road to accommodate the new factory,
- A new Dalton Utilities 115-kV TL to serve the new factory,
- The addition of the Carbondale Business Park where a new hotel and restaurants are being courted. The Carbondale Business Park has been designed and expanded with TVA's Economic Development assistance with prohibitions against overhead TLs,
- The update of the Carbondale I-75 interchange ramps to lengthen them to accommodate the increased traffic in the area,
- A building expansion of a carpet mill equipment supplier on Carbondale Road, and
- A large subdivision planned on the mountain foothills near the Swamp Creek Substation.

The TL route alternative Segments 29, 30, 31, 32, 33, 34, 35, 36, 37, and 38 met strong opposition and concern for potential effects on these planned developments, future development, and sales opportunities. These segments all converge onto the Carbondale Business Park where there is a presumption of high visual quality within the park, and utilities have been planned all underground.

To provide an alternative route for the 115-kV TL and the ROW for a future 230-kV connection, TVA established new TL route alternative Segments 39, 40, and 41. These segments allowed TVA to avoid directly impacting these developments. A portion of the proposed TL route would be located at the extreme northern edge of the business park development beyond any buildings or parking lots.

This new TL route option requires plans for a new tap point in the Center Point-Swamp Creek TL. This tap point must be located within a few TL spans the Swamp Creek 115-kV Substation to minimize the risk of outage to the Center Point-Swamp Creek TL. Due to the development plans mentioned previously, only one tap point location was identified that could be utilized on the Center Point-Swamp Creek TL. Electric system reliability concerns required a disconnect switch in the source tap line near the tap point. This switch location must meet line engineering requirements and must be accessible by road in all weather conditions, including high water. Other aspects of the new TL route consisting of alternative Segments 39, 40, and 41 are challenging due to the presence of wetlands and streams, Interstate and U. S. Highway crossings, railroad crossings, and TL crossings. Additionally, the new route option would still require location on the Carbondale Business Park property where covenants prohibited overhead TLs.

With the addition of Segments 39, 40, and 41, TVA eliminated Segments 29, 31, 32, 33, 34, 36, 37, and 38 from further consideration.

Segment 30 would be located just uphill from the highway cut of the relocated Lower Dug Gap Road and on relatively steep side-hill terrain. Due to the planned Engineered Floors development and relocation of Lower Dug Gap Road to the east and the steep terrain to the west, no route modifications were feasible for this segment.

Segment 35 would be a single-circuit 115-kV TL connection to Swamp Creek Substation. Parts of the TL segment would interfere with planned home development near the foot of the steeper mountain property. A switch design assessment of the prospects available for the tap to the Swamp Creek Substation found a need for a switch arrangement that could be an unacceptable solution to criteria set by TVA TL Operations. This is because the NGEMC underbuilt TL on the TVA TL structures makes switches elsewhere on this segment very problematic. Further, the path of Segment 35 runs through property planned for a 300-home subdivision development and part of the segment is on very steep mountain slopes. No route modifications were feasible for this segment.

In Table 2-1, the original segments presented at the open houses (as shown in Figure 1-2) are listed, and any modification and/or elimination of these segments, or addition of new segment numbers are described. These changes are reflected in Figure 1-3.

**Table 2-1. Original Segments and Status Following Open House**

Original Segment Identification (Figure 1-2)	Change Status
1	Modified to allow proper crossing of two Georgia Power TL; includes Original Segments 2 and 4.
2	Eliminated in favor of modified Segment 1 to allow proper crossing of two Georgia Power TLs.
3	Eliminated in favor of modified Segment 7 to allow proper crossing of two Georgia Power TLs.
4	Eliminated in favor of modified Segment 1 to allow proper crossing of two Georgia Power TLs.
5	Eliminated in favor of modified Segment 7 to allow proper crossing of two Georgia Power TLs.
6	Eliminated in favor of modified Segment 7 to allow proper crossing of two Georgia Power TLs and address owner's land use concerns.
7	Modified to facilitate Georgia Power TL crossings and address owner's land use concerns.
8	Modified due to planned land use.
9	Modified due to landowner concerns; reduces tree clearing along property line. Results in segment connecting directly to Segment 16.
10	No adjustment possible despite wetlands and planned chicken house development.
11	No change.
12	No change.
13	No change.

<b>Original Segment Identification (Figure 1-2)</b>	<b>Change Status</b>
14	Eliminated due to the modification of Segment 9.
15	Eliminated due to the modification of Segment 9.
16	No change.
17	Eliminated due to the modification of Segment 9.
18	No change.
19	No adjustments possible despite strong opposition due to planned houses.
20	No adjustments possible despite strong opposition due to visual and residential impacts.
21	No adjustments possible despite strong opposition due to visual and residential impacts.
22	No change.
23	No change.
24	No change.
25	No change.
26	Modified due to strong landowner opposition.
27	No change.
28	No change.
29	Eliminated due to planned development in Carbondale.
30	No change.
31	Eliminated due to planned development in Carbondale.
32	Eliminated due to planned development in Carbondale.
33	Eliminated due to planned development in Carbondale.
34	Eliminated due to planned development in Carbondale.
35	No change.
36	Eliminated due to planned development in Carbondale.
37	Eliminated due to planned development in Carbondale.
38	Eliminated due to planned development in Carbondale.
N/A	Segment 39 added to avoid direct impacts to planned development in Carbondale.
N/A	Segment 40 added to avoid direct impacts to planned development in Carbondale.
N/A	Segment 41 added to avoid direct impacts to planned development in Carbondale.

In summary, as a result of information obtained during and after the open house, Segments 2 to 6, 14, 15, 17, 29, 31 to 34, and 36 to 38 were eliminated from further consideration, and Segments 39, 40, and 41 were added to the analysis.

### 2.3.5.2 Potential Transmission Line Corridors

The remaining segments allowed a total of 18 alternative TL routes consisting of a combination of the 25 constituent segments (see Figure 1-3 and Table 2-2).

**Table 2-2. Alternative Route Corridors with Constituent Segments**

Alternative Route	Constituent Segments
1	1,7,8,10,20,23,26,27,30,35,39,41
2	1,7,8,10,20,23,26,27,39,40,41
3	1,7,8,10,21,22,23,26,27,30,35,39,41
4	1,7,8,10,21,22,23,26,27,39,40,41
5	1,7,8,11,12,18,22,23,26,27,30,35,39,41
6	1,7,8,11,12,18,22,23,26,27,39,40,41
7	1,7,8,11,13,19,24,26,27,30,35,39,41
8	1,7,8,11,13,19,24,26,27,39,40,41
9	1,7,8,11,13,19,25,27,28,30,35,39,41
10	1,7,8,11,13,19,25,27,28,39,40,41
11	1,7,9,16,18,22,23,26,27,30,35,39,41
12	1,7,9,16,18,22,23,26,27,39,40,41
13	1,7,9,19,24,26,27,30,35,39,41
14	1,7,9,19,24,26,27,39,40,41
15	1,7,9,19,25,27,28,30,35,39,41
16	1,7,9,19,25,27,28,39,40,41
17	1,7,8,11,13,16,18,22,23,26,27,30,35,39,41
18	1,7,8,11,13,16,18,22,23,26,27,39,40,41

## 2.4 Identification of the Preferred Transmission Line Route

Some of the key considerations used in identifying and assessing alternative TL route locations were development (both commercial and residential), TL length, amount of existing ROW, road/highway crossings, construction access, access to switches, airport flight zones, forest clearing, wetlands, sensitive stream and/or stream crossings, cultural resources, and number of parcel/property tracts.

Of the alternative TL routes identified in Table 2-2, half utilize Segments 30 and 35 to connect to the Swamp Creek Substation (Routes 1, 3, 5, 7, 9, 11, 13, 15, and 17). As previously described, this path, while technically feasible, is less than ideal. The Engineered Floors factory development resulted in the need for the relocation of Lower Dug Gap Road and the addition of a new NGEMC distribution line. As a result, Segment 30 is routed on steep, and possibly unstable, side-hill terrain. Segment 35 would interfere with planned development near the foot of the steeper mountain property. Additionally, the only feasible switching arrangements from Segment 35 for the Swamp Creek Substation would be difficult for TVA Operations and Maintenance. A NGEMC underbuild circuit on the TL makes switches elsewhere very problematic.

The other nine alternative routes (2, 4, 6, 8, 10, 12, 14, 16, and 18) utilize Segments 39, 40, and 41 which avoid direct impacts on all these developments and still provide a 115-kV connection and ROW for a future 230-kV connection.

Alternative Routes 1 through 4 would go through a large wetland area west of Baugh Mountain, where constructability and environmental impacts would be a concern. These routes would also interfere with a planned expansion of chicken houses. These routes faced opposition due to visual impacts on mountain views, for impacts to a generations old family farm, and plans for a new home on that farm.

Alternative Routes 5 and 6 would also cross a large wetland area south of the Sugar Valley community for which constructability and environmental impacts would be a concern.

Alternative Routes 7 through 10 would cross four roads with residential development and interfere with plans for future planned homes. Alternative Routes 9 and 10 would cross terrain with limited FAA air space clearance from the Zack Airport which could result in design issues.

Alternative Routes 11 through 16 were strongly opposed by landowners in the area south of Oostanaula River. Potential impacts to cultural resources was also a consideration on these routes as several Civil War related homes and a battlefield are in the immediate area. Alternative Routes 15 and 16 would cross terrain with limited air space clearance from the Zack Airport which could result in design issues.

Of the alternative routes considered, Routes 17 and 18 had the least overall impacts when considering the social, engineering, and environmental criteria. These routes avoid the extensive wetland areas present along Routes 1-6, minimize impacts to residential development, avoid potential cultural resources and the floodplain south of the Oostanaula River, and avoid possible conflicts with the Zack Airport flight path. These two routes differ only in how they connect to the Swamp Creek Substation. Alternative Route 17 utilizes Segments 30 and 35, which is not ideal for reasons previously mentioned. Alternative Route 18 connects to the Center Point-Swamp Creek TL utilizing Segments 39, 40, and 41 which avoid direct impacts on all the developments hindering Segments 30 and 35. For the reasons described above, TVA's preferred route utilized Alternative Route 18. This route was determined to have the least overall impact.

TVA announced the agency's preferred TL route as Alternative Route 18 in February 2014 (Figure 1-3 includes the segments that comprised this preferred route). Following this announcement, several adjustments were considered as a result of field surveys and additional public comment. The preferred TL route was then modified in a few locations from the original alignment as presented on the website in February 2014. These modifications are described below and reflected in Figure 1-1.

During the initial environmental field assessment for potential impacts on the preferred TL route, wetland biologists identified several areas where a route adjustment might alleviate some of the wetland impacts. The TVA siting engineer considered this information and developed three feasible route relocations for review. Although these potential route relocations lessened the effects of the project on wetlands, each of these proposed changes was opposed by the affected property owners. Therefore, TVA elected not to pursue these adjustments to Alternative Route 18.



Two property owners along the southern portion of Segment 26 were opposed to the preferred route as it was originally presented. The two landowners worked collectively on a relocation alternative that was presented to TVA. Review of their proposal found it to be agreeable to all parties involved. Therefore, the preferred route was adjusted per their request. This change is reflected on Figure 1-1.

A section of the TL on the northern end of the proposed project area runs north-south adjacent to the property boundary for the USFS (Chattahoochee National Forest). It was TVA's original intent to align this section of the TL such that the western boundary of the new easement would border the USFS property. In order to lessen the potential impact of danger tree removal occurring in the National Forest, TVA proposed to shift the alignment slightly east to provide an additional buffer between TVA's ROW easement boundary and that of the USFS. There was substantial property owner resistance to this change and thus, TVA committed to keeping the western ROW easement boundary line as close as possible to the USFS property.

## 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 2-3.

**Table 2-3. Summary and Comparison of Alternatives by Resource Area**

Resource Area	Impacts From Implementing the No Action Alternative	Impacts From Implementing the Action Alternative
Groundwater and Geology	No effects to local groundwater quality or quantity are expected.	Any effects to groundwater quality or quantity are anticipated to be minor.
Surface Water	No changes in local surface water quality are anticipated.	Any effects to local surface waters would be minor and temporary.
Aquatic Ecology	Aquatic life in local streams would not be affected.	With the implementation of protective measures including 17 Category B SMZs and Category C SMZ protection for the Oostanaula River crossing, effects to aquatic life in local surface waters are expected to be temporary and insignificant.
Vegetation	Local vegetation would not be affected.	Site preparation and clearing of the proposed 115-kV TL ROW would have a temporary, minor effect on most local vegetation. An insignificant direct long-term effect on approximately 121 acres of forested areas is anticipated.
Wildlife	Local wildlife would not be affected.	Wildlife inhabiting onsite forest, early successional, and edge habitats along the proposed 115-kV TL ROW would be displaced to adjacent local habitats. Any effects to wildlife are expected to be insignificant.

Resource Area	Impacts From Implementing the No Action Alternative	Impacts From Implementing the Action Alternative
Endangered and Threatened Species	No effects to endangered or threatened species or any designated critical habitats (DCH) are anticipated.	<p>Several streams crossed by the proposed 115-kV TL may affect the trispot darter or the Coosa creekshell, two species that are not currently federally-listed, but that are petitioned, with a Service listing decision currently scheduled for September 2017. With the implementation of protective or avoidance measures no impacts to this species are anticipated. Impacts to two state-listed plants, Asa Gray's sedge and the dense-flower knotweed, would be insignificant with the implementation of avoidance measures. Impacts to the state-listed common map turtle and the Alabama map turtle would be insignificant with the implementation of avoidance measures. TVA field surveys determined that the Action Alternative would result in the removal of 24.98 acres of potentially suitable summer roosting habitat for the federally listed as endangered Indiana bat and threatened northern long-eared bat. Consultation with USFWS resulted in a determination that the Action Alternative may impact a total of 59.8 acres of suitable or potentially suitable summer roosting habitat. TVA would finalize all mitigation measures with the USFWS prior to any clearing or construction along the proposed ROW.</p>
Floodplains	Local floodplain functions would not be affected.	Local floodplain functions would not be affected.
Wetlands	No changes in local wetland extent or function are expected.	<p>A total of 22.94 acres of wetland are located within the proposed ROW, of which, 14.36 are forested. Forested wetlands would be converted to emergent and/or scrub-shrub wetland habitat thus reducing some wetland functions.</p>
Aesthetics	Aesthetic character of the area is expected to remain virtually unchanged.	<p>Minor visual discord and noise above ambient levels would be produced during construction. The proposed TL would present a minor cumulative visual effect.</p>

Resource Area	Impacts From Implementing the No Action Alternative	Impacts From Implementing the Action Alternative
Archaeological and Historic Resources	No effects to archaeological or historic resources are anticipated.	Archaeological effects to 20 sites of undetermined eligibility within the APE would be avoided through the use of standard BMPs or other mitigation. With the implementation of protective measures, effects to the Dickey Cemetery would be insignificant. TVA and the Georgia SHPO would enter into an agreement such that there would be no adverse affects to archaeological resources or historic properties through avoidance or mitigation measures.
Recreation, Parks, and Natural Areas	No changes in local recreation opportunities or natural areas are expected.	With the implementation of protective measures impacts to the Oostanula River DCH expected to be insignificant. There would be minor visual impacts to the viewshed within the the Chattahoochee National Forest or Johns Mountain WMA. Indirect impacts to these areas (e.g., sedimentation and runoff) would be insignificant with the use of BMPs.
Socioeconomics and Environmental Justice	Over time, the lack of reliable power service could have adverse economic effects to local businesses and residents.	Continued reliability of service would benefit the area and help maintain economic stability and growth in the area. Any adverse social, economic or environmental justice effects would be minor and would diminish over time.

## 2.6 Identification of Mitigation Measures

The following routine measures would be applied during the construction, operation, and maintenance of the proposed TL and access roads to reduce the potential for adverse environmental effects.

- TVA will utilize standard BMPs, as described by Muncy (2012), 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, consistent with EO 13112 (Invasive Species), TVA will follow standard operating procedures for revegetating with noninvasive plant species as defined in Muncy (2012).
- Ephemeral streams that could be affected by the proposed construction will be protected by implementing standard BMPs as identified in Muncy (2012).
- In areas requiring chemical treatment, only USEPA-registered herbicides will be used in accordance with BMPs and label directions designed in part to restrict applications near receiving waters and to prevent unacceptable aquatic and groundwater impacts.

- The ROW will be re-vegetated where natural vegetation would be removed.
- Perennial and intermittent streams will be protected by the implementation of Standard Stream Protection (Category A), Protection of Important Permanent Streams, Springs, and Sinkholes (Category B), or Protection of Unique Habitats (Category C) as identified in Appendix B and defined in Muncy (2012).
- TVA will utilize *Environmental Quality Protection Specifications for Transmission Substation or Communications Construction* (TVA 2016a) during the proposed work at their Moss Lake and Center Point 230-kV substations.

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

- To compensate for the reduction of wetland functions resulting from the conversion of 14.36 acres of forested wetlands to scrub-shrub or emergent habitat, TVA will purchase mitigation credits, in compliance with current standards and guidelines and with USACE approval, through Georgia's In-Lieu-Fee program.
- To minimize impacts to state-listed plants Asa Gray's sedge and dense-flower knotweed, on-site environmental technicians and TVA Biological Permitting and Compliance botanists will coordinate before ROW clearing to determine access routes through sensitive areas.
- In accordance with the terms of the ESA, a conservation memorandum of understanding (MOU) will be established between the USFWS and TVA prior to TVA commencing ROW clearing activities. The MOU will address the direct loss of 59.8 acres of potential suitable summer roosting habitat for Indiana and northern long-eared bats. TVA will implement the proposed Action Alternative in accordance with the stipulations of the MOU, including the following measures:
  - Any potentially suitable Indiana and northern long-eared bat roosting habitat will be selectively removed between the dates of October 15, 2016 and March 31, 2017.
  - TVA will contribute to 'The Conservation Fund' to promote the conservation and recovery of Indiana bat.
- The proposed 115-kV TL ROW crosses suitable habitat for the common map turtle and the Alabama map turtle in and around Swamp Creek. Two areas of this creek that may be impacted by the proposed actions also have sandy shorelines suitable for nesting map turtles. To avoid and minimize potential impacts to these two species, TVA would implement the following measures:
  1. Within the two areas of suitable turtle habitat, project-related activities that may impact nesting grounds (including driving) will be limited to September through April to avoid any direct impacts to turtle nests.
  2. BMPs and SMZs, as outlined in Muncy (2012), will be followed in delineated wetlands and along streams to avoid impacts to water quality in these two areas.

3. Any gravel or other substrate material added on top of the sand within the areas of suitable habitat, will be removed upon completion of the project to avoid permanently altering nesting habitat.
- To prevent any potential impacts to the trispot darter during its spawning season, TVA will implement the following protective measures at fourteen designated SMZ crossings:
    1. Temporary culverts will be not be placed or removed between November and April.
    2. Any geotextile fabric placed will be removed along with the culverts.
  - TVA will enter into a Programmatic Agreement (PA) with the Georgia SHPO. TVA will follow the stipulations of that agreement such that any potential adverse effects to archaeological resources or historic properties in the APE will be resolved prior to TVA's initiation of clearing or construction activities near any archaeological site of "undetermined" eligibility.
  - TVA will perform additional identification efforts (Phase II testing) to fully determine the NRHP eligibility of five archaeological sites of "undetermined" eligibility where adverse effects cannot be avoided. If any of the tested archaeological sites are eligible for the NRHP, TVA will consult further with SHPO to reach agreement on avoidance, minimization, and/or mitigation measures for any NRHP-eligible archaeological sites where the undertaking could potentially result in adverse effects. These measures will be stipulated by a Memorandum of Agreement (MOA) between TVA and SHPO. The MOA will commit TVA to the avoidance and/or minimization and/or mitigation measures for the historic properties where potential adverse effects could occur. The MOA will be signed by TVA and SHPO prior to TVA commencing construction or clearing activities near any archaeological site determined via Phase II testing to be eligible for the NRHP.
  - TVA will avoid project effects to 15 archaeological sites of "undetermined" eligibility by implementing the following measures and any other measures stipulated in the MOA between TVA and the Georgia SHPO:
    1. No TL structures or guy wires will be installed in the archaeological site boundaries.
    2. Access across the site boundaries will be avoided where practical.
    3. BMPs implementing for access and clearing.
  - To avoid effects to the Dickey Cemetery, TVA will adhere to the following avoidance measures:
    1. A 30-foot wide buffer will be placed surrounding the cemetery wall and fence. No construction related to this undertaking will take place within the buffer. TVA will not disturb the cemetery including the fence and wall.

2. Any required vegetation clearing within the Dickey cemetery buffer will be accomplished either by hand or by using a feller-buncher or other low ground-pressure equipment.
3. No heavy equipment will be used inside the cemetery boundary.

## **2.7 The Preferred Alternative**

The Action Alternative, i.e. Provide an Additional Power Supply to the Calhoun and Dalton Area, is TVA's preferred alternative for this proposed project. TVA would purchase ROW easements and any necessary permanent access road easements to accommodate the construction of a new 115-kV TL. In addition, to facilitate a future 230-kV TL connection to the Center Point Substation, TVA would purchase approximately 1.3 miles of ROW for this purpose.

TVA's preferred alternative route for the Action Alternative is Alternative Route 18. This approximate 19.2-mile route is comprised of alternative route Segments 1, 7, 8, 11, 13, 16, 18, 22, 23, 26, 27, 39, 40, and 41. The total length of TL and ROW would be approximately 20.5 miles.

## CHAPTER 3

### 3.0 AFFECTED ENVIRONMENT

The existing condition of environmental resources that could be affected by the proposed Action Alternative during construction, operation or maintenance of the proposed 19.2 mile TL is described in this chapter. The descriptions below of the potentially affected environment are based on field surveys conducted between September 2014 and April 2016, 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 three-mile radius for terrestrial animals, a five-mile radius for plants, and within 10-digit hydrologic unit code<sup>4</sup> (HUC) watershed 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 and associated access roads. The area of potential effect (APE) for architectural resources included all areas within a 0.5-mile radius from the proposed TL route, as well as any areas where the project would alter existing topography or vegetation in view of a historic resource. The APE with respect to archaeological resources included the entire ROW width as described in Section 2.2.1.1 for the proposed route and the associated access roads.

Potential effects related to air quality and global climate change, solid and hazardous waste, and health and safety were considered. Potential effects on these resources were found to be minor and insignificant because of the nature of the action. Thus, any further analysis for effects to these resources was not deemed necessary.

### 3.1 Groundwater and Geology

The project area is located in the Valley and Ridge Physiographic Province and is underlain by Paleozoic-aged rock strata. The Valley and Ridge aquifer consists of folded and faulted bedrock comprised of carbonates, sandstone, and shale. Soluble carbonate rocks and some easily eroded shale underlie the valleys in the province, and more erosion-resistant siltstone, sandstone, and cherty dolomite underlie ridges. The arrangement of the northeast-trending valleys and ridges are the result of a combination of folding, thrust faulting, and erosion. Compressive forces from the southeast have caused these rocks to yield, first by folding and subsequently by repeatedly breaking along a series of thrust faults. The faulting has resulted in geologic formations which are repeated several times across the region often with older age strata overlying rock of a younger geologic age (Miller 1990).

Groundwater in the Valley and Ridge aquifers is primarily stored in and moves through fractures, bedding planes, and solution openings in the bedrock. Primary recharge is by downward percolation of precipitation from the surface or direct connection to sources of

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<sup>4</sup> The United States is divided and subdivided into hydrologic units by the U. S. Geological Survey. There are six levels of classification. A 10-digit HUC is the fifth (watershed) level of classification.

recharge, such as rivers or lakes. Characteristically, fractures and bedding planes in the carbonate bedrock units have been enlarged by dissolution of the rock. The dissolution occurs as slightly acidic water dissolves some of the calcite and dolomite which are the principle components of carbonate-rock aquifers. Chemical weathering progresses possibly resulting in the development of karst features (caves, sinkholes, springs).

Groundwater movement in the Valley and Ridge province is localized and is restricted by the repeating sequences of the rock formations imparted by thrust faulting. Generally, groundwater movement is from the ridges toward lower water levels adjacent to major streams that flow parallel to the long axes of the valleys. Most of the groundwater is discharged directly to local springs or streams (Miller 1990). In unconfined or poorly confined conditions, karst aquifers have very high flow and contaminant transport rates under rapid recharge conditions such as during storm events.

The chemical quality of water in the freshwater parts of the Valley and Ridge aquifers is similar for shallow wells and springs. In places where the residuum overlying the carbonate rocks is thin, the Valley and Ridge aquifers are susceptible to contamination by human activities. Examination of maps developed by the Northwest Georgia Regional Commission (NGRC) and GDNR indicate the proposed TL ROW is located in or in close proximity to designated Groundwater Recharge Areas (NGRC 2013; GDNR 1998). These recharge areas are described as natural resources which could be impacted by development. As described in a resource protection plan developed by the NGRC, clearing, grading, and soil disturbance should be limited to only those areas where it is required for construction (NGRC 2012).

Public drinking water for Whitfield and Gordon counties is supplied by both surface water and groundwater sources (USEPA 2015). A majority of the population is supplied by these public water systems; however, some private residences may rely on private wells. Based on review of available documentation, the proposed TL ROW would not cross a designated Water Supply Watershed District developed for Gordon County (2010); however, it would cross the Watershed District for the Oostanaula River in south Whitfield County (2008).

### **3.2 Surface Water**

Precipitation in the project area averages about 55.1 inches per year with the wettest month in March at 6.3 inches and the driest month in October at 3.3 inches. The average annual air temperature is 59.6 degrees Fahrenheit, ranging from a monthly average of 38.0 degrees Fahrenheit in January to 78.7 degrees Fahrenheit in July (NOAA 2002). Stream flow varies with rainfall and averages about 23 inches of runoff per year or approximately 1.7 cubic feet per second per square mile of drainage area (USGS 2008).

The federal CWA requires all states to identify all waters where required pollution controls are not sufficient to attain or maintain applicable water quality standards and to establish priorities for the development of limits based on the severity of the pollution and the sensitivity of the established uses of those waters. States are required to submit reports to the USEPA. The term “303(d) list” refers to the list of impaired and threatened streams and water bodies identified by the state.

Streams within the project area include seven named streams in the Oostanaula River watershed, the Oostanaula River directly, and one named stream in the Conasauga River watershed. All of the streams are classified by the Georgia Environmental Protection



Division (GA EPD) for Fishing. Three of the nine streams within the project area fully meet the state water quality criteria for their designated uses. As seen in Table 3-1, six of the streams are on the state 303 (d) list as impaired and are not fully supporting the designated uses (GA EPD 2014).

**Table 3-1. Designated Stream Uses and 303(d) Impairments**

Stream	Classification	303 (d) Impaired Stream		
		Impaired Use	Pollutant Cause	Source
<u>Conasauga River</u> <sup>1</sup>	Fishing <sup>2</sup>	Yes <sup>3</sup>	Fecal Coliform; PCB's	Urban Runoff
Swamp Creek	Fishing	Yes	Fecal Coliform	Nonpoint
<u>Oostanaula River</u>	Fishing <sup>4</sup>	Yes <sup>5</sup>	Fecal Coliform; PCB's	Nonpoint, Urban Runoff
Camp Creek <sup>1</sup>	Fishing	Yes	Fecal Coliform	Nonpoint
Dry Creek	Fishing	Yes	Fecal Coliform; Dissolved Oxygen	Nonpoint, Urban Runoff
Blue Springs Creek	Fishing	Not Impaired		
Graham Creek <sup>1</sup>	Fishing	Not Impaired		
Lick Creek	Fishing	Not Impaired		
Snake Creek	Fishing	Yes	Fecal Coliform; Fish Bioassessments	Nonpoint
Bow Creek	Fishing	Yes	Fish Bioassessments	Nonpoint
Blue Spring Branch	Fishing	Not Impaired		
Oothkalooga Creek	Fishing	Yes	Fecal Coliform; Macroinvertebrate Bioassessments	Nonpoint

<sup>1</sup> Not in project area, listed to show network path to primary receiving River

<sup>2</sup> Conasauga River is classified for Drinking Water in portions upstream of the project area, but not within the project vicinity.

<sup>3</sup> Conasauga River has different violation in other reaches. This data includes the reach from Holly Creek to Thomason Creek. Swamp Creek discharges upstream of Thomason Creek.

<sup>4</sup> Oostanaula River is classified for Drinking Water in portions upstream and downstream of the project area, but not within the project vicinity.

<sup>5</sup> Oostanaula River has different violations in other reaches. The did include the reach from Conasauga/Coosawattee Confluence to Oothkalooga Creek

### 3.3 Aquatic Ecology

The proposed TL route crosses portions of the Conasauga River, Oostanaula River, and Oothkalooga Creek watersheds. Streams encountered during field surveys were typical of the Ridge and Valley subcoregions. Overall, a total of 118 watercourse intersections occur along the proposed TL route, access roads, and/or within 200 feet (as per the State of Georgia stormwater permit requirements) of the edge of the proposed ROW. The watercourses include 37 perennial, 15 intermittent, 62 ephemeral<sup>5</sup> streams, and four ponds

<sup>5</sup> Ephemeral streams are those small creeks and streams that typically flow only following rainfall events. They are also known as wet weather conveyances or "WWCs."

Because TL construction and maintenance activities mainly affect riparian conditions and instream habitat, TVA evaluated the condition of both of these at each stream crossing along the proposed route and access roads. Riparian condition was evaluated during March and August 2015 field surveys using the TVA habitat assessment form. A listing of stream and pond crossings within the proposed and existing ROWs and access roads, excluding ephemeral streams, is provided in Appendix B. Additional information regarding watercourses located in the vicinity of the project area can be found in Section 3.2.

Three classes were used to indicate the current condition of streamside vegetation across the length of the proposed TL and access roads, as defined below, and accounted for in Table 3-2.

- Forested - Riparian area is fully 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.
- Nonforested - No or few trees are present within the riparian zone. Significant clearing has occurred, usually associated with pasture or cropland.

**Table 3-2. Riparian Condition of Streams Located Within the Proposed Transmission Line 115-kV Right-of-Way**

<b>Riparian Condition</b>	<b>Perennial Streams</b>	<b>Intermittent Streams</b>	<b>Total</b>
Forested	21	12	33
Partially forested	8	1	9
Non-forested	8	2	10
<b>Total</b>	<b>37</b>	<b>15</b>	<b>52</b>

TVA assigns appropriate SMZs and BMPs based on field evaluations and other considerations (such as State 303(d) listing and presence of endangered or threatened aquatic species). Appropriate application of the BMPs minimizes the potential for impacts to water quality and instream habitat for aquatic organisms.

The upper Coosa River drainage has been impounded by six major dams resulting in inundation and flow regulation of greater than 60 percent of historical riverine habitat. The subsequent disappearance of shoal habitat, in addition to municipal and industrial pollution, urban development, and agricultural runoff, have together led to drastic reductions of suitable habitat for sensitive aquatic species, particularly freshwater mussels and aquatic snails, in the Coosa River drainage, of which the Conasauga and Oostanaula rivers are major tributaries (Neves et al. 1997; USFWS 2000).

The Oostanaula, Coosawattee, and Conasauga rivers, and Holly and Floyd creeks (Unit 25) are listed as federally DCH for ten mussel species and one invertebrate. This DCH unit is located within the potentially affected watersheds crossed by the proposed TL route. The

TL crossing occurs on the mainstem Oostanaula River approximately 0.5 miles upstream of the state route (SR) 156 bridge crossing, southwest of Calhoun. The riverine reach of the Conasauga River in DCH Unit 25 continues to support localized populations of four of the ten mussel species. Holly Creek, a tributary of the Conasauga River, hosts the last known population of the one federally threatened mussel within DCH Unit 25 (USFWS 2004; USFWS 2008). Tributary streams of DCH documented in the project vicinity would receive Category B Protection with a 70-foot-wide SMZ buffer width according to Muncy (2012) guidelines.

The majority of the proposed TL ROW is drained by the Oostanaula River, a major tributary of the Coosa River system, which eventually forms Weiss Reservoir. The Oothkalooga Creek watershed drains approximately one mile of the southern portion of the TL, which feeds the Oostanaula River. The Conasauga River watershed drains approximately four miles of the northern portion of the TL, which joins with the Coosawattee River to form the Oostanaula River. While some channelization and removal of riparian areas has impacted streams along the proposed TL route, the majority of aquatic resources observed in the project vicinity appeared stable with intact riparian zones in forested areas. The primary impact to watercourses in the project vicinity appeared to be logging operations and in some instances livestock access to stream channels.

### **3.4 Vegetation**

The proposed transmission system upgrade is located within the Ridge and Valley Level 3 ecoregion, which is located between the Blue Ridge to the east and Southwestern Appalachians on the west (Griffith et al. 2001). The alternating ridges and valleys found in this region are variable in size and are comprised of multiple types of bedrock including limestone, sandstone, shale, and others. Approximately half of the ecoregion is currently forested; many areas of higher productivity soils are in agricultural production. Vegetation within the proposed project area is characterized by two main types - forested vegetation (50 percent) and herbaceous vegetation (50 percent). No forested areas in the proposed project area had structural characteristics indicative of old growth forest (Leverett 1996). All plant communities observed in the project area are common and well represented throughout the region.

Most forest in the project area is deciduous in composition. Deciduous forest is characterized by trees with overlapping crowns where deciduous species account for more than 75 percent of total canopy cover (Grossman et al. 1998). Dry forests were found along numerous portions of the proposed ROW and ranged from early successional (less than 5 years after clear cut) to mature stands. Average diameter at breast height commonly ranged from 18 to 24 inches in forests that had not been recently harvested. Common overstory tree species in these areas included black oak, chestnut oak, pignut hickory, shagbark hickory, shortleaf pine, post oak, Virginia pine, and white oak with blackgum, sassafras, sourwood, dogwood in the midstory. The dryness of these stands prevents establishment of a rich herbaceous flora, but species like common blue aster, crossvine, false foxglove, hairy skullcap, panic grass, partridge berry, spotted wintergreen, and waxyleaf aster were present.

Moist forest was observed primarily on north and east facing slopes or at the base of hills where the landscape position promotes a richer site that supports different plants than those found in the dry forest type. Basswood, black walnut, northern red oak, sugar maple, sweetgum, white ash, yellow-poplar occur in the overstory in these stands along with

midstory species like pawpaw, spicebush and sweet shrub. The herbaceous layer was relatively rich on this forest type and included plants like black snakeroot, Carolina elephant's foot, dwarf violet iris, eastern bluestar, Indian pink, mercury spurge, richweed, and spiderwort.

Forested wetlands are found sporadically throughout the proposed ROW and possess a species composition that differs from other forest types. These stands, which range from early successional to mature forest, support species that are adapted to wet conditions throughout part or all of the year. Diameter at breast height of overstory species in forested wetlands ranged from small pole size trees to mature trees of 12 to 18 inches. Common overstory tree species in these habitats include American elm, green ash, loblolly pine, oaks (cherry bark, swamp chestnut, water, and willow), red maple, river birch, sweetgum, and sycamore. Herbaceous, understory species varied considerably by site and included American water horehound, bulrush, cardinal flower, rice-cut-grass, great blue lobelia, lizard's tail, seaside brookweed, sedges, and smartweeds. The state-listed plant *Asa Gray's sedge* also occurs in this habitat within the proposed ROW.

Evergreen and mixed evergreen forests were relatively uncommon within the proposed ROW and represented just over five percent of total forest cover. Forests with higher proportions of evergreen species are common throughout the region and often develop from natural processes. However, within the proposed ROW, stands dominated by pine trees had all been relatively recently harvested (less than 10 years previous) or had been planted in loblolly pine at some point in the past. These forest stands have low levels of species richness and diversity and possess little to no conservation value.

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 (Grossman et al. 1998). Cropland, mowed lawns, pastures, TL ROW, and recent clear cuts account for nearly all herbaceous vegetation located within the project area. These areas have little to no conservation value and support species typical of disturbed sites including broomsedge, brown-eyed susan, crabgrass, dallisgrass, dog fennel, English plantain, fireweed, ironweed, Japanese honeysuckle, sericea lespedeza, southern blackberry, tall fescue, and white clover. Several small emergent wetlands support a higher proportion of native species including beak sedges, bog smartweed, boneset, buttonbush, lizard's tail, dotted smartweed, redtop panic grass, rushes, sedges, and seedbox. In addition, the state-listed plant dense-flowered knotweed was observed in an emergent wetland within the proposed ROW. For a more complete list of species found in emergent wetlands, see Section 3.8.

EO 13112 (Invasive Species) serves to prevent the introduction of invasive species and provides for their control to minimize the economic, ecological, and human health impacts that those species potentially cause. In this context, invasive species are nonnative species that invade natural areas, displace native species, and degrade ecological communities or ecosystem processes (Miller et al. 2010). No federal-noxious weeds were observed, but populations of plant species designated by the Georgia Exotic Plant Pest Council (GA-EPPC) as Category 1 invasive species were observed at many locations along the proposed TL ROW (Table 3-3; GA-EPPC 2015). These species are considered a serious problem in Georgia Natural Areas (GA-EPPC 2015). During field surveys, invasive plants were more prevalent in areas of herbaceous vegetation. This likely reflects the frequency and magnitude of disturbance present in areas of herbaceous vegetation. Disturbances associated with agriculture, grazing, and mowing prevent tree species from becoming established, but can also encourage invasion and establishment of weedy plants.

**Table 3-3. Invasive Plant Species Observed Within the Proposed Transmission Line Right-of-Way**

Common Name	Scientific Name
Chinese lespedeza	<i>Lespedeza cuneata</i>
Chinese privet	<i>Ligustrum sinense</i>
Japanese honeysuckle	<i>Lonicera japonica</i>
Japanese stiltgrass	<i>Microstegium vimineum</i>
Marsh Dew Flower	<i>Murdannia keisak</i>

### 3.5 Wildlife

Wildlife habitat assessments were conducted in March and August 2015 for the proposed TL ROW and associated access roads. The landscape directly surrounding the project footprint is a combination of forest, wetlands, early successional (pasture and agricultural) fields, roads, and residential homes. The majority of the proposed TL is routed through forested areas and agricultural fields or pastures. Forested areas include evergreen forest, deciduous forest and mixed evergreen forest. Approximately twenty-three acres of wetland, five acres of developed areas including road crossings and four ponds, are intersected by the proposed ROW. Each of the varying community types offers suitable habitat for species common to the region both seasonally and year-round.

Evergreen forests encountered during field surveys were typically pine forests. These forests provide habitat for other common terrestrial species. Barred owl, brown creeper, golden-crowned kinglet, hermit thrush, northern parula, pine siskin, pine warbler, red-breasted nuthatch, summer tanager, wild turkey, yellow-rumped, and yellow-throated warblers all utilize this habitat (National Geographic 2002). Cotton deermouse and white-footed deermouse, eastern fox squirrel, Seminole bat, and Wild boar are mammalian species that may utilize resources found in pine forests of this region (Kays and Wilson 2002; Reid 2006). Coachwhip, eastern hognose, pine, northern red-bellied, red corn, and northern scarlet snakes are found in open pine forests (Conant and Collins 1998; Jensen et. al. 2008). Additionally, eastern narrowmouth toad, eastern spadefoot toad, Fowler's toads, and eastern tiger salamander may all be present in pine forests (Jensen et. al. 2008; Niemiller and Reynolds 2011).

Deciduous forests and mixed deciduous-evergreen forests provide habitat for an array of terrestrial animal species. Avian species found in this habitat are chuck-will's-widow, downy and hairy woodpecker, eastern screech-owl, eastern wood-pewee, red-tailed hawk, white-breasted nuthatch, wood thrush, and yellow-billed cuckoo (National Geographic 2002). This area also provides foraging and roosting habitat for several species of bat, particularly in areas where the forest understory is more open. Some examples of bat species likely found within this habitat are big and little brown, eastern red, evening, hoary, Rafinesque's big-eared, silver-haired, and tricolored bat. Coyote, eastern chipmunk, eastern woodrat, North American deermouse, and woodland vole are also likely mammalian species present within this habitat (Kays and Wilson 2002; Reid 2006). Black rat snake, midland brown snake, as well as scarlet kingsnake are all common reptilian residents of this habitat (Conant and Collins 1998; Jensen et. al. 2008). In forests with aquatic features, amphibians likely found in the area include dusky, marbled, mole, spotted, and southern red-backed salamanders as well as barking and Cope's gray treefrogs and southern leopard frogs (Conant and Collins 1998; Niemiller and Reynolds 2011).

Pastures and agricultural fields offer habitat to a multitude of species such as brown-headed cowbird, brown thrasher, common grackle, common yellowthroat, dickcissel, eastern bluebird, eastern kingbird, eastern meadowlark, field sparrow, grasshopper sparrow, house finch, and prairie warbler among others (National Geographic 2002). Mammalian species likely present in this habitat include eastern cottontail, eastern harvest mouse, eastern woodrat, hispid cotton rat, red fox, and striped skunk (Kays and Wilson 2002; Reid 2006). Farm ponds within agricultural settings provide habitat for common amphibians and reptiles. Amphibious species likely present include pickerel, and upland chorus frogs as well as spring peepers and mole salamander (Jensen et. al. 2008; Niemiller and Reynolds 2011). Reptilian species with the potential to occur in the project area are eastern milk, gray rat, smooth earth, and southern black racer snakes, as well as slender glass lizard (Conant and Collins 1998; Jensen et. al. 2008).

Wetland habitat provides resources for such avian species as blue grosbeak, great horned owl, hooded warbler, northern harrier, red-winged blackbird, song sparrow, swamp sparrow and white-throated sparrow (National Geographic 2002). Mammalian species that may utilize this habitat are American beaver, eastern harvest mouse, marsh rice rat, common muskrat, nutria, and swamp rabbit (Kays and Wilson 2002; Reid 2006). Eastern black kingsnake, eastern ribbon, garter, northern water, ring-necked and rat snake are all wetland reptilian species (Conant and Collins 1998; Jensen et. al. 2008). Eastern red-spotted newt and three-lined salamanders as well as bull frog, bird-voiced treefrog, green frog, northern cricket frog, pickerel frog, and southern cricket frog are examples of some amphibian species that are likely present (Jensen et. al. 2008; Niemiller and Reynolds 2011).

Disturbed, developed areas are home to a plethora of common species. American robin, barred owl, Carolina chickadee, blue jay, European starling, house sparrow, mourning dove, northern cardinal, northern mockingbird, and black and turkey vultures are all commonly found in TL ROWs, as well as near roads and neighborhoods. Urbanized mammals found in this community may be eastern gray squirrel, nine-banded armadillo, northern raccoon and Virginia opossum (Kays and Wilson 2002; Reid 2006). Road-side ditches can be habitat for American toad, upland chorus frog and spring peeper. Reptiles using these urbanized areas can include black rat and gray rat snakes as well as mole kingsnake (Conant and Collins 1998; Jensen et. al. 2008).

Three caves occur within three miles of the proposed Action Alternative (TVA 2015c). The nearest cave occurs approximately 0.2 miles from the proposed 115-kV TL ROW. No additional caves were observed during the March or August 2015 field surveys. No other unique or important terrestrial habitats are known in the proposed project area.

No aggregations of migratory birds or colonial wading bird colonies are known to exist in the proposed project area (TVA 2015c). The nearest known wading bird colony occurs approximately 30 miles from the proposed project area. No other unique habitats were identified during the March or August 2015 field surveys.

### **3.6 Endangered and Threatened Species**

Endangered species are those determined to be in danger of extinction throughout all or a significant portion of their range. Threatened species are those determined to be likely to become endangered within the foreseeable future. Section 7 of the ESA requires federal agencies to consult with the USFWS when their proposed actions may affect endangered or threatened species or their critical habitats.

The ESA provides broad protection for species of fishes, wildlife, and plants that are listed as threatened or endangered in the United States or elsewhere. The Act outlines procedures for federal agencies to follow when taking actions that may jeopardize federally listed species or DCH. The policy of Congress is that federal agencies must seek to conserve endangered and threatened species and use their authorities in furtherance of the Act's purposes.

The state of Georgia provides protection for species considered threatened, endangered, or deemed in need of management within the state other than those federally listed under the ESA. The listing is handled by the GDNR; however, the Georgia Natural Heritage Program and TVA (TVA 2015c) both maintain databases of species that are considered threatened, endangered, special concern, or tracked in Georgia. A listing of federally and state-listed species that occur near the proposed TL ROW is provided as Table 3-4.

**Table 3-4. Federally and State-listed Species from and/or within Gordon and Whitfield Counties, Georgia<sup>1</sup>**

Common Name	Scientific Name	Federal Status <sup>2</sup>	State Status <sup>2</sup>	State Rank <sup>3</sup>
<b>Plants</b>				
American Ginseng	<i>Panax quinquefolius</i>	-	SPCO	S3
Asa Gray's Sedge <sup>4</sup>	<i>Carex grayi</i>	-	SPCO	S2?
Broadleaf Phlox	<i>Phlox amplifolia</i>	-	SPCO	S1
Climbing Fern	<i>Lygodium palmatum</i>	-	SPCO	S2
Dense-flower Knotweed <sup>4</sup>	<i>Polygonum densiflorum</i>	-	SPCO	S1?
Dwarf Trillium	<i>Trillium pusillum</i>	-	END	S1
Georgia Aster	<i>Symphyotrichum georgianum</i>	-	THR	S2
Georgia Rockcress	<i>Arabis georgiana</i>	THR	THR	S1
Jacobs Ladder <sup>4</sup>	<i>Polemonium reptans</i>	-	SPCO	S1S2
Lanceleaf Trillium	<i>Trillium lancifolium</i>	-	SPCO	S3
Large-flowered Skullcap	<i>Scutellaria montana</i>	THR	THR	S2
Largeleaf Waterleaf	<i>Hydrophyllum macrophyllum</i>	-	SPCO	S1
Limerock Milkvine	<i>Matelea obliqua</i>	-	SPCO	S2
Naked-fruit Rush	<i>Juncus gymnocarpus</i>	-	SPCO	S2S3
Nuttall's Hedge-nettle	<i>Stachys nuttallii</i>	-	SPCO	S2
Pennsylvania Pellitory	<i>Parietaria pensylvanica</i>	-	SPCO	S1?
Pink Ladyslipper	<i>Cypripedium acaule</i>	-	U	S4
Pin Oak	<i>Quercus palustris</i>	-	SPCO	SH
Purple Sedge	<i>Carex purpurifera</i>	-	SPCO	S2
Shining Indigo-bush	<i>Amorpha nitens</i>	-	SPCO	S1?
Spreading Chervil	<i>Chaerophyllum procumbens</i>	-	SPCO	S2
Spreading Yellow Foxglove	<i>Aureolaria patula</i>	-	THR	S1
Tennessee Yellow-eyed Grass <sup>5</sup>	<i>Xyris tennesseensis</i>	END	END	S1
Trailing Meadowrue	<i>Thalictrum debile</i>	-	THR	S1
Trepocarpus	<i>Trepocarpus aethusae</i>	-	SPCO	S2?
Virginia Bluebells	<i>Mertensia virginica</i>	-	SPCO	S2
Yellow Ladyslipper	<i>Cypripedium parviflorum</i>	-	Rare	S3
<b>Invertebrates<sup>6</sup></b>				
Cylindrical Lioplax	<i>Lioplax cyclostomaformis</i>	END	--	
Interrupted Rocksnail <sup>7</sup>	<i>Leptoxis foremani</i>	END	END	S1
<b>Mussels<sup>6</sup></b>				
Alabama Creekmussel	<i>Strophitus connasaugaensis</i>	--	END	S2S3

Common Name	Scientific Name	Federal Status <sup>2</sup>	State Status <sup>2</sup>	State Rank <sup>3</sup>
Alabama Moccasinshell	<i>Medionidus acutissimus</i>	THR	THR	S1
Coosa Creekshell	<i>Villosa umbrans</i>		SPCO	S1
Coosa Moccasinshell	<i>Medionidus parvulus</i>	END	END	S1
Fine-lined Pocketbook	<i>Lampsilis altilis</i>	THR	THR	S2
Georgia Pigtoe	<i>Pleurobema hanleyianum</i>	END	END	S1
Ovate Clubshell	<i>Pleurobema perovatum</i>	END	END	SH
Painted Clubshell	<i>Pleurobema chattanoogaense</i>	--	TRKD	S1
Southern Acornshell	<i>Epioblasma othcaloogensis</i>	END	END	S1
Southern Clubshell	<i>Pleurobema decisum</i>	END	END	SH
Southern Pigtoe	<i>Pleurobema georgianum</i>	END	END	S1
Triangular Kidneyshell	<i>Ptychobranthus greenii</i>	END	END	S1
Upland Combshell	<i>Epioblasma metastrata</i>	END	END	S1
<b>Fishes<sup>6</sup></b>				
Amber Darter	<i>Percina antesella</i>	END	END	S1
Bigeye Chub	<i>Hybopsis amblops</i>	--	RARE	S1S2
Blue Shiner	<i>Cyprinella caerulea</i>	THR	END	S1S2
Bridled Darter	<i>Percina kusha</i>	--	RARE	S2
Coldwater Darter	<i>Etheostoma ditrema</i>	--	THR	S1
Conasauga Logperch	<i>Percina jenkinsi</i>	END	END	S1
Flame Chub	<i>Hemitremia flammea</i>	--	END	S1
Frecklebelly Madtom	<i>Noturus munitus</i>	--	END	S1
Freckled Darter	<i>Percina lenticula</i>	--	END	S1
Holiday Darter	<i>Etheostoma brevirostrum</i>	--	THR	S2
Lined Chub	<i>Notropis lineapunctata</i>	--	TRKD	S3
River Redhorse	<i>Moxostoma carinatum</i>	--	RARE	S2
Trispot Darter	<i>Etheostoma trisella</i>	--	THR	S1
<b>Reptiles</b>				
Alabama map turtle	<i>Graptemys pulchra</i>	--	RARE	S1
Common map turtle	<i>Graptemys geographica</i>	--	RARE	S1
<b>Birds</b>				
Peregrine falcon <sup>8</sup>	<i>Falco peregrinus</i>	PS	RARE	S1
<b>Mammals</b>				
Indiana bat <sup>9</sup>	<i>Myotis sodalis</i>	LE	END	S1
Northern long-eared bat <sup>10</sup>	<i>Myotis septentrionalis</i>	LT		S2S3

<sup>1</sup> Sources: TVA Regional Natural Heritage database, Georgia Natural Heritage data, and USFWS Ecological Conservation Online System, USFWS Information, Planning, and Assessment (IPaC) database

<sup>2</sup> Status Codes: END = Endangered; NMGT = In Need of Management; NOST = No Status; PS = Partial Status; PT = Proposed Threatened; RARE = Listed Rare; SPCO = Special Concern; T-CE = Threatened – Commercially Exploited THR = Threatened; TRKD = Tracked by state natural heritage program (no legal status); U = Listed as Unusual (and thus deserving of special consideration)

<sup>3</sup> State Ranks: S1 = Extremely imperiled; S2 = Imperiled; S3 = Vulnerable; SH = Presumed Historical; S#B = Rank of breeding population; S#S# = Denotes a range of ranks because the exact rarity of the element is uncertain (e.g., S1S2)

<sup>4</sup> Plant species observed with areas where work would occur.

<sup>5</sup> Federal-listed species occurring within the county where work would occur, but not necessarily within 5 miles of the project area.

<sup>6</sup> Aquatic animal species identified within a 10-digit HUC watershed.

<sup>7</sup> USFWS records indicate this species occurs in the potentially affected watersheds.

<sup>8</sup> A subspecies of peregrine falcon found in Eurasia is federally endangered. The species of peregrine falcon found in Gordon and Whitfield counties, Georgia are not federally listed.

<sup>9</sup> Federally endangered species that the USFWS has determined has the potential to exist in Whitfield County, Georgia, though no records are known to date.

<sup>10</sup> Federally threatened species that the USFWS has determined has the potential to exist in Gordon and Whitfield counties, Georgia, though no records are known to date.



### 3.6.1 Aquatic Animals

Fifteen federally listed species (three fishes, 10 mussels, and two snails) and 12 additional state-listed species (10 fishes, three mussels) are known to occur within the lower Conasauga River, the upper Oostanaula River, and the Oothkalooga Creek watersheds; and/or within Whitfield and Gordon counties (Table 3-4; TVA 2015c). All 15 federally listed species are endemic to the Mobile Basin, and many are found only in the upper Coosa River drainage.

Of the 15 federally listed species, the cylindrical lioplax and ovate clubshell are considered historical records and are not anticipated to occur in or near the project vicinity (TVA 2015c), and the southern acornshell and upland combshell are presumed extinct (Gangloff and Feminella 2007; USFWS 2008). Previously, TVA presumed the Alabama moccasinshell and Coosa moccasinshell as historic. However, information provided by USFWS indicated that these two species are extant in the upper Coosa River System and TVA's database will be updated to reflect the USFWS status (USFWS 2004). The remaining federally listed species are considered extant within the aforementioned watersheds and include the federally endangered amber darter, Conasauga logperch, Georgia pigtoe, southern clubshell, southern pigtoe, triangular kidneyshell, interrupted rocksnail, and the federally threatened blue shiner and fine-lined pocketbook.

The Conasauga River is located approximately 2 to 3 miles east of the proposed TL route and flows southward toward its confluence with the Coosawattee to form the Oostanaula River. The Conasauga and a few of its tributaries are particularly important to the conservation of several federally listed species, including the Alabama moccasinshell, blue shiner, Conasauga logperch, Georgia pigtoe, and triangular kidneyshell (USFWS 2004). Swamp Creek, a direct tributary of the Conasauga River, would be crossed multiple times by the proposed TL. The federally listed Alabama moccasinshell, Coosa moccasinshell, fine-lined pocketbook and southern pigtoe have been collected from Swamp Creek, and the state-listed trispot darter is considered extant in Swamp Creek in the vicinity of the proposed TL crossing (TVA 2015c). Furthermore, the state-listed trispot darter and Coosa creekshell mussel are currently petitioned to be listed by the USFWS and are under review. The trispot darter is a highly specialized species that requires slackwater areas along margins of the Conasauga River and some of its tributaries associated with detritus or rooted vegetation. In the late fall, the trispot darter migrates to smaller tributaries with riffles and by December congregate in proximity to spawning habitat consisting of adjacent seeps. Coosa creekshell has habitat requirements similar to other freshwater mussels within the Coosa River drainage, but may be found in smaller first or second order streams.

The following list includes federally listed aquatic species with the potential to occur in the proposed project area. Unless otherwise specified, general descriptions were retrieved from the following sources: Etnier and Starnes (1993), Boschung and Mayden (2004); Parmalee and Bogan (1998), and Williams et al. (2008).

The Alabama moccasinshell inhabits sand and gravel substrates in medium-sized creeks and rivers, and is typically found in moderate to swift current in shoal areas (USFWS 1993). In Georgia, it appears to be restricted to Holly Creek, a tributary of the upper Conasauga River (USFWS 2004; USFWS 2008).

The amber darter is typically found in riffles or shoals in moderate to swift currents over cobble and gravel substrates, and is also known to burrow in loose sand and gravel (USFWS 1985). In Georgia, it occurs in both the Etowah and Conasauga rivers. The

population in the Etowah River is small, but apparently has remained stable over the last decade, whereas the population in the Conasauga River appears to be in decline. Amber darters are particularly sensitive to siltation and are threatened by land-disturbing activities such as development and removal of riparian buffer zones.

The blue shiner prefers small to medium streams in riffles, runs, or pools in moderate to swift current over gravel, cobble, or boulder substrate (USFWS 1992). It is endemic to the Mobile Basin; in Georgia, it is likely extirpated from the Etowah, Oostanaula, and Coosawatte River systems, but remains in the Conasauga River in low numbers. Its decline in the Conasauga River may be attributed to degraded habitat conditions due in part to poor land management practices. Like other sensitive fish species, the blue shiner is vulnerable to excessive sedimentation which is known to disrupt spawning efforts.

The Conasauga logperch is typically found in riffles and runs with swift current over cobble and gravel substrate (USFWS 1985). This species is endemic to the Conasauga River, where its known range is approximately 27 miles in Whitfield and Murray counties, Georgia. This species is under constant threat due to its extremely limited range where loss of habitat and declines in water quality contribute to the increasing threats to its survival.

The Coosa creekshell is endemic to the Coosa River drainage above the Fall Line in Alabama, Georgia, and Tennessee (Williams et al. 2008). It is primarily a species of small creeks to medium rivers. Although once fairly widespread, it is now thought to persist only in a few tributaries in the uppermost reaches of the Coosa River drainage, primarily in Georgia.

The Coosa moccasinshell is endemic to the Mobile Basin in Alabama, Georgia, and Tennessee and occurs in medium-sized creeks and rivers in areas of sand and gravel substrates (USFWS 1993). In Georgia, it is currently restricted to a limited reach of the Conasauga River and Holly Creek (USFWS 2004).

The cylindrical lioplax typically inhabits muddy substrate under large rocks in shoal areas with swift currents (USFWS 1998). Little is known in regards to its biology or life history, as it has disappeared from an estimated 90 percent of its former range. It currently is only known from a limited reach of the Cahaba River in Alabama and is presumed extirpated from Georgia (USFWS 2005).

The fine-lined pocketbook (USFWS 1993) occurs in small creeks to large rivers in areas of slow to moderate current with sand and gravel substrates, and is endemic to the Mobile Basin in Alabama, Georgia and Tennessee. In Georgia, it is restricted to the Conasauga River and one of its tributaries, Holly Creek (USFWS 2004).

The Georgia pigtoe inhabits shoal areas with sand, gravel, and cobble substrates of large creeks and small to large rivers, and is endemic to the Coosa River drainage in Alabama, Georgia and Tennessee (USFWS 2010). This species is appears entirely restricted to a few isolated shoals in the upper Conasauga River in Murray and Whitfield counties, Georgia and in Polk County, Tennessee (USFWS 2014).

The interrupted rocksnail lives attached to bedrock, boulders, cobble and gravel, typically in shoal, riffle or reef areas with moderate to swift current in relatively shallow depths (USFWS 2010). It formerly occurred in the Coosa River drainage of Alabama and Georgia, and occurred in Georgia in the Etowah, Oostanaula, Coosawattee, and Conasauga River

systems. However, this species has been eliminated from roughly 99 percent of its former range, and is now apparently restricted to a limited reach of the Oostanaula River (7 river miles) near the confluence of Armuchee Creek, which is downstream of the project area in Floyd County, Georgia (USFWS 2014).

The ovate clubshell typically occurs in riffles, runs, and shoals areas of small creeks to larger rivers (USFWS 1993). It historically occurred in the Conasauga, Coosa and Etowah rivers in Georgia (USFWS 2004), but is now presumed extirpated from the state.

The southern acornshell presumably occurred in shoals and riffles in smaller rivers and was known from the Coosa River drainage in Alabama, Georgia and Tennessee (USFWS 1993). This species was last collected in 1973 and is presumed extinct (Gangloff and Feminella 2007; USFWS 2008).

The southern clubshell occurs in larger streams and rivers in areas of moderate flow with sand and gravel substrate, and may occur in pool habitats with little current (USFWS 1993). This species is endemic to the Mobile River Basin in Alabama, Georgia, Mississippi and Tennessee; however, in Georgia, is now restricted to 9 river miles within the Conasauga River (USFWS 2004).

The southern pigtoe is generally found in medium-sized creeks to large rivers in areas of riffle, run, and shoal habitat with sand and gravel substrates (USFWS 1993). It is endemic to the Coosa River drainage of the Mobile Basin in Alabama, Georgia, and Tennessee, and is now restricted to isolated populations in a few tributaries of the Coosa River. In Georgia, this increasingly rare species is restricted to the Conasauga River and one of its tributaries, Holly Creek (USFWS 2004).

The triangular kidneyshell occurs in a variety of stream sizes, typically in shoal areas with sand and gravel substrates (USFWS 1993). It is known to occur in isolated populations in the Conasauga River in Georgia.

The upland combshell is endemic to the Mobile Basin in Alabama, Georgia and Tennessee that formerly occurred in shoal habitats of medium to large rivers (USFWS 1993). It was last collected in the Little Cahaba River and is presumed extinct (Gangloff and Feminella 2007; USFWS 2008).

### **3.6.2 Plants**

Within a five-mile vicinity of the proposed project area, twenty-three state-listed and two federally listed plant species have been previously reported (Table 3-4; TVA 2015c). One additional federally listed plant has been documented from Gordon and Whitfield counties (Table 3-4). No DCH for federally listed as threatened or endangered plant species occurs in the project area.

Field surveys of the proposed ROW occurred in September 2014, May 2015, and August 2015 when federally listed plant species would be visible above ground. Georgia rockcress and Tennessee yellow-eyed grass require specialized habitats that do not occur within the project area. A small portion of the proposed ROW is located on the banks of the Oostanaula River where Georgia rockcress potentially could occur. However, no rock outcrops or other habitat capable of supporting that species was observed. Tennessee yellow-eyed grass, which occurs only in calcareous seeps with thin soils over bedrock, has been previously reported from two small localities more than 15 miles distant from the

project area. No plant communities similar to these unique wetland habitats were observed during field surveys. Large-flowered skullcap occupies a variety of forested and semi-open habitats and cannot be easily excluded from the project area based on habitat preferences alone. However, comprehensive surveys of the proposed ROW did not locate occurrences of this species. One previously reported occurrence of large-flowered skullcap is located in close proximity to a portion of ROW proposed for purchase by TVA. Multiple visits to this site, which occurs about 0.5 miles northwest of the Cross Plains Substation, did not relocate the plant within the proposed ROW.

Three state-listed species were observed in forested and wetland habitat along the proposed ROW. Asa Gray's sedge occurs in wetlands throughout the eastern U. S., but is restricted to Gordon County in Georgia. About ten individual plants were observed in the proposed ROW within a forested wetland. Jacob's ladder is common across the eastern U.S., but occurs in five counties in Georgia. This species prefers rich, calcareous forests. Two flowering plants were identified within the proposed ROW. Dense-flowered knotweed had not been previously reported from Gordon or Whitfield counties. In fact, the closest previously documented location for that species in Georgia is on the Atlantic coast nearly 300 miles southeast of the proposed project. About 15 individual plants were observed in an emergent wetland within the ROW.

### **3.6.3 Terrestrial Animals**

Records for three state-listed species and no federally listed or federally protected terrestrial animal species are known from within three miles of the proposed Action Alternative (Table 3-4; TVA 2015c). Additionally, the federally endangered Indiana bat and federally threatened northern long-eared bat both have the potential to occur in Whitfield County (USFWS 2015a). Northern long-eared bat also has been determined to have the potential to occur in Gordon County (USFWS 2015a).

Peregrine falcons inhabit various open spaces including seacoasts, mountains, open forests, and urban areas. This species nests on ledges, cliffs, river banks, tree hollows, rock quarries, large nests of other species, and man-made structures (National Geographic 2002; NatureServe 2015). No suitable nesting habitat occurs within the proposed ROW, however, suitable foraging habitat does exist alongside and within the proposed ROW. No peregrine falcons or their nests were observed during field work in March or August 2015.

Both the common map turtle and the Alabama map turtle are found in the Conasauga River system and its tributaries. These turtles use medium-sized rivers to large creeks with sand bars sandy banks and logs for basking, as well as deep pools and abundant mollusks for foraging. They nest in sand bars and sandy banks adjacent to these bodies of water from May to August (Buhlmann et al. 2008). The closest common map turtle record is approximately 2.4 miles from the project, while the closest Alabama map turtle record is approximately 1.7 miles from the project footprint. The northern portion of the proposed ROW crosses Swamp Creek, a tributary of the Conasauga River. Suitable map turtle nesting and basking habitat exists within and adjacent to Swamp Creek. No map turtles were observed during the field reviews.

Indiana bats hibernate in caves in winter and use areas around them in fall and spring (for swarming and staging), prior to migration back to summer habitat. During the summer, Indiana bats roost under the exfoliating bark of dead and living trees in mature forests with an open understory often near sources 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. This species forages over forest canopies, along forest edges, and tree lines, and occasionally over bodies of water (Pruitt and TeWinkel 2007; Kurta et al. 2002; USFWS 2015a). The USFWS has determined that this species has the potential to occur in Whitfield County, however no records are known (USFWS 2015a). The closest known records of Indiana bat are from approximately 26 miles away in Walker County and approximately 30 miles away in Gilmer County. Three caves are known to exist within three miles of the project footprint. The nearest cave occurs approximately 0.2 miles from the project footprint. No caves were identified during field visits in March and August 2015. Foraging habitat exists throughout the proposed project area over forested areas, streams, ponds, fence rows, and other corridors. Suitable summer roosting habitat for the Indiana bat exists within thirteen forested sections along the proposed ROW. Suitability was determined by the presence of trees with exfoliating bark and relatively open understory.

The northern long-eared bat predominantly overwinters in large hibernacula such as caves, abandoned mines, and cave-like structures. During the 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 bat is similar to Indiana bat; however, it is thought that northern long-eared bats are more opportunistic in roost site selection. This species has also been documented roosting 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 known records of northern long-eared bat within Whitfield and Gordon counties, however, the USFWS has determined this species has the potential to occur in either county (USFWS 2014, 2015c). Three caves have been recorded within three miles of the project footprint. The nearest cave occurs approximately 0.2 miles from the project footprint. No caves were identified during field visits in March and August 2015. Foraging habitat exists throughout the proposed project area over forested areas, streams, ponds, fence rows and other corridors. Suitable summer roosting habitat for northern long-eared bat exists within eleven forested sections along the proposed ROW. Suitability was determined by the presence of trees with exfoliating bark, density of the understory, and proximity to water. Suitability determinations followed USFWS 2014 and 2015 Range-wide Indiana Bat Summer Survey Guidelines (USFWS 2014a; USFWS 2015b).

TVA field surveys along the proposed 19.2-mile TL ROW identified suitable summer roosting habitat for both Indiana and northern long-eared bats totaling 24.98 acres. Eleven sections of forest were identified along the proposed route as either moderate or highly suitable roosting habitat due to a high concentration of white oaks, shag bark hickories, and/or snags with exfoliating bark in and around the proposed ROW. Suitable summer roosting areas were comprised of mature hardwood stands dominated by a mixture of oaks (red and white) and other hardwood species such as hackberry, sweetgum, and shagbark hickories.

### **3.7 Floodplains**

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. It is necessary to evaluate development in the 100-

year floodplain to ensure that the project is consistent with the requirements of EO 11988. The proposed TL route would cross several floodplain areas associated with streams (see Section 3.3) in Gordon and Whitfield counties.

### 3.8 Wetlands

Wetlands are those areas inundated by surface or groundwater such that vegetation adapted to saturated soil conditions are prevalent. Examples include swamps, marshes, bogs, and wet meadows. Wetland fringe areas also are found along the edges of most watercourses and impounded waters (both natural and man-made). Field surveys were conducted in September 2014, January 2015, and July 2015 to delineate wetland areas potentially affected by the proposed Action Alternative.

Wetland determinations were performed according to the USACE standards, which require documentation of hydrophytic (wet-site) vegetation, hydric soil, and wetland hydrology (USACE 2010; Environmental Laboratory 1987; Lichvar et al. 2014; U. S. Department of Defense and USEPA 2003). Broader definitions of wetlands, such as that used by the USFWS (Cowardin et al. 1979), the Tennessee definition (Tennessee Code 11-14-401), and the TVA Environmental Review Procedures definition (TVA 1983), were also considered in this review. Using a TVA-developed modification of the Ohio Rapid Assessment Method (Mack 2001) specific to the TVA region (TVA Rapid Assessment Method or “TVARAM”) was used to categorize wetlands by their functions, sensitivity to disturbance, rarity, and ability to be replaced.

TVARAM scores are used to classify the quality of wetlands into three categories. Category 1 wetlands are considered “limited quality waters.” They represent degraded aquatic resources having limited potential for restoration with such low functionality that lower standards for avoidance, minimization, and mitigation can be applied. Category 2 includes wetlands of moderate quality and wetlands that are degraded but have reasonable potential for restoration. Avoidance and minimization are the preferred mitigation measures for Category 2 wetlands. Category 3 generally includes wetlands of very high quality or of regional/statewide concern, such as wetlands that provide habitat for threatened or endangered species.

The proposed TL would traverse a rural landscape, dominated by pastureland and forested land, with occasional residential and commercial areas located in close proximity. While the TL ROW is situated across predominantly upland habitat, the landscape is dissected by watercourses and associated wetland features. Forty-two wetland areas, totaling 22.94 acres, were identified within the proposed TL ROW and access roads (Table 3-5). Of this, forested wetlands comprised 14.36 acres.

**Table 3-5. Wetlands Located Within the Proposed Transmission Line ROW and Access Roads**

Wetland Identifier	Wetland Type <sup>1</sup>	TVARAM <sup>2</sup> Existing Functional Capacity (Score)	Wetland Acreage within the ROW	Forested Wetland Acreage within the ROW
W001	PEM/PSS1E	Moderate (44)	0.16	0
W002	PEM/PSS1E	Moderate (43)	0.11	0
W003	PFO1E	Moderate (34.5)	0.39	0.39
W004	PSS1E	Moderate (32)	0.09	0
W005	PEM1E	Low (27)	0.12	0

Wetland Identifier	Wetland Type <sup>1</sup>	TVARAM <sup>2</sup> Existing Functional Capacity (Score)	Wetland Acreage within the ROW	Forested Wetland Acreage within the ROW
W006	PEM1E	Low (21)	0.01	0
W007	PEM1E	Low (21)	0.12	0
W008	PFO1E	High (69)	0.45	0.45
W009	PFO1E	Moderate (42)	0.13	0.13
W010	PEM1E	Low (29)	0.01	0
W011	PFO1E	Moderate (43.5)	0.84	0.84
W012	PEM1E	Moderate (43.5)	0.10	0
W013	PEM1E	Moderate (41.5)	2.62	0
W014	PFO1E	Moderate (41.5)	0.36	0.36
W015	PEM1E	Moderate (41.5)	0.85	0
W016	PEM1E	Low (27)	0.06	0
W017	PEM1E	Low (20.5)	0.05	0
W018	Recently Clearcut	Low (23)	0.72	0
W019	Recently Clearcut	Low (23)	0.59	0
W020	PFO1E	Moderate (38)	1.61	1.61
W021	PSS1H	Moderate (41)	0.19	0
W022	PEM1E	Low (10)	0.05	0
W023	PEM1E	Low (10)	0.01	0
W024	PFO1E	Moderate (53)	2.31	2.31
W025	PEM1E	Moderate (53)	0.02	0
W026	PFO1E	Moderate (41)	1.42	1.42
W027	PFO1E	Moderate (41)	0.64	0.64
W028	PSS/PFO1E	Moderate (41)	0.58	0.30
W029	PEM1E	Moderate (41)	0.21	0
W030	PFO1E	Moderate (41)	0.43	0.43
W031	PEM1E	Low (11)	0.03	0
W032	PFO1E	Moderate (38)	0.02	0.02
W033	PFO1E	Moderate (38)	0.01	0.01
W034	PFO1E	Moderate (55)	1.44	1.44
W035	PEM/PSS1E	Moderate (36)	1.33	0
W036	PFO1E	Moderate (40.5)	0.25	0.25
W037	PEM/PSS/PFO1A	High (71.5)	2.11	2.11
W038	PFO1E	High (71.5)	0.03	0.03
W039	PEM/PSS1E	Moderate (41)	0.63	0
W040	PFO1A	High (65)	1.51	1.51
W041	PSS1E	Low (26)	0.22	0
W042	PFO1E	Moderate (41)	0.11	0.11
<b>Total Acres</b>			<b>22.94</b>	<b>14.36</b>

<sup>1</sup>Classification codes as defined in Cowardin et al. (1979): A=Temporarily flooded; E = Seasonally flooded/saturated; H=Permanently Flooded; PEM1 = Palustrine emergent, persistent vegetation; PFO1=Palustrine forested, broadleaf deciduous vegetation; PSS1=Palustrine, scrub-shrub, broadleaf deciduous vegetation.

<sup>2</sup>TVARAM = A TVA Rapid Assessment Method that categorizes wetland quality by their functions, sensitivity to disturbance, rarity, and ability to be replaced.

W001 comprises 0.16 acres of emergent/scrub-shrub wetland within the ROW. The wetland is located adjacent to the Fuller Substation within the riparian strip associated with the confluence of two tributaries to Oothkalooga Creek. W001 extends outside the ROW to the north for an estimated total of 0.75 acre, bound by the substation to the east, and pastureland to the west. W001 exhibited hydric soils with redox features extending to the

surface. W001 was dominated by hydrophytic vegetation including soft pathrush, barnyard grass, redbud panic grass, and young saplings of black willow, silver maple, sugarberry, and overcup oak.

W002 consists of a man-made basin holding surface water even during the dry season. W002 was likely designed for water retention when landscape leveling occurred for the construction of the existing and surrounding subdivision. W002 is culverted on both sides to maintain flow, with 0.11 acre of the basin located within the ROW, but extending outside the ROW to the east for an estimated total of 0.5 acre. The tributary waters draining from this wetland basin feed W001 and empty into Oothkalooga Creek. W002 exhibited soils with mottled coloration indicative of hydric conditions. Wetland W002 consists of scrub-shrub vegetation, dominated by black willow sapling, a hydrophytic species.

W003 is a forested wetland located in the headwaters of a wide drain, possibly feeding the creek associated with W002 at one time. A man-made berm separates W003 from W002. This wetland contains 0.39 acre on the ROW, but extends outside the ROW to the west for an estimated total of one acre. W003 exhibited hydric soils with redox features extending to the surface with water-stained leaves indicating the persistence of wetland hydrology. W003 was dominated by sweetgum, slippery elm, and red maple.

W004 consists of fringe scrub-shrub wetland along a perennial stream. W004 totals 0.09 acre within the ROW, extending outside the ROW along the stream for a total of less than a quarter acre. This wetland/stream drains via culvert into the W002 basin, eventually feeding W001 and tributary to the Oothkalooga Creek. W004 contained evident drift deposits and exhibited soils with mottled coloration indicative of hydric conditions. W004 consisted of scrub-shrub vegetation, dominated by hydrophytic vegetation including box elder, willow oak, sweetgum, and sugarberry.

W005 comprises a total of 0.12 acres of emergent wetland habitat within a wide drain crossing the ROW. This linear wetland drainage feature bisects an agricultural field within the floodplain of the Oostanaula River, and is tributary to the river. W005 exhibited soils with mottled coloration indicative of hydric conditions. W005 was dominated by hydrophytic vegetation including soft pathrush, barnyard grass, and redbud panic grass.

W006, W007, and W008 are part of the same floodplain wetland complex, but exhibit different habitat types. W006 and W007 comprise of 0.01 acre and 0.12 acre, respectively, of an emergent wetland habitat bisected by an upland farm road within the ROW. W008 contains 0.45 acre of forested wetland within the ROW adjacent to W007, extending north of the ROW for a total wetland acreage of about 25 acres. This floodplain wetland complex is associated with an unnamed tributary to the Oostanaula River. W006, W007, and W008 exhibited soils with mottled coloration indicative of hydric conditions. W006 and W007 were dominated by hydrophytic emergent vegetation including soft pathrush, barnyard grass and redbud panic grass. W008 represents a high quality forested wetland complex, dominated by hydrophytic tree species including swamp chestnut oak, water oak, green ash, sycamore, and red maple.

W009 consists of 0.13 acre of forested wetland located on a floodplain terrace along the west bank of the Oostanaula River. This feature extends north and south of the ROW for a total estimated area of double in size. W009 contained drift deposits and exhibited hydric soils indicators. W009 was dominated by sycamore in the overstory and spicebush in the understory, both hydrophytic species.



W010 is 0.01 acre of emergent wetland located entirely within the ROW on streamside depositional bar. W010 was inundated at the time of the site visits, and exhibited saturated soils with mottled coloration indicative of hydric conditions. W010 was dominated by marsh dew flower, an emergent hydrophytic species.

W011 comprises 0.84 acre of forested wetland within the ROW, adjacent to the emergent wetland habitat of W012, and extending east for a total estimated wetland acreage of five acres. This wetland is located within a drainage basin, feeding an unnamed tributary of the Oostanaula River. W011 contained crayfish borrows and exhibited drainage patterns underlain by alluvial and depleted soils within a foot of the soil surface. W011 was dominated by hydrophytic vegetation including sycamore and sugarberry, and included populations of the state-listed Gray's sedge (*Carex grayi*).

W012 consists of 0.10 acre of emergent wetland within the ROW, and is part of the same wetland complex including W011 and extending east of the ROW for a total of approximately 5 wetland acres. W012 exhibited saturated soils with mottled coloration indicative of hydric conditions. W012 was dominated by hydrophytic vegetation that included mild waterpepper, Virginia buttonweed, and barnyard grass.

W013, W014, and W015 are part of the same floodplain wetland complex, but exhibit different habitat types. W013 and W015 consist of 2.62 acres and 0.85 acre emergent wetland habitat, respectively, within the ROW and bisected by an upland farm road. W014 contains 0.36 acre of forested wetland within the ROW adjacent to W013, extending east of the ROW for a total wetland acreage of approximately five acres. This floodplain wetland complex is associated with an unnamed tributary to the Oostanaula River. Portions of W013 and W015 exhibited saturated soils; whereas drier soils across all three mapped wetland areas contained oxidized root channels and mottled coloration indicative of hydric conditions. W013 and W015 were dominated by hydrophytic emergent vegetation including mild waterpepper, Virginia buttonweed, and barnyard grass. W014 was dominated by hydrophytic forested vegetation including water oak, sugarberry, sweetgum, and red maple.

W016 is 0.06 acre of emergent fringe wetland located along the margins of a pond within the ROW. The overflow for the pond provides intermittent hydrologic connectivity to the Oostanaula River. W016 was inundated at the time of the field surveys, and exhibited saturated soils with hydric coloration. W016 was dominated by hydrophytic emergent species including cacklebur, late thoroughwort, and barnyard grass.

W017 comprises a total of 0.05 acres of emergent wetland habitat within a wide drain crossing the ROW. This linear wetland drainage feature bisects an agricultural field. W017 and consists of the upper reaches of an unnamed tributary to an approximate five acre bottomland forested wetland complex outside the ROW within the nearby floodplain of the Oostanaula River. W017 exhibited soils with mottled coloration indicative of hydric conditions. W017 was dominated by hydrophytic vegetation including fowl mannagrass and softpathrush.

W018 and W019 are located within a recent clearcut; thereby, exhibiting emergent wetland habitat under current conditions. W018 and W019 contain 0.72 and 0.59 acre within the ROW, respectively, separated by a small upland rise. Both are located within the upper reaches of a wide roughly 10 acre wetland flat along Bow Creek, tributary to the Oostanaula River. These wetland areas saturated soils with hydric coloration. W018 and W019 were

dominated by hydrophytic vegetation including strawcolored flatsedge, seedbox, boneset, soft pathrush, barnyard grass, and redtop panic grass.

W020 consists of 1.61 acre of forested wetland located nearly entirely within the ROW. This wetland is located within a drainage basin, feeding National Creek, a tributary to the Oostanaula River. W020 contained crayfish borrows and exhibited drainage patterns underlain by soils exhibiting indicators of hydric conditions. W020 was dominated by green ash in the overstory and swamp holly and sedges throughout the understory, all of which are hydrophytic species.

W021 consists of 0.19 acre of scrub-shrub wetland habitat within the ROW. This wetland area has developed in an old pond which has become vegetated throughout, and extends east of the ROW for a total of about 0.5 acre. W021 was inundated at the time of the field surveys, and exhibited saturated hydric soils with mottled coloration indicative of wetland hydrology. W021 was dominated by hydrophytic sapling and shrub species including black willow and buttonbush, and emergent species such as woolgrass and cattails.

W022 and W023 consist of connected outlet ditches likely created when the area was drained and ditched to create productive agricultural fields. W022 and W023 comprise 0.05 and 0.01 acre as they cross the ROW, draining into a floodplain wetland complex associated with Snake Creek and mapped as W024. Both W022 and W023 exhibit drainage patterns, inundation, and saturated soils with hydric coloration. W022 and W023 were dominated by hydrophytic emergent vegetation including meadow beauty, late thoroughwort, and soft pathrush.

W024 consists of 2.31 acres of oak forested bottomland wetland within the ROW, extending northwest and southeast of the ROW for total of about 40 acres within the Snake Creek floodplain, tributary to the Oostanaula River. W024 was inundated at the time of the field survey and exhibited saturated hydric soils with depletions extending nearly to the surface. W024 was dominated by hydrophytic vegetation including green ash, sugarberry, willow oak, water oak, sweetgum, sycamore, and cherrybark oak.

W025 comprises 0.02 acre of emergent wetland, likely maintained by mowing or bush-hogging. This wetland is located along the periphery of the Snake Creek floodplain where the ROW overlaps. W025 exhibited drainage patterns, crayfish burrows, and contained soils with mottled coloration indicative of hydric soils. W025 was dominated by cypress panic grass, an emergent hydrophytic species.

W026 contains 1.42 acres of forested wetland within the ROW. This wetland feature comprises a portion of an approximate five acre wetland located within a topographic drain tributary to Snake Creek. W026 exhibited drift deposits, water stained leaves, drainage patterns, and oxidized root channels within depleted hydric soils. W026 was dominated by hydrophytic vegetation including green ash, sugarberry, water oak, sweetgum, and sycamore.

W027 contains 0.64 acre of forested wetland within the ROW. This wetland feature comprises a portion of a roughly three acre wide flat conveying run-off and precipitation to Snake Creek. W027 exhibited drift deposits, water stained leaves, drainage patterns, and oxidized root channels within hydric soils. W027 was dominated by hydrophytic vegetation including green ash, sugarberry, water oak, sweetgum, and sycamore.

W028 contains 0.58 acre of a forested/scrub-shrub wetland complex within the ROW. This wetland feature comprises a portion of a roughly three acre wide flat conveying run-off and located within the Snake Creek floodplain north of W027. W028 exhibited drift deposits, water stained leaves, drainage patterns, and oxidized root channels within hydric soils. W028 contained scrub-shrub and forested wetland habitat in a somewhat intermixed pattern, with 0.28 acre comprised of saplings species within the scrub-shrub habitat and 0.30 acre dominated by mature trees within the forested wetland area. Dominated species consisted of green ash, sugarberry, water oak, sweetgum, and sycamore, all hydrophytic wetland vegetation.

W029 consists of 0.21 acre of emergent fringe wetland along both banks of Snake Creek where the ROW crosses. W029 was inundated at the time of the field surveys, and exhibited saturated hydric soils. W029 was dominated by hydrophytic emergent species including jewel weed and rice cut grass.

W030 consists of 0.43 acre of forested wetland habitat within the ROW. This wetland area has developed in an overflow lowland separated from Snake Creek by a natural berm within the ROW; although, draining into Snake Creek outside the ROW. W030 exhibited drift deposits, drainage patterns, crayfish burrows, and oxidized root channels throughout the upper surface of depleted hydric soils. W030 was dominated by hydrophytic species including sugarberry, sweetgum, water oak, and box elder.

W031 consists of a 0.03 acre emergent wetland depression entirely located within the ROW. This wetland area is an isolated depression which has been cultivated with the normal farming practices applied to the surrounding field; however, the depression does not support crops. W031 exhibited surface soil cracks, sparse vegetation, oxidized root channels, and hydric soils. No hydrologic connectivity was evident during the field survey. The vegetated portions of W031 were dominated by hydrophytic emergent species including cocklebur, strawcolored flatsedge, and barnyard grass.

Wetlands W032 and W033 comprise 0.02 acre and 0.01 acre, respectively, of forested wetland area within the ROW. These wetlands are connected outside the ROW for a total acreage of about one acre. The wetlands are part of a floodplain complex associated with an unnamed tributary to Snake Creek. Both wetland areas exhibited hydric soils with redox features extending to the surface. W032 and W033 were dominated by hydrophytic vegetation including black willow, green ash, soft pathrush, barnyard grass and redbud panic grass.

W034 comprises a total of 1.44 acres of forested wetland within the ROW. The wetland is a part of a floodplain wetland complex associated with an unnamed tributary to Snake Creek, extending north and south of the ROW for a total wetland area of about 5 acres. W034 exhibited saturated hydric soils with oxidized root channels present. Wetland W034 was dominated by hydrophytic vegetation including Frank's sedge, swamp chesnut oak, water oak, green ash, and soft pathrush.

W035 comprises a total of 1.33 acres of emergent/scrub-shrub wetland habitat within the ROW. The wetland is a part of a floodplain wetland complex associated with an unnamed tributary to Snake Creek. W035 exhibited saturated soils containing oxidized root channels and mottling indicative of hydric conditions. Wetland W035 was dominated by hydrophytic vegetation including soft pathrush, barnyard grass and redbud panic grass.

W036 comprises a total of 0.25 acres of forested wetland habitat within the ROW. The wetland constitutes the headwaters of a wide drain feeding the wetland floodplain complex associated with Swamp Creek. W036 exhibited saturated soils with mottled coloration indicative of hydric conditions. W036 was dominated by hydrophytic vegetation including green ash, sycamore and soft pathrush.

W037 totals of 2.11 acres of forested wetland habitat within the ROW, with inclusions of open water, scrub-shrub, and emergent habitat present. The section within the ROW comprises a small portion of the Swamp Creek wetland floodplain complex, estimated to be 30 acres in size west of I-75. W037 exhibited inundation and saturated soils with mottled coloration indicative of hydric conditions. W037 was dominated by hydrophytic vegetation including black willow, sycamore, river birch, buttonbush, tag alder, bulrush, sedges, and rice-cut-grass.

W038 is an island forested wetland, located within the Swamp Creek channel and entirely within the ROW, totaling 0.03 acre in size. W038 contained drift deposits, crayfish burrows, and exhibited hydric soils. W038 was dominated by sycamore trees, a hydrophytic species.

W039 comprises a total of 0.63 acres of emergent/scrub-shrub habitat within the ROW. The wetland consists of a wide drain feeding the Swamp Creek floodplain wetland complex east of I-75. W039 exhibited saturated soils with mottled coloration indicative of hydric conditions. Wetland W039 was dominated by hydrophytic vegetation including planted sporadic young loblolly pine, boneset, Frank's sedge, soft pathrush, barnyard grass, and redbud panic grass.

W040 comprises a total of 1.51 acres of forested wetland within the ROW. This wetland area is a part of the Swamp Creek floodplain wetland complex, totaling over 40 acres east of I-75. W040 saturated soils with hydric soils coloration. W040 was dominated by hydrophytic vegetation including green ash, sycamore, water oak, soft pathrush, barnyard grass and redbud panic grass.

W041 is located on a disturbed parcel with 0.22 acre of scrub-shrub/sapling wetland habitat within the ROW. The wetland area extends off the ROW for a total of about 0.5 acre. W041 exhibited intermittent connectivity to an unnamed tributary of Swamp Creek. This wetland was dominated by hydrophytic young saplings including loblolly pine and sweetgum and hydrophytic emergent species such as deer tongue panic grass, late thoroughwort, and soft pathrush.

W042 comprises a total of 0.11 acre of forested wetland within the ROW, but extending outside the ROW north and south to double its size. This wetland area is associated with a wide flat feeding an unnamed tributary of Swamp Creek. W042 exhibited inundation and saturated hydric soils. W042 was dominated by hydrophytic vegetation including green ash, sweetgum, and red maple.

### **3.9 Aesthetics**

#### **3.9.1 Visual Resources**

The physical, biological, and man-made features of an area combine to make the visual landscape character both identifiable and unique. Scenic resources are evaluated based on existing landscape character, distances of available views, sensitivity of viewing points, human perceptions of landscape beauty/sense of place (scenic attractiveness), and the

degree of visual unity and wholeness of the natural landscape in the course of human alteration (scenic integrity). The varied combinations of natural features and human alterations that shape landscape character also help define their scenic importance. Where and how the landscape is viewed would affect the more subjective perceptions of its aesthetic quality and sense of place.

Views of a landscape are described in terms of what is seen in foreground, middle ground, and background distances. In the foreground (an area within 0.5 miles of the observer), details of objects are easily distinguished in the landscape. In the middle-ground (normally between 0.5 and 4.0 miles from the observer), objects may be distinguishable, but their details are weak and they tend to merge into larger patterns. Details and colors of objects in the background (the distant part of the landscape) are not normally discernible unless they are especially large and standing alone. The impressions of an area's visual character can have a significant influence on how it is appreciated, protected, and used. The general landscape character of the study area is described in this section, with additional details provided in the Land Use Section. The scenic integrity indicates the degree of intactness or wholeness of the landscape character (TVA 2003).

The proposed 19.2 miles long 115-kV TL would connect to TVA's existing Center Point-Swamp Creek 115-kV TL just outside NGEMC's Swamp Creek 115-kV Substation in Whitfield County, and extend to TVA's existing Fuller-Moss Lake 115-kV TL just outside of NGEMC's Fuller 115-kV Substation located south of Calhoun near SR 53 in Gordon County.

The Fuller Substation can be seen from two small residential developments near the substation. The surrounding topography is gently rolling to level and includes areas of dense vegetation and areas clear of vegetation. The SR 53 corridor is a prominent feature in the area, altering the natural elevation of the area. The Fuller Substation is located in a district classified as Emerging Suburban according to the Gordon County Zoning Map.

The cities of Dalton, Resaca, and Calhoun are in close proximity to the proposed Center Point-Moss Lake TL. Along the planned route, three places of worship and two cemeteries are located within the foreground viewing distance. Scenic attractiveness is common to minimal along the proposed route and range from heavy manufacturing, rural residential, and neighborhood commercial in Whitfield County to river corridor/floodplain reserve and emerging suburban in Gordon County. Scenic Integrity is moderate to low as the landscape appears to be altered.

### **3.9.2 Noise**

There are no single, major sources of noise along the proposed TL route. However, some traffic noise is generated along SR 53 and from the cities of Dalton, Resaca, and Calhoun which are in close proximity to the proposed TL route. Local residents have become acclimated to this recurring noise.

### **3.9.3 Odors**

There are no known major sources of objectionable odors along the route or in the vicinity of the proposed TL.

### 3.10 Archaeological and Historic Resources

Federal agencies are required by Section 106 of the NHPA and by the National Environmental Protection Act (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 U. S. 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 are:

- 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; and
- Resolution of adverse effects by avoidance, minimization, or mitigation.

During the Section 106 process, the agency must consult with the appropriate SHPO, federally-recognized tribes that have an interest in the undertaking, and any other party with a vested interest in the undertaking. TVA is coordinating its Section 106 compliance with NEPA’s requirement to assess adverse impacts on cultural or historical resources.

TVA initially defined the APE for archaeological resources for the proposed Action Alternative as the proposed 19.2 mile, mostly 150-foot wide ROW for the proposed 115-kV TL and 1.3 mile, 150-foot wide ROW to accommodate a future 230-kV TL. In areas where the TL would consist only of 115-kV TL, the APE for architectural resources is 100 feet wide. For historic architectural resources, the APE is defined as a 0.5-mile radius surrounding the centerline of the proposed TL.

A Phase I cultural resources survey of the APE (TL ROW) was conducted to identify any historic properties that may be impacted by the undertaking. The investigation included an archaeological survey and a survey for historic above ground (architectural) resources. Within the APE, 73 archaeological resources were recorded including 55 archaeological sites, 18 isolated finds of archaeological material, and an historic cemetery. Of these, TVA has determined that 35 archaeological sites, as well as the 18 isolated finds, are ineligible for inclusion in the NRHP. The NRHP eligibility statuses of 20 archaeological sites are considered undetermined as the scope of the Phase I survey was not sufficient to determine their eligibility. If TVA’s proposed actions could potentially result in adverse effects to any of these 20 sites, additional studies would be required to determine the site’s NRHP status so that TVA could evaluate the need to avoid, minimize, or mitigate the effect. Section 4.2.10 describes additional measures that would be required in such a case. These sites may contain data that would be important in prehistory or history. Five of the “undetermined” sites are located in areas where proposed TL structures would be erected. The remainder are located within the proposed ROW and would be spanned by the TL.

Subsequently, once TVA's design for the new TL had been submitted, TVA modified the archaeological APE to include access roads that would be used for vehicle ingress/egress during construction and maintenance. The access roads that would be outside the recently surveyed TL ROW were added to the APE, and a new archaeological survey was conducted of those areas. This newly added portion of the APE comprised portions of twelve access roads with a total length of 3.57 miles. The survey identified three previously unrecorded archaeological sites and one isolated find. TVA has determined that all three sites and the isolated find are ineligible for the NRHP. The survey also resulted in the expansion of the site boundaries of previously recorded site 9GO379, which TVA and SHPO have agreed is of undetermined NRHP eligibility. With the new information from this additional portion of the site, TVA finds that the site should continue to be regarded as having undetermined eligibility.

Although the Georgia SHPO agreed with TVA's NRHP eligibility determinations regarding the 38 ineligible archaeological sites and 20 sites of undetermined eligibility, they also asked TVA to record two additional resources as archaeological sites: the Dickey Cemetery (located in the proposed ROW) and a Civil War-era "burial pit" associated with the Liberty Cumberland Church. TVA complied with the request. In addition, SHPO requested that TVA conduct additional study at the Dickey Cemetery in order to fully delineate the cemetery boundaries and identify and map all graves and grave markers. Based on the results of the study which included both remote sensing (ground penetrating radar) and probing with a metal grave probe, TVA found that the cemetery is confined to the surrounding wall and fence, and no graves associated with the cemetery are located outside this area. SHPO agreed with this finding.

SHPO has stated an opinion that the Liberty Cumberland Church burial pit is NRHP-eligible, but this resource is outside the undertaking's archaeological APE. TVA and SHPO agree the Dickey Cemetery is of undetermined NRHP eligibility under Criterion D (the criterion by which the NRHP eligibility of archaeological sites is normally considered).

The survey of above ground resources identified 21 previously undocumented architectural resources and revisited 55 previously documented architectural resources. Based on the results of the investigation, TVA determined that three of the previously recorded resources (IS-4, a ca. 1930 Colonial Revival style house; IS-15, Liberty Cumberland Presbyterian Church, and IS-23, two segments of the Norfolk Southern Railroad) are eligible for the NRHP. TVA determined that the remaining 19 previously undocumented architectural resources are ineligible for the NRHP due to their lack of architectural distinction and loss of integrity caused by modern alterations and/or damage. In addition, TVA determined that four of the 55 newly recorded architectural resources (36460, Rooker Davis House; 36458, Hill City Depot; 36462, Sugar Valley Consolidated School; and 36467, J.M. Muse House) are eligible for the NRHP. Of the remaining 50 previously documented architectural resources, TVA determined that 14 are ineligible for the NRHP due to a lack of architectural distinction or loss of integrity resulting from modern alterations or damage and 14 have been destroyed since they were recorded. In addition, 22 of the previously documented architectural resources are located outside a direct line of sight to the project, and are therefore outside the APE. In such cases TVA does not comment on the resource's NRHP eligibility.

SHPO agreed with TVA's eligibility determinations regarding the above-mentioned architectural resources. SHPO also stated an opinion that IS-22, the Dickey Cemetery, is eligible for inclusion in the NRHP under Criterion C (concerning distinctive characteristics of

a type, period or method or construction, or representing the work of a master, or possessing high artistic values, or representing a significant and distinguishable entity whose components may lack individual distinction), and under Criteria Consideration D (“A cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events.”). However, TVA continues to find that IS-22 does not satisfy NRHP eligibility criteria or criteria considerations. Section 4.2.10 describes measures TVA would take to avoid adverse effects to the cemetery, for which the SHPO has concurred.

In addition, SHPO stated an opinion that IS-16, a one-story “Colonial Revival” Ranch subtype house constructed ca. 1960, is NRHP-eligible. TVA conducted an additional architectural assessment of this property in January 2016 and found that the owners had recently renovated the house extensively, resulting in a loss of integrity. According to SHPO guidelines (GDNR, Historic Preservation Division, 2010, *The Ranch House in Georgia: Guidelines for Evaluation*), houses of this type must have original window sashes to be considered eligible for inclusion in the NRHP. As the recent renovations at IS-16 included the replacement of all original wooden window sashes with vinyl window sashes (as well as the removal of the original interior walls, floor plan, flooring, and tile), the house no longer meets NRHP eligibility criteria. TVA is continuing to consult with SHPO regarding the eligibility of this resource.

### **3.11 Recreation, Parks, and Natural Areas**

This section describes recreational opportunities and natural areas near the proposed TL ROW. 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.

There are no developed outdoor recreation areas within the pathway of the proposed TLs. Some informal recreational activity such as hunting, target practice, nature observation, and walking for pleasure may occur in the vicinity of the proposed TLs. In addition, a portion of the proposed 115-kV TL would pass close to the boundary of the Chattahoochee National Forest which receives public recreation use. The proposed 115-kV TL also crosses the Oostanaula River about .25 miles upstream from a developed public river access facility.

A portion of the proposed TL crosses one natural area (TVA 2015c). Two natural areas are within 0.10-mile of a portion of the TL, and one historic site is within 5 miles of the proposed project.

The southern portion of the TL crosses the Oostanaula River, which is DCH for multiple aquatic species. This area is discussed in more detail in Sections 3.3 and 3.6.1.

A 1.85-mile portion of the proposed TL runs along the easternmost property boundary of Chattahoochee National Forest and Johns Mountain WMA. The Chattahoochee National Forest’s 750,145-acres includes land in 18 north Georgia counties; the forest is managed for camping, hiking, hunting and fishing, and includes portions of the Chattooga River and the headwaters of the Chattahoochee River. The national forest also includes the beginning of the 2,174 miles Appalachian Trail and ten wilderness areas that are part of the National Wilderness Preservation System managed by the USFS.



Johns Mountain WMA is a 24,849-acre WMA located within Chattahoochee National Forest open to hunting seasonally. The WMA also allows a wide range of recreational activities including horseback riding, biking, camping, and hiking.

Resaca Battlefield State Historic Site is located 2.6 miles from the proposed TL ROW.

### **3.12 Socioeconomics and Environmental Justice**

The proposed Action Alternative would be located in two Statistical Areas. The northern portion of the proposed 115-kV TL is located in the Dalton Metropolitan Statistical Area (MSA) that consists of Whitfield and Murray Counties. The minority population of this MSA is approximately 14.7 percent. The southern portion of the proposed proposed 115-kV TL would be located in the Calhoun MSA that includes Gordon County.

The proposed Action Alternative would be located in Whitfield and Gordon counties, Georgia, near the city of Calhoun, south of the city of Dalton. The proposed 115-kV TL would go through sparsely populated areas, avoiding houses to the extent feasible. The proposed ROW has been routed to minimize impacts to the properties it would cross, generally avoiding more populated areas to the extent feasible.

The northern portion of the proposed line would be located in Whitfield County, Census Tract (CT) 313.08, Block Group (BG) 3. As well as CT 313.15, BG 3. The southern extent of the proposed proposed 115-kV TL would be located in Gordon County, CT 129.9706, BG 3. A total of 9 block groups would be affected. Three block groups are located in Whitfield County and six in Gordon County. According to the U.S. Census Bureau (USCB), these individual block groups have a total population of 14,972 (USCB 2015a).

As shown in Table 3-7, the estimated 2014 populations of Whitfield and Gordon counties are 103,542 and 56,047 respectively (USCB 2015b). The 2014 population of Dalton, the largest city in Whitfield County, was estimated at 33,529. The 2014 population of Calhoun, the largest city in Gordon County, was estimated at 16,052. The minority population in the area around the proposed proposed 115-kV TL consists of 2,608 persons, approximately 17.4 percent of the total population in the area. The percentage of minority population within the area around the proposed proposed 115-kV TL is less than the minority populations of Whitfield County (39.4 percent), Gordon County (21.1 percent) and Georgia (45.2 percent) as reported by the USCB 2015b.

The TVA Swamp Creek Substation is located west of Dug Gap Road, west of the Carbondale Rd. SW / Larry McDonald Memorial Highway interchange, in CT 313.08, BG 3, which has a total population of 659. According to the 2015 USCB, 13.2 percent are minorities (USCB 2015b).

The poverty data is not available for individual blocks. However, the poverty level in Whitfield and Gordon Counties, as measured by the 2015 USCB, is 20.5 percent and 20.1 percent respectively (USCB 2015b). These percentages are higher than the State (18.2 percent) and National (15.4 percent) poverty levels.

**Table 3-1. Socioeconomic and Demographic Conditions in Gordon and Whitfield Counties, Georgia**

<b>Demographic Characteristic</b>	<b>Dalton (2014)</b>	<b>Calhoun (2014)</b>	<b>Whitfield County</b>	<b>Gordon County</b>	<b>Georgia</b>
Estimated 2014 population	33,529	16,052	103,542	56,047	10,097,343
Black or African American	7.9%	8.5%	3.9%	4.4%	29.8%
Hispanic or Latino	45.6%	31.5%	31.9%	14.1%	8.7%
White (excluding Hispanic or Latino)	42.4%	55.7%	61.0%	78.6%	53.8%
Per capita income (2009-2013)	\$19,226	\$17,754	\$19,497	\$19,177	\$25,182
Median household income (2009-2013)	\$35,538	\$31,723	\$40,471	\$40,926	\$49,179
Below poverty level (2009-2013)	26.4%	26.9%	20.5%	21.0%	18.2%

Source: U.S. Census Bureau (2015)

## CHAPTER 4

### 4.0 ENVIRONMENTAL CONSEQUENCES

The potential effects of adopting and implementing the No Action Alternative and the Action Alternative on the various resources described in Chapter 3 were analyzed, and findings are documented in this chapter. The potential effects are presented below by resource in the same order as in Chapter 3. Cumulative effects are discussed, as appropriate and necessary, under the respective resource areas.

#### 4.1 No Action Alternative

As stated in Section 2.1.1, under the No Action Alternative, TVA would not provide an additional power supply to the Calhoun and Dalton areas. As a result, no property easements for locating the proposed TL would be purchased by TVA, and the proposed transmission facilities would not be built. TVA would continue to supply power to the Dalton and Calhoun areas under the current conditions.

Because the proposed construction, operation, and maintenance of the proposed new facilities would not occur under the No Action Alternative, no direct effects to those environmental resources listed in Chapter 3 are anticipated. However, changes to the project area and resources in this area may occur over time, independently of TVA's actions, due to factors such as population increases, changes in land use, and the potential for development to occur in the area. These changes are not expected to be the result of implementing the No Action Alternative.

Under the No Action Alternative, a decline in the reliability of electric service for some customers would be likely in the future. Service problems and interruptions likely would gradually become more frequent and more severe. These outages would have negative impacts on the ability of businesses in the area to operate. Residents of the area would also incur negative impacts from outages, such as more frequent loss of power for household heating or cooling, as well as other activities such as cooking or clothes washing. These conditions would clearly diminish the quality of life for residents in the area and would likely have negative impacts on property values in the area. Any such impacts would negatively affect all populations in the region.

#### 4.2 Action Alternative

##### 4.2.1 Groundwater and Geology

Potential impacts to groundwater could result if sediments from excavated materials enter or clog sinkholes or springs, and from the transport of contaminants, such as herbicides and fertilizers, into sinkholes and other karst features. BMPs described in *A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority* (Muncy 2012) would be used to avoid impacts on groundwater. BMPs would be used to control sediment infiltration of sinkholes from stormwater runoff.

In accordance with the Whitfield County Comprehensive Plan (2008), all applicable regulations regarding storm water permitting and the applicable BMPs described by Muncy 2012 would be followed to minimize and control erosion during construction. Spill prevention and containment control methods would be used to contain and properly

dispose of all wastes and accidental spills in order to prevent the discharge of potential contaminants to groundwater.

During clearing, revegetation and maintenance activities, herbicides with groundwater contamination warnings would not be used. Although some herbicides break down quickly, others may persist in groundwater. Use of fertilizers and herbicides would be considered with caution, and undertaken strictly before application and applied according to the manufacturer's label. TVA's BMPs for herbicide and herbicide-related fertilizer application would be used to prevent impacts to groundwater. With the application of appropriate BMPs, during construction, operation, and maintenance of the proposed TL, potential direct and indirect effects to groundwater under the Action Alternative would be insignificant. No cumulative impacts are anticipated.

#### **4.2.2 Surface Water**

Soil disturbances associated with ROW clearing and site grading for structures, access roads, or other construction, maintenance, and operation activities can potentially result in adverse water quality impacts. Soil erosion and sedimentation can clog small streams and threaten aquatic life. Removal of the tree canopy along stream crossings can increase water temperatures, algal growth, and dissolved oxygen depletion, and cause adverse impacts to aquatic biota. Improper use of herbicides to control vegetation could result in runoff to streams and subsequent aquatic impacts.

TVA routinely includes precautions in the design, construction, and maintenance of its TL projects to minimize these potential impacts. Permanent stream crossings that cannot be avoided are designed to not impede 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 and TVA requirements as described in Muncy (2012). ROW maintenance would employ manual and low-impact methods wherever possible. In areas requiring chemical treatment, only USEPA-registered 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 of these controls is expected to result in only minor temporary impacts to surface waters. As anticipated actions occurring in the proposed project area would be meeting permit requirements and following BMPs, no cumulative impacts are anticipated.

#### **4.2.3 Aquatic Ecology**

Aquatic life could potentially be affected by the proposed Action Alternative from storm water runoff resulting from construction and maintenance activities along the TL ROW. Impacts would either occur directly by the alteration of habitat conditions within the stream or indirectly due to modification of the riparian zone.

Potential impacts due to removal of streamside vegetation within the riparian zone may 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 (such as ephemeral streams) and that could be affected by the proposed TL route would be protected by standard best management practices (BMPs) as identified in Muncy (2012) 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.

TVA also provides additional categories of protection to watercourses directly affected by the 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. The width of the SMZs is determined by the type of watercourse, primary use of the water resource, topography, or other physical barriers (Muncy 2012).

Applicable USACE 404 Permits would be obtained for any stream alterations located within the project area and the terms and conditions of these permits would be followed in addition to guidelines outlined in Muncy (2012). A total of 40 watercourses were assigned Category A (Standard Stream Protection) SMZs, as defined in Muncy (2012) (see Appendix B). This standard (basic) level of protection for streams and the habitats around them is to minimize the amount and length of disturbance to the water bodies without causing adverse impacts on the construction work.

Due to the presence of suitable habitat for federally listed and significant state-listed aquatic species known from within the potentially affected watersheds and the presence of federally DCH, 17 watercourses were assigned Category B (Important Permanent Streams) SMZs along portions of the TL (Appendix B). This category is used when there is one or more specific reason(s) why a stream requires protection beyond that provided by standard BMPs. Although SMZ 015 is believed to be an intermittent stream, it is a direct tributary to the Oostanaula, Coosawattee, and Conasauga Rivers and Floyd Creek Unit 25 federally DCH and could be occupied by sensitive aquatic species during portions of the year. The Oostanaula River TL crossing (SMZ 022) was assigned a Category C (Unique Water Habitats) SMZ. This enhanced level of protection provides for specialized measures including a wider SMZ buffer zone (see Appendix B). This relatively uncommon level of protection is required because the Oostanaula River crossing is DCH for numerous federally protected aquatic species. The purpose of this protection is to avoid or minimize any disturbance of unique aquatic habitat.

The SMZs of Swamp Creek, and an unnamed tributary to Oostanaula River are intersected by the proposed TL and ROW five times and Snake Creek is intersected three times. Additionally, portions of SMZ 002 (~1,044 feet), SMZ 003 (~1,068 feet), SMZ 004 (~838 feet), and SMZ 014 (~2,000 feet) occur within the proposed TL ROW. The aquatic community within these streams would potentially be negatively impacted from increased overland flow, changes in water temperatures, and potentially short term destabilization of the stream banks due to removal of forest canopy and streamside vegetation.

Because appropriate BMPs would be implemented during construction, operation, and maintenance activities, any direct or indirect effects to aquatic ecology would be temporary and insignificant as a result of implementing the proposed Action Alternative. No cumulative impacts are anticipated.

#### **4.2.4 Vegetation**

Implementing the Action Alternative would involve clearing the ROW (to accommodate TLs and structures) and access roads. Such ground-disturbing activities would directly affect

the existing plant communities in these areas. Additionally, vegetation management along the ROW is necessary to prevent tall, woody vegetation from becoming established within the ROW. Therefore, the type of vegetative cover that occurs on the ROW would be directly affected.

Conversion of forested land along the proposed TL ROW to a shrub/herbaceous vegetative community would be long-term in duration, but insignificant. However, the overall effect with respect to local vegetation would be minor to the terrestrial ecology of the region. As of 2013, there were at least 1,370,000 acres of forested land in Gordon and Whitfield County and the adjacent Georgia and Tennessee counties (USFS 2015). Completion of the project, as currently proposed, would result in clearing and converting about 121 acres of forest for the new 115-kV TL. Cumulatively, project-related effects to forest resources would be negligible when compared to the total amount of forested land occurring in the region.

Many forest stands within the proposed ROW have a relatively small component of invasive terrestrial plants. The construction and operation of a TL would likely result in an increase of invasive plant cover in these areas. However, the plants most likely to invade the ROW are common throughout northwestern Georgia and adoption of the Action Alternative would not change the abundance of these species at the county, regional, or state level. The use of TVA standard BMPs to revegetate with noninvasive species (Muncy 2012) would serve to minimize the potential introduction and spread of invasive species in the project area.

Plant communities found within the proposed ROW are common and well represented throughout the region. No unique plant habitats possessing conservation value would be negatively impacted by construction, operation, and maintenance of the new TL.

#### **4.2.5 Wildlife**

Under Action Alternative, TVA would construct the proposed 115-kV TL and associated access roads. On the proposed TL ROW, TVA would initially clear and then maintain about 121 acres of forest for the new 115-kV TL as described in Sections 2.2.1.1. and 2.2.2.2. In many areas, the TL would span across agricultural and developed areas. Impacts to wildlife habitat in these spanned areas would thus be limited to the structure locations and to ground disturbance in these areas. Any wildlife currently using these heavily disturbed herbaceous habitat areas may be displaced by increased levels of disturbance during construction actions. However, it is expected that these primarily common, habituated species would return to the project area upon completion of actions.

As indicated in Section 4.2.4, approximately 121 acres of forested habitat would be removed and permanently maintained as early successional habitat for as long as the new 115-kV TL is in operation. Direct effects of forest removal along the proposed ROW may occur to some individuals that may be immobile or slow moving during the time of construction (i.e. juvenile animals or eggs). This could be the case if construction activities took place during breeding/nesting seasons. However, the actions are not likely to affect populations of species common to the area, as similar forested habitat exists in the surrounding landscape.

Construction-associated disturbances and habitat removal is expected to force wildlife to move into surrounding areas in an attempt to find new food sources, shelter sources and to reestablish territories. In the event that the surrounding areas are already overpopulated, further stress to wildlife populations could occur to those species presently utilizing these areas as well as those attempting to relocate. However, the proposed project area and

surrounding landscape is highly fragmented and influenced by human activity. It includes fragmented forests, agricultural fields, residential homes, farm ponds, roads and railroad tracks. Thus, it is unlikely that species currently occupying adjacent habitat surrounding the proposed ROW would be negatively impacted by the influx of new residents. It is expected that over time any displaced individuals able to utilize early successional habitat would return to the project area upon completion of construction, maintenance, and operational activities.

Cumulative effects of the project on common wildlife species are expected to be negligible. Much of the proposed TL ROW and access roads area is through or adjacent to previously disturbed areas impacted by agriculture, industrial, and residential development. Proposed actions across the TL would permanently remove existing forested habitat for common wildlife. Following completion of the project, the ROW would be maintained as early successional herbaceous fields which would provide habitat for several common wildlife species that utilize early successional fields and agricultural/developed areas.

## **4.2.6 Endangered and Threatened Species**

### **4.2.6.1 Aquatic Animals**

As discussed in Sections 4.2.2 and 4.2.3 changes to water quality resulting from the implementation of the proposed Action Alternative could have direct and indirect impacts to aquatic biota within watercourses in the project area. These effects could occur either directly by the alteration of habitat conditions or indirectly due to modification of riparian zones and storm water runoff resulting from construction activities associated with the vegetation removal efforts. Potential impacts due to the removal of streamside vegetation within the riparian zone include increased erosion and siltation. Loss of in-stream habitat, and increased stream temperatures. Other potential construction impacts include alteration of stream banks and stream bottoms by heavy equipment and runoff of herbicides into streams.

However, the watercourses documented within the proposed ROWs would be protected by implementing standard BMPs and category stream protection measures as defined in Muncy (2012) or as required by standard permit conditions. Specifically, watercourses that are direct tributaries to federally listed DCH would receive Category B Protection which requires a minimum 70-foot-wide SMZ buffer width, and the mainstem Oostanaula River would receive Category C Protection with a minimum 90-foot-wide SMZ buffer width according to Muncy guidelines (2012) in order to provide additional protection to critical habitat for federally listed species. These BMPs are designed in part to minimize disturbance of riparian areas and subsequent erosion and sedimentation that can be carried to streams.

The proposed TL route and associated access roads in Whitfield and Gordon counties crosses three 10-digit HUC watersheds, including Conasauga River-lower, Oostanaula River-upper, and Oothkalooga Creek. Within these watersheds, there are 11 known federally listed species: Alabama moccasinshell, amber darter, blue shiner, Conasauga logperch, Coosa moccasinshell, fine-lined pocketbook, Georgia pigtoe, southern clubshell, southern pigtoe, triangular kidneyshell, and interrupted rocksnail (USFWS 2004, USFWS 2014). However, no federally listed aquatic species have been collected within the proposed project footprint and no in-stream work would occur in any areas designated as DCH for aquatic species. Furthermore, appropriate BMPs and stream protection measures

would be implemented during construction, maintenance, and operation of the proposed TL and the associated access roads.

During consultation with the USFWS Athens Ecological Services field office (December 2015 meeting and a follow-up conference call in January 2016), the Service indicated the following stream crossings may contain the trispot darter, a species that is not currently federally-listed, but that is petitioned, with a Service listing decision currently scheduled for September 2017: SMZs 006, 008-012, 018, 027, 038, 039, 045-047, and 052. To ensure no impacts to this species, TVA would take the following protective measures:

- Temporary culverts at these crossings would be not be placed or removed between November and April to avoid any potential effects to this species during its spawning season.
- Any geotextile fabric placed would be removed along with the culverts

In addition, TVA surveyed SMZs 008-012, 27, 038, and the ford footprint of SMZ 052 in March 2016 for the presence or likely presence of the federally listed fined-lined pocketbook, southern pigtoe, and southern clubshell. The mussel survey documented no federally listed species. However, the state-listed Coosa creekshell, currently petitioned with a Service listing decision currently scheduled for September 2017, was collected in low abundance in two of the streams sampled (038 and 008-012) (TVA 2016b). ROW access roads would be sited to avoid crossing these two streams. TVA has determined that no streams to be crossed by ROW access roads contain either species petitioned for listing or federally listed aquatic species.

With the implementation of the measures described above, no direct, indirect, or cumulative impacts to federally or state-listed as threatened and endangered aquatic species are expected to occur under the Action Alternative.

#### **4.2.6.2 Plants**

Implementing the proposed Action Alternative, would not affect federally listed plant species or DCH, because neither occurs in the project area. The state-listed plant species that occur in the proposed ROWs include: Asa Gray's sedge, dense-flowered knotweed, and Jacob's ladder. Thus, these state-listed species would be impacted, to some extent, under the proposed Action Alternative. Generally, Jacob's ladder requires forested conditions for survival and reproduction. Even if Jacob's ladder were to survive the disturbance related to ROW clearing and TL construction, it would not likely persist in the open ROW. Jacob's ladder would likely be eliminated from the portion of the proposed ROW where it occurs. However, this impact would not be significant because the population identified within the proposed ROW contains just two individuals and is not viable in the long-term. In addition, this species is known to occur at about 10 other location in northwestern Georgia. One site in Dade County supports between 50 to 100 individual plants, respectively.

Asa Gray's sedge and dense-flower knotweed both occur in wetlands and could persist in open conditions like those found in a ROW. Dense-flower knotweed is currently found in an area with full sun comparable to a maintained ROW. Asa Gray's sedge generally prefers shadier environments and currently occurs in a forested wetland, but the species can occur in more open situations. Standard BMPs implemented in wetlands prevent grubbing out stumps and other activities during ROW clearing that would heavily disturb the soil profile



and negatively impact Asa Gray's sedge and dense-flower knotweed. Trees would be removed in these areas using a feller buncher (or similar piece of equipment) that would produce relatively little disturbance. This method of clearing has successfully been used on other TVA TL projects where state-listed plants inhabited wetlands (TVA 2012). For example, the state-listed plants found within the Hillsboro 161-kV TL ROW were still present, one year post-construction, in numbers comparable to those found before the work took place.

With implementation of the avoidance measures listed below, the proposed Action Alternative would not significantly impact Asa Gray's sedge and the dense-flower knotweed. Mitigation measures for areas containing these two species would include:

- On-site environmental technicians and TVA's Biological Permitting and Compliance botanists would coordinate before ROW clearing to determine access routes through sensitive areas.

#### **4.2.6.3 Terrestrial Animals**

The potential for impacts occurring as a result of implementing the proposed Action Alternative to two federally listed species and three Georgia state-listed species were assessed based on their documented presence within three miles of the proposed Action Alternative. Two federally listed species were addressed based on the potential for the species to occur in the project area. All of these species have the potential to utilize the project area.

Peregrine falcons may utilize open areas within the proposed 115-kV TL ROW for foraging and construction activities may temporarily disrupt these foraging efforts. However ample amounts of similar foraging habitat exist in the surrounding landscape such that any indirect effects would be negligible. In addition, ROW clearing would ultimately create foraging habitat for this species upon completion of construction activities. Therefore, direct, indirect, or cumulative impacts to populations of peregrine falcon are not anticipated.

The proposed 115-kV TL ROW crosses suitable habitat for the common map turtle and the Alabama map turtle in and around Swamp Creek. Two areas of this creek that may be impacted by the proposed actions also have sandy shorelines suitable for nesting map turtles. To avoid and minimize potential impacts to these two species, TVA would implement the following measures:

- Within the two areas of suitable turtle habitat, project-related activities that may impact nesting grounds (including driving) would be limited to September through April to avoid any direct impacts to turtle nests.
- BMPs and SMZs, as outlined in Muncy (2012), would be followed in delineated wetlands (See sections 4.2.3 and 4.2.8) and along streams (See Sections 4.3 and 4.6.1) to avoid impacts to water quality in these two areas.
- Any gravel or other substrate material added on top of the sand within the areas of suitable habitat, would be removed upon completion of the project to avoid permanently altering nesting habitat.

If these minimization measures are followed, no direct, indirect, or cumulative impacts are expected to neither the common map turtle nor the Alabama map turtle by the proposed Action Alternative.

No caves or other winter hibernacula for either the Indiana bat or northern long-eared bat exist in the area affected by the proposed project activities or would be impacted by the proposed actions. However, utilizing the Range-wide Indiana Bat Summer Survey Guidelines (USFWS 2014a; USFWS 2015b), TVA identified 24.98 acres of suitable foraging and summer roosting habitat for these bat species was during field surveys in the proposed project area. This potential roosting habitat would be removed for the creation of the proposed ROW causing indirect effects by lessening the amount of habitat for these bats to return to. TVA initiated consultation with USFWS in Athens, Georgia which resulted in an adjustment to the amount of suitable Indiana bat and northern long-eared bat habitat in comparison to that identified during field reviews.

Per communications with this office, an In-Lieu Fee Mitigation Option was proposed that utilized a habitat modeling analysis of the project footprint. This model identified additional acreage of potentially suitable habitat for Indiana bat and northern long-eared bat that was not observed during the field surveys following the Range-Wide Indiana Bat Summer Survey Guidelines. Through the Section 7 consultation process, it has been determined that ROW clearing for the proposed TL may impact a total of 59.8 acres of suitable or potentially suitable summer roosting habitat. No additional suitable summer roosting habitat would be removed for construction of the access roads. Females and pups could be occupying maternity roosts within the action area during June and July. Potential direct impacts to Indiana bat and northern long-eared bat would be avoided by a restriction on tree removal activities.

In accordance with the terms of the ESA, a conservation MOU would be established between the USFWS and TVA for the direct loss of 59.8 acres of potential suitable summer roosting habitat for Indiana and northern long-eared bats. TVA would implement the proposed Action Alternative in accordance with the stipulations of the MOU, including the following measures:

- Any potentially suitable Indiana and northern long-eared bat roosting habitat would be selectively removed between the dates of October 15, 2016 and March 31, 2017.
- TVA would contribute to 'The Conservation Fund' to promote the conservation and recovery of Indiana bat.

Any potential indirect and cumulative effects to these species (i.e. removal of forest habitat suitable for use by Indiana or northern long-eared bats) would be appropriately mitigated prior to the start of clearing activities as part of TVA's compliance with ESA in consultation with USFWS.

#### **4.2.7 Floodplains**

As a federal agency, TVA is subject 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" (United States Water Resources Council 1978). 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. The EO requires that agencies avoid the 100-year floodplain unless there is no practicable alternative.

Under the Action Alternative, the proposed TL would be constructed, maintained, and operated as stated in Section 2.2. Additionally, a transformer and communications equipment would be installed at an existing TVA substation. Portions of the TL would cross the 100-year floodplains of several streams in Whitfield and Gordon counties. Consistent with EO 11988, overhead TLs and related support structures are considered to be repetitive actions in the 100-year floodplain. The conducting wires of the TL would be located well above the 100-year floodplain.

The support structures for the TLs 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 TL location in floodplains are followed. To minimize adverse impacts on natural and beneficial floodplain values, the following routine mitigation measures would be implemented:

- The ROW would be revegetated where natural vegetation would be removed
- BMPs would be used during construction activities
- Road improvements would be done in such a manner that upstream flood elevations would not be increased
- Construction would adhere to the TVA subclass review criteria for TL location in floodplains

Based upon a review of Whitfield and Gordon counties, Flood Insurance Rate Maps, portions of 17 of the proposed access roads would be located within 100-year floodplains. Consistent with EO 11988, temporary access roads are considered to be repetitive actions in the 100-year floodplain. To minimize adverse impacts, any road improvements would be done in such a manner that upstream flood elevations would not be increased.

The proposed transformer and communications equipment would be located outside the 100-year floodplain, which would be consistent with EO 11988.

Based upon implementation of the above mitigation measures, the proposed project would have no significant impact on floodplains.

#### **4.2.8 Wetlands**

Activities in wetlands are regulated under Section 401 and 404 of the CWA and are addressed by EO 11990 (Protection of Wetlands). Section 401 requires water quality certification by the state for projects permitted by the federal government (Strand 1997). Section 404 implementation requires activities resulting in the discharge of dredge or fill into waters of the U. S. to be authorized through a Nationwide General Permit or Individual Permit issued by the USACE. EO 11990 requires federal agencies to minimize wetland destruction, loss, or degradation, and preserve and enhance natural and beneficial wetland values, while carrying out agency responsibilities.

Under the Action Alternative, the proposed TL and associated access roads would be constructed. Efforts were made during the TL siting process to avoid wetlands. However,

because of project and topographic constraints, and because of the goal of minimizing impacts to other environmental resources, no practicable alternative was available that would allow complete avoidance of wetlands.

A total of 22.94 acres of wetlands located within the ROW would be spanned by the proposed TL (Table 3-5). As described in Section 2.2.1.1, adequate clearance between tall vegetation and TL conductors would require trees within the proposed ROW be cleared. Establishing a TL 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 over wires.

Of the 22.94 acres of wetland, 8.58 acres is currently low growing scrub-shrub/emergent wetland (Table 3-5). Emergent wetland areas would not require clearing due to the existing low stature of this habitat type. Scrub-shrub wetland are would require minimal clearing to accommodate TL construction; however, it would be anticipated that this community type would recover quickly due to the fast growing nature of scrub-shrub vegetation.

The clearing and habitat conversion of the remaining 14.36 forested wetland acres within the ROW would be required to accommodate the construction of the proposed TL. Forested wetlands, in general have deeper root systems and contain greater biomass (quantity of living matter) per area than do emergent and scrub-shrub wetlands which do not grow as tall. as a result, forested wetlands tend to be able to provide higher levels of “wetland functions,” such as sediment retention, carbon storage, and pollutant retention and transformation (detoxification), all of which support better water quality. Consequently, the clearing and conversion of forested wetlands to lower-growing wetlands reduces some wetland functions that support healthier or improved downstream water quality (Wilder and Roberts 2002; Ainslie et al. 1999; Scott et al. 1990). Although, these forested wetland areas would be converted to emergent and scrub-shrub wetland communities providing the same suite of functions, it would be at a reduced level.

As such, the proposed conversion of forested wetland to scrub-shrub or emergent habitat is subject to the regulation of the USACE Savannah District and Georgia Environmental Protection Division to ensure no net loss of wetland function across the landscape, in accordance with CWA Section 404/401. Likewise, four structures with guy wires are proposed for location within wetlands. Although, siting has minimized structure locations in wetlands to the extent practicable, fill resulting from structure placement is considered a direct wetland impact and is to be compensated for, accordingly. Therefore, to reduce loss of wetland resources within the project watershed, TVA would purchase compensatory mitigation credits, in compliance with current standards and guidelines and with USACE approval, through Georgia’s In-Lieu-Fee program.

TVA would minimize wetland disturbance during construction via no-mechanized clearing in wetlands, use of low ground pressure equipment, or use of mats during clearing and construction activities to minimization of rutting to less than 12 inches to reduce soil compaction, and adherence to wetland best management practices (Muncy 2012) for any and all other work necessary within the delineated wetland boundaries. Wetland habitat within the ROW located in areas proposed for heavy equipment travel would experience minor and temporary impacts during TL construction. Vehicular traffic would be limited to narrowed access corridors along the ROW for structure and conductor placement. Similarly, potential structure placement in wetlands would be conducted within the

parameters and meet the conditions of the approved USACE permit, resulting in no significant wetland impacts.

Cumulative impact analysis of wetland effects takes into account wetland loss and conversion at a watershed scale currently and within the reasonable and foreseeable future. The proposed wetland impacts would be insignificant on a cumulative scale due to the avoidance, minimization, and mitigation measures in place, in accordance with the Clean Water Act and per the directives of USEPA and USACE to ensure no net loss of wetland resources. In addition, TVA would purchase a 1.3-mile ROW easement for a future TL connection to the Center Point Substation, as part of this project; however, construction would occur at a future time when demand justifies the action. The purchase of this easement is categorically excluded under TVA procedures for Compliance with the National Environmental Policy Act Section 5.2.17. While wetland areas are present within the 1.3-mile easement proposed for purchase, ROW corridor clearing and TL construction within the easement would undergo a separate environmental review if and when it is determined that this TL would be needed. This review would require appropriate wetland mitigation efforts be in place to compensate for wetland impacts in accordance with Federal mandates requiring no net loss of wetland resources. Therefore, via mitigation provisions for the current project and future projects, in accordance CWA no-net-loss of wetland resources mandate, no cumulative wetland impacts are anticipated as a result of the proposed project.

In compliance with the CWA, EO11990, TVA has considered all alternatives to avoid and minimize wetland impacts, resulting in the least wetland disturbance practicable. As a result of proposed protective measures in place during construction, maintenance, and operation and fulfilling USACE mitigation requirements, the project would have no significant adverse direct, indirect, or cumulative impacts to wetland areas or to the associated wetland functions and values provided within the general watershed.

#### **4.2.9 Aesthetics**

Visual consequences were examined in terms of visual changes between the existing landscape and proposed actions, sensitivity of viewing points available to the general public, their viewing distances, and visibility of proposed changes.

##### **4.2.9.1 Visual Resources**

The visual attributes of existing scenery, along with the anticipated attributes resulting from the proposed action, are reviewed and classified in the visual analysis process. The classification criteria are adapted from a scenic management system developed by the USFS and integrated with planning methods used by TVA. The classifications are based on methodology and descriptions from the USDA (1995) and TVA (2003). Sensitivity of viewing points available to the general public, their viewing distances, and visibility of proposed changes are also considered during the analysis. Scenic integrity indicates the degree of intactness or wholeness of the landscape character. These measures help identify changes in visual character based on commonly held perceptions of landscape beauty, and the aesthetic sense of place. The foreground, middle ground, and background viewing distance parameters were previously described in Section 3.9.1.

The proposed 115-kV TL construction would begin at the Swamp Creek Substation. The new tap point would be visually similar to the existing lines and structures currently seen in the existing landscape of the heavy manufacturing area. Views for area motorists and residents would not likely be negatively affected.

The proposed 115-kV TL would be routed to the west toward the USFS Chattahoochee National Forest crossing I-75 and Dug Gap Road. The proposed TL would pass adjacent to the eastern edge of the Forest land and would be shielded from most to the forest by higher elevations west of the proposed TL. Views of this new TL would be mainly by motorists on I-75. Views from the road would be brief and in the foreground. The TL would generally follow the National Forest property line south. The proposed 115-kV TL route continues south near Carbondale Road SW parallel to the railroad. This portion of the TL would be located in the foreground viewing distance of some residential, agricultural and manufacturing properties that are adjacent to the railroad.

The proposed 115-kV TL route diverts from the railroad and crosses the Blue Spring Branch near Roland Hayes Parkway SW toward SR 53. This portion of the TL is routed cross county through rural residential and agricultural areas and would be in the foreground viewing distance of these properties.

After crossing SR 53 the proposed TL route follows property lines near a large residential development and terminates at the existing Fuller Substation near McDaniel Station Road SW. This area is classified as Emerging Suburban and consists of new residential developments and agricultural fields. Although the new TL would add to the number of discordantly contrasting elements seen in the landscape, these views are not expected to be visually significant due to the existing substation and number of existing TL that are present in the area.

Operation, construction, and maintenance of the proposed 115-kV TL would be visually insignificant. There may be some minor visual discord during the construction period due to an increase in personnel and equipment and the use of laydown and materials storage areas. These minor visual obtrusions would be temporary until the existing and proposed ROW and laydown areas have been restored through the use of TVA standard BMPs (Muncy, 2012). Therefore, overall visual impacts are anticipated to be minimal as a result of the proposed Action Alternative. Cumulative impacts are not anticipated.

#### **4.2.9.2 Noise and Odors**

During construction of the proposed TL, equipment could generate noise above ambient levels. Because of the short construction period, noise-related effects are expected to be temporary and minor. For similar reasons, noise related to periodic TL maintenance is also expected to be insignificant. TLs may produce minor noise during operation under certain atmospheric conditions. Off the ROW, this noise is below the level that would interfere with speech.

#### **4.2.10 Archaeological and Historic Resources**

Under the Action Alternative, the proposed TL and associated access roads would be constructed. TVA, in consultation with SHPO and federally recognized tribes, determined that the APE contains 20 archaeological sites of undetermined eligibility as well as IS-22 (9GO399), the Dickey Cemetery, also considered of “undetermined” eligibility. These sites may contain data that would be important in prehistory or history. Five of the “undetermined” sites are located in areas where the proposed TL structures would be erected. The remainder are located within the proposed ROW, where impacts would be limited to possible ground disturbance resulting from TL maintenance activities and ROW maintenance.

TVA has elected to perform additional identification efforts (Phase II testing) to fully determine the NRHP eligibility of five archaeological sites of undetermined eligibility where adverse effects cannot be avoided. TVA has proposed to the SHPO that to avoid project effects to the remaining 15 archaeological sites of “undetermined eligibility,” TVA would complete the following measures:

- No TL structures or guy wires would be installed in the archaeological site boundaries.
- Access across the site boundaries would be avoided where practical.
- BMPs implementing for access and clearing.

TVA’s routine BMPs would include clearing of vegetation using a fellerbuncher, or by hand clearing using chain saws or herbicides, and that all cleared vegetation be removed from the site boundaries by hand. Access across these sites would be accomplished using wetland mats, low-ground pressure equipment, or when the ground is dry and firm. TVA and SHPO currently are in consultation regarding which of the 20 sites require Phase II testing. Once TVA and SHPO have agreed on this and on the scope of the identification efforts, TVA would carry out the testing.

In a meeting with the SHPO on March 31, 2016, TVA and SHPO agreed to execute a PA for the undertaking. The PA will outline the procedures and processes that TVA will follow in order to meet TVA’s NHPA section 106 obligations for the undertaking. The PA will stipulate that, if any of the tested archaeological sites are eligible for the NRHP, TVA would consult further with SHPO to reach agreement on avoidance, minimization, and/or mitigation measures for any NRHP-eligible archaeological sites where the undertaking could potentially result in adverse effects. These measures would be stipulated by a Memorandum of Agreement (MOA) between TVA and SHPO. The MOA would commit TVA to the avoidance and/or minimization and/or mitigation measures for the NRHP-eligible resources where potential adverse effects could occur.

Based on the Dickey Cemetery delineation study, TVA and SHPO agreed that TVA would avoid effects to the cemetery with the following avoidance measures:

- A 30-foot wide buffer would be placed surrounding the cemetery wall and fence. No construction related to this undertaking would take place within the buffer. TVA would not disturb the cemetery including the fence and wall.
- Any required vegetation clearing within the buffer would be accomplished either by hand or by using low ground-pressure equipment.
- No heavy equipment would be used inside the cemetery boundary.
- TVA would note these restrictions permanently on TVA’s project drawings, and would apply them to all future maintenance activities associated with this proposed new TL.

Once TVA has furnished the additional information concerning recent renovations at IS-16 (Colonial Revival Ranch house) to SHPO, and pending SHPO’s concurrence with TVA’s *ineligible* determination for that resource, seven above-ground resources would remain

within the APE for which TVA and SHPO agree are NRHP-eligible. TVA has found that the undertaking would affect each of the seven NRHP-eligible above-ground resources indirectly, but that the effects would not be adverse. TVA continues to consult with SHPO on this finding. Should SHPO find that the project has the potential to adversely affect any of these seven properties, TVA and SHPO would execute an MOA that would stipulate TVA's avoidance, minimization, or mitigation measures for the resource in question.

The PA, when signed by TVA and SHPO, will govern the evaluation and resolution of adverse effects as project designs are developed, as provided for under 36 CFR §800.14(b)(3). With this agreement in place, any potential adverse effects to historic properties in the APE will be resolved prior to TVA's initiation of construction activities.

#### **4.2.11 Recreation, Parks, and Natural Areas**

Under the Action Alternative, construction of the proposed 115-kV TL and associated access roads could cause some minor shifts in informal outdoor recreation use patterns in the immediate vicinity of the TL ROW corridor. However, the extent of any such impacts should be minor and insignificant. Because of the distance between the project and the Oostnaula River access facility, no significant impacts on public use of this recreation area would occur.

The proposed 115-kV TL would cross a portion of the Oostanaula River which is DCH for multiple aquatic species. SMZs and BMPs, as defined by Muncy (2012), would be implemented to minimize or avoid any impacts resulting from the proposed 115-kV TL construction, operation, and maintenance. These measures are designed to minimize disturbance resulting from construction activities in or around streams to prevent sediment and debris from entering the river. Because SMZs and BMPs would be implemented, no direct, indirect or cumulative impacts to the Oostanaula River DCH are anticipated.

The proposed project-related construction would occur along the easternmost property boundary of a portion of the Chattahoochee National Forest and Johns Mountain WMA. There would be no direct impacts to these areas as the TL ROW does not cross these areas. However, there would be minor visual impacts to the viewshed within the national forest and WMA (see Section 4.2.9.1 Visual Resources). Indirect impacts to these areas could include sedimentation and runoff. These impacts would be minimized to an insignificant level by the use of BMPs as described above.

Resaca Battlefield State Historic Site is located 2.6 miles from the proposed TL ROWs. Because the distance from the project site to this feature is sufficient, no direct, indirect or cumulative impacts to these natural areas are anticipated as a result of the proposed Action Alternative.

#### **4.2.12 Socioeconomics and Environmental Justice**

Under the Action Alternative, the proposed 115-kV TL would help maintain reliable service in the area, thereby avoiding the potential increase in negative impacts from lack of reliability. Most homes in the area are located far enough from the proposed TLs that property values would not be impacted. Various studies have concluded that such TLs have little or no impact on the value of nearby properties, and that if impacts do occur, they tend to dissipate over time (Kroll and Priestley 1992). Construction activity would be temporary and would generally have little impact on residents of the area.



The proposed 115-kV TL would be constructed cross-country including crossing rivers, public and private roads and interstate highway. The population in the areas near the proposed TLs is generally small. The minority population consists of 14.7 percent of the total population in the area and poverty levels in the area are slightly higher than the county and state levels. No significant negative impacts are expected as a result of the proposed Action Alternative. Therefore, no disproportionate impacts to disadvantaged populations are likely.

#### **4.2.13 Postconstruction Effects**

##### ***4.2.13.1 Electric and Magnetic Fields***

TLs, like all other types of electrical wiring, generate both electric and magnetic fields (i.e., EMFs). The voltage on the conductors of a TL generates an electric field that occupies the space between the conductors and other conducting objects such as the ground, TL 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 TL, and the distance from the TL.

The fields from a TL 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 TL 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 TL 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 TL 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 TLs, such as the proposed 115-kV TL, may produce an audible low-volume hissing or crackling noise (Appendix C). 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 TLs. 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 United States, 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 TLs, 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 TLs 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 TL connectors are not anticipated to cause any significant impacts related to EMF.

Under this alternative, EMFs would be produced along the length of the proposed TL. The strength of the fields within and near the ROW varies with the electric load on the TL and with the terrain. Nevertheless, EMF strength attenuates rapidly with distance from the TL 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.

#### **4.2.13.2 Lightning Strike Hazard**

TVA TLs 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 TL, for at least the width of the ROW. The NESC is strictly followed when installing, repairing, or upgrading TVA TLs or equipment. TL structures are well grounded, and the conductors are insulated from the structure. Therefore, touching a structure supporting a TL poses no inherent shock hazard.

#### **4.2.13.3 Transmission Structure Stability**

The structures, similar to those shown in Section 2.2.1.4, that would be used on the proposed TL are the result of detailed engineering design and have been used by TVA for over 70 years with an exceptional 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.

#### **4.2.13.4 Other Impacts**

No major impacts as air quality and solid waste are expected to result from the relatively short-term activities of construction. TVA standard practices and procedures are used to address these issues (TVA 2016).

TL structures are well grounded, and the conductors are insulated from the ground. Therefore, touching a structure supporting a TL poses no inherent shock hazard. Additionally, TVA TLs are built with overhead ground wires that would 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 a TL, for at least the width of the ROW. The NESC is strictly followed when installing, repairing, or upgrading TVA TLs or equipment.

### **4.3 Long-term and Cumulative Impacts**

The presence of the TL would present long-term visual effects to the mostly rural character of the local area. However, because of the route of the proposed TL would traverse mostly rural areas with few residences and would involve only a few road crossings, the TL would not be especially prominent in the local landscape. Likewise, the establishment of easements for the proposed ROW with local landowners would pose a long-term encumbrance on the affected properties. 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 TL.

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 in Gordon and Whitfield counties, depends on a variety of factors and cannot be predicted accurately. 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.

### **4.4 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 TL could result in a small amount of localized siltation.
- Trees would not be permitted to grow within the TL ROW or to a determined height adjacent to the ROW that would endanger the TL. 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 loss of about 143 acres of forested habitat for the life of the TL.
- Any burning of cleared material would result in some short-term air pollution.
- ROW construction would involve tree clearing and conversion of 14.36 acres of forested wetland to emergent or scrub-shrub habitat, and maintenance of a total of 22.94 acres of wetland habitat as scrub-shrub habitat for the life of the TL.
- The proposed TL would result in minor, long-term visual effects on the landscape in the immediate local area.

### **4.5 Relationship of Local Short-Term Uses and Long-Term Productivity**

Land within the ROW of the proposed TL would be committed to use for electrical system needs for the foreseeable future. Approximately 370 acres of ROW, including the purchase of about 317 acres for new ROW and 53 acres of existing ROW would be utilized for the proposed project (as described in Sections 1.1 and 2.2.1.1). Roughly 24 acres would be

purchased for new ROW that would be utilized in the future for a 230-kV connection to Center Point Substation. Some of this acreage would be converted from their current use of pasture, agriculture, and as forested land to use as a ROW. The proposed ROW would support the 115-kV TL (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 TL. These losses of long-term productivity with respect to timber production and as wildlife habitat are minor both locally and regionally.

#### **4.6 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 TL would be committed for the life of the TL. 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 TL 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 TL could continue.

## CHAPTER 5

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Involvement: Floodplains

## CHAPTER 6

### 6.0 ENVIRONMENTAL ASSESSMENT RECIPIENTS

#### 6.1 Federal Agencies

Chattahoochee-Oconee National Forest  
Gainesville, Georgia

United States Army Corps of Engineers  
Morrow, Georgia

United States Fish and Wildlife Service  
Athens, Georgia

#### 6.2 Federally Recognized Tribes

The following tribes were notified of the availability of the document:

Absentee Shawnee Tribe of Oklahoma  
Alabama-Coushatta Tribe of Texas  
Alabama-Quassarte Tribal Town  
Cherokee Nation  
Chickasaw Nation  
Eastern Band of Cherokee Indians  
Eastern Shawnee Tribe of Oklahoma  
Kialegee Tribal Town  
Muscogee (Creek) Nation of Oklahoma  
Poarch Band of Cherokee Indians  
Seminole Nation of Oklahoma  
Shawnee Tribe  
Thlopthlocco Tribal Town  
United Keetoowah Band of Cherokee Indians in Oklahoma

#### 6.3 State Agencies

Georgia Department of Natural Resources - Historic Preservation Division  
Stockbridge, Georgia

Georgia Department of Transportation  
Atlanta, Georgia

Tennessee Historical Commission  
Nashville, Tennessee

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## CHAPTER 7

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## **Appendix A – Correspondence**



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Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, TN 37902

June 9, 2015

Dr. David Crass, Division Director  
Georgia Department of Natural Resources  
Historic Preservation Division  
Attn: Environmental Review  
254 Washington Street, SW  
Ground Level  
Atlanta, GA 30334

Dear Dr. Crass:

TENNESSEE VALLEY AUTHORITY (TVA), CENTER POINT-MOSS LAKE #2  
TRANSMISSION LINE (TL), PHASE I CULTURAL RESOURCES SURVEY, GORDON AND  
WHITFIELD COUNTIES, GEORGIA

TVA proposes to construct a new transmission line (TL) that would improve electric reliability by providing a back-up path for power to the area. TVA would construct approximately 19.5 miles of new TL on new and existing right-of-way (ROW) near North Georgia EMC's existing Swamp Creek Substation located south of Dalton, to their Fuller Substation located on the south side of Calhoun (see attached map). TVA would purchase an additional 1.4 miles of ROW from the new TL to TVA's existing Center Point Substation. Additionally, TVA would install a new transformer in their Moss Lake 230-kV Substation and communications equipment at their Moss Lake and Center Point 230-kV Substations. TVA has determined that this proposed Center Point-Moss Lake #2 TL with taps to Swamp Creek and Fuller Substations project (referenced as the Center Point-Moss Lake #2 Transmission Line Project) is an undertaking (as defined at 36 CFR § 800.16(y)) that has the potential to cause effects on historic properties. We are initiating consultation under Section 106 of the National Historic Preservation Act for this undertaking.

TVA identified the area of potential effects (APE) for the undertaking, for archaeological resources, as the 20.9-mile proposed TL ROW. This APE includes some 100-foot wide ROW but consists mostly of 150-ft wide ROW. TVA has identified the APE for historic architectural resources as a one-half mile radius surrounding the centerline of the proposed new TL, as well as any areas where new construction or vegetation clearing would occur within view of an historic resource.

TVA contracted with Tennessee Valley Archaeological Research (TVAR) to perform a phase I cultural resources survey of the APE. Enclosed are three bound copies of the draft report titled, *A Phase I Cultural Resources Survey of Tennessee Valley Authority's Planned Center Point-Moss Lake No. 2 Transmission Line in Gordon and Whitfield Counties, Georgia*, along with three CDs containing digital copies of the report.

Dr. David Crass  
Page Two  
June 9, 2015

TVAR's background study, conducted prior to the archaeological investigation, indicated that eight previous archaeological surveys have intersected the APE at various points; no archaeological sites have been recorded previously within the APE; and one historic cemetery (Dickey Cemetery) is located within the APE. This cemetery contains a stone wall and fence and 40-50 graves, most of which are unmarked, and many of which are outside the stone wall and fence. The survey resulted in the identification of 55 previously unrecorded archaeological sites and 18 isolated finds of cultural material. TVAR recommends that 35 of the sites and all 18 isolated finds are ineligible for inclusion in the National Register of Historic Places (NRHP). The remaining 20 archaeological sites could contain data important to prehistory, but given the inherent limitations of Phase I surveys, their NRHP eligibility is recommended as "undetermined". These sites are: 9GO354, 9GO355, 9GO356, 9GO357, 9GO361, 9GO362, 9GO364, 9GO365, 9GO367, 9GO370, 9GO372, 9GO373, 9GO375, 9GO376, 9GO379, 9GO386, 9GO390, 9WD164, 9WD165, 9WD171. TVAR recommends that TVA avoid project effects to these sites.

The background study also indicated that 51 previously documented historic architectural resources are located within the APE. The field survey revisited all 51 of these resources. TVAR recommends that four of the previously recorded resources (GNHARGIS numbers 36458, 36460, 36462, and 36467) are eligible for the NRHP. The undertaking would result in visual effects to all four, but the effects will not be adverse because the historic setting of all four has been compromised due to modern development. The survey also identified 23 previously undocumented resources (which the report authors denoted IS-1 through IS-23). Of these, TVAR recommends three as eligible for the NRHP: IS-4, a ca. 1930 Colonial Revival style house; IS-15, Liberty Cumberland Presbyterian Church; and IS-23, two segments of the Norfolk Southern Railroad. TVAR recommends that the undertaking will have a visual effect on all three, but that the effect will not be adverse due to modern development that has altered the historic setting of these properties. In addition, TVAR recommends that although the Dickey Cemetery (located within the proposed new ROW) is ineligible for the NRHP, TVA should span the cemetery resulting in no structures being placed within the cemetery. TVAR suggests that TVA place a 50-foot avoidance buffer around the cemetery.

TVA has reviewed the enclosed report and agrees with the findings and recommendations of the authors. TVA finds that the undertaking would result in no adverse effects to any above ground (historic architectural) resources in the APE. TVA will place a 50-foot avoidance buffer surrounding the Dickey Cemetery as recommended by TVAR, and will ensure that the buffer is clearly marked on all plans and profiles. No TL construction will take place within the buffer, and vegetation clearing will be accomplished by hand or by using low ground pressure equipment such as a feller buncher. In addition, TVA will develop an Inadvertent Discovery Plan and implement it during construction.

TVA finds further that the undertaking could result in adverse effects to the 20 archaeological sites of undetermined eligibility. At this time, TVA has not developed specific construction plans and does not know the locations where TL structures would be installed. TVA proposes to develop a Programmatic Agreement (PA) with your office to govern the evaluation and resolution of adverse effects as project designs are developed, as provided for under 36 CFR §800.14(b)(1)(ii). This PA would stipulate specific steps for TVA to follow for avoiding or

Dr. David Crass  
Page Three  
June 9, 2015

minimizing project effects to historic properties, evaluating the NRHP eligibility of any archaeological sites that are currently of undetermined eligibility and could not be avoided, evaluating project effects to any sites that our offices agree are eligible for the NRHP (once project designs have become available), and resolving any adverse effects to historic properties resulting from the undertaking. The PA would follow steps prescribed by the Advisory Council's regulations at 36 CFR §§ 800.4 to 800.13.

Pursuant to 36 CFR Part 800.4(d)(1), we are seeking your concurrence with the following:

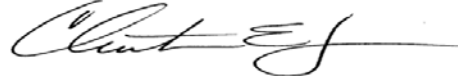
- TVA's definition of the APE
- TVA's determinations concerning the NRHP eligibility of the resources identified within the APE
- TVA's finding that the undertaking would result in no adverse effects to any architectural property included, potentially eligible, or eligible for inclusion in the NRHP.
- TVA's plans for avoiding project effects on the Dickey Cemetery by placing no structures and minimizing ground disturbance with clearing equipment within the 50-foot buffer.

In addition, we are seeking your agreement to review a draft PA between our offices regarding the management of historic properties within the APE.

Pursuant to 36 CFR Part 800.3(f)(2), TVA is consulting with federally recognized Indian tribes regarding historic properties within the proposed project's APE that may be of religious and cultural significance and are eligible for the NRHP.

Should you have any questions or comments, please contact Richard Yarnell at 865/632-3463 or [wryarnell@tva.gov](mailto:wryarnell@tva.gov).

Sincerely,



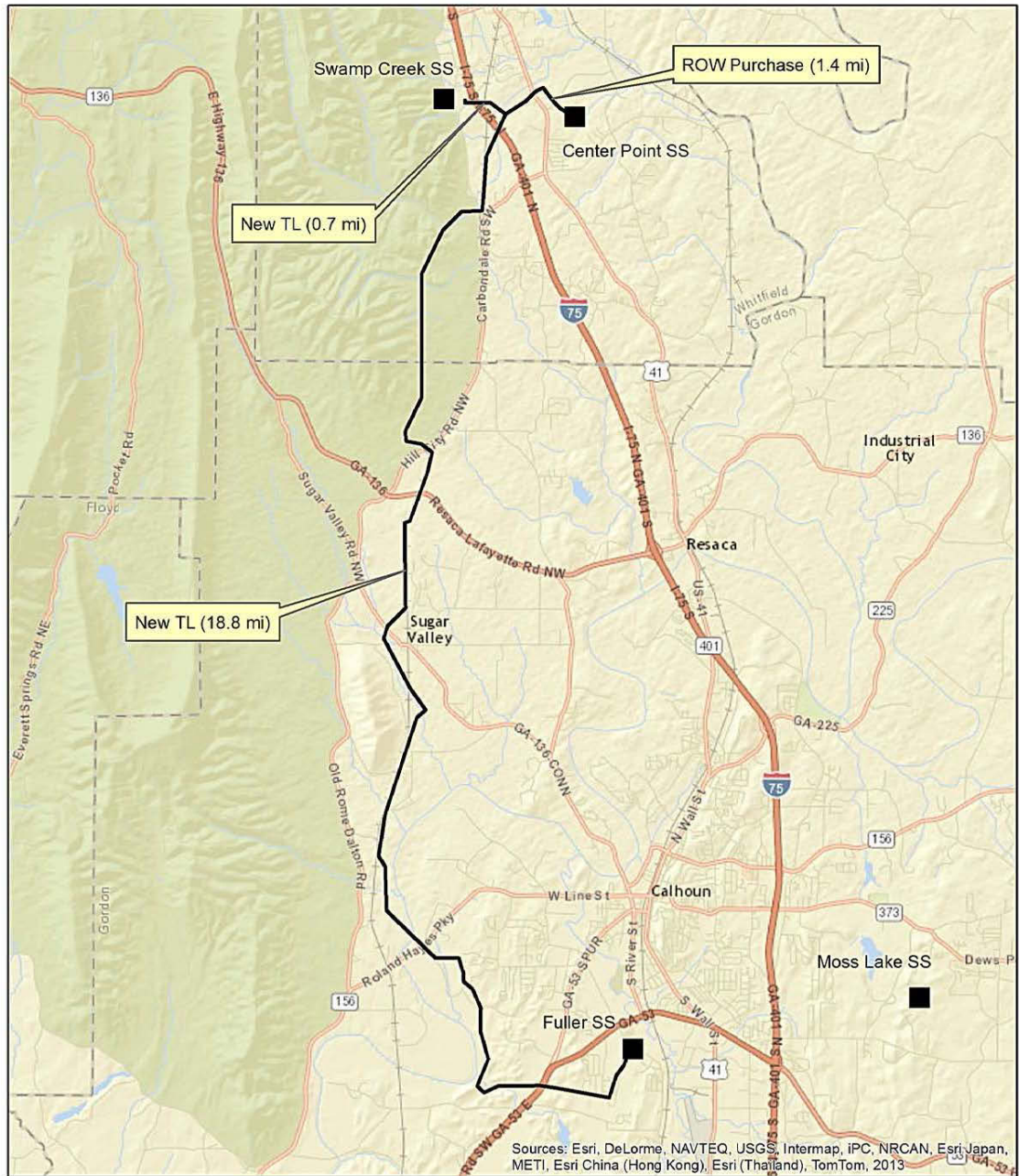
Clinton E. Jones  
Manager, Biological and Cultural Compliance  
Safety, River Management, and Environment

SCC:CSD  
Enclosures

cc (Enclosures):

Karen Anderson-Cordova, Program Manager  
Georgia Department of Natural Resources  
Environmental Review and Preservation Planning  
Attn: Environmental Review  
254 Washington Street, SW, Ground Level  
Atlanta, GA 30334

### Center Point-Moss Lake #2 TL



#### Legend

- Substations
- Centerline

**Dudley, Cynthia S**

**From:** Ezzell, Patricia Bernard  
**Sent:** Tuesday, June 09, 2015 1:14 PM  
**To:** 'sheila-bird@cherokee.org'; Tyler B. Howe (tylehowe@nc-chokeee.com); 'Miranda Panther (mirapant@nc-chokeee.com)'; 'ukbthpo-larue@yahoo.com'; 'HPO@chickasaw.net'; 'Emman Spain (ESpain@mcn-nsn.gov)'; 'jjacobs@mcn-nsn.gov'; 'celestine.bryant@actribe.org'; 'slandsberry@alabama-quassarte.org'; 'kialegettcpo@gmail.com'; 'Charles Coleman (chascoleman75@yahoo.com)'; 'Thrower, Robert (rthrower@pci-nsn.gov)'; 'Natalie Harjo (harjo.n@sno-nsn.gov)'; 'Joseph Blanchard'; 'cecil.wilson@astribe.com'; 'Robin Dushane (RDushane@estoo.net)'; 'Dee Gardner (dgardner@estoo.net)'; 'Kim Jumper (kim.jumper@shawnee-tribe.com)'  
**Cc:** 'Russell Townsend (RussellT@nc-chokeee.com)'; 'jfife@muscogeation-nsn.gov'; 'odette\_freeman@muscogeation-nsn.gov'; 'David Proctor (Davidp@mcn-nsn.gov)'; 'tthompson@mcn-nsn.gov'; 'Johnnie Wesley (jswesley@mcn-nsn.gov)'; 'lwendt@mcn-nsn.gov'  
**Subject:** TENNESSEE VALLEY AUTHORITY (TVA), CENTER POINT-MOSS LAKE #2 TRANSMISSION LINE (TL), PHASE I CULTURAL RESOURCES SURVEY, GORDON AND WHITFIELD COUNTIES, GEORGIA  
**Attachments:** Ctr Point-Moss Lake\_Draft Rpt\_GA THPO 20150609.pdf

Good Afternoon,  
 I hope this email message finds you well. By this email, I am transmitting the attached letter regarding TVA's proposal to construct a new transmission line (TL) that would improve electric reliability by providing a back-up path for power to the area. TVA would construct approximately 19.5 miles of new TL on new and existing right-of-way (ROW) near North Georgia EMC's existing Swamp Creek Substation located south of Dalton, to their Fuller Substation located on the south side of Calhoun. TVA would purchase an additional 1.4 miles of ROW from the new TL to TVA's existing Center Point Substation. Additionally, TVA would install a new transformer in their Moss Lake 230-kV Substation and communications equipment at their Moss Lake and Center Point 230-kV Substations.

The referenced report can be found at this link: [http://www.tvaresearch.com/download/TVA\\_Center\\_Point\\_Moss\\_Lake\\_Final\\_Review\\_Draft\\_Report.pdf](http://www.tvaresearch.com/download/TVA_Center_Point_Moss_Lake_Final_Review_Draft_Report.pdf).

As always, please do not hesitate to contact me if you have any questions. Please respond by July 9, 2015 if you have any comments or if you wish to participate in the development of the proposed PA.

Thank you.

Sincerely,

Pat

Pat Bernard Ezzell  
 Senior Program Manager  
 Tribal Relations and Corporate History  
 Tennessee Valley Authority  
 400 W. Summit Hill Drive  
 460 WT 7D-K  
 Knoxville, Tennessee 37902  
 Office Phone: (865) 632-6461  
 Cell phone: 865-304-9251  
 E-mail: [pbezzell@tva.gov](mailto:pbezzell@tva.gov)



Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, TN 37902

June 9, 2015

To Those Listed:

TENNESSEE VALLEY AUTHORITY (TVA), CENTER POINT-MOSS LAKE #2  
TRANSMISSION LINE (TL), PHASE I CULTURAL RESOURCES SURVEY, GORDON AND  
WHITFIELD COUNTIES, GEORGIA

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To Those Listed  
 Page Two  
 June 9, 2015

18 isolated finds are ineligible for inclusion in the National Register of Historic Places (NRHP). The remaining 20 archaeological sites could contain data important to prehistory, but given the inherent limitations of Phase I surveys, their NRHP eligibility is recommended as "undetermined". These sites are: 9GO354, 9GO355, 9GO356, 9GO357, 9GO361, 9GO362, 9GO364, 9GO365, 9GO367, 9GO370, 9GO372, 9GO373, 9GO375, 9GO376, 9GO379, 9GO386, 9GO390, 9WD164, 9WD165, 9WD171. TVAR recommends that TVA avoid project effects to these sites.

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To Those Listed  
Page Three  
June 9, 2015

Pursuant to 36 CFR Part 800.3(f)(2), TVA is consulting with the following federally recognized Indian tribes regarding historic properties within the proposed project's APE that may be of religious and cultural significance and are eligible for listing in the NRHP: Cherokee Nation, Eastern Band of Cherokee Indians, United Keetoowah Band of Cherokee Indians in Oklahoma, The Chickasaw Nation, Muscogee (Creek) Nation of Oklahoma, Alabama-Coushatta Tribe of Texas, Alabama-Quassarte Tribal Town, Kialegee Tribal Town, Thlopthlocco Tribal Town, Poarch Band of Creek Indians, Seminole Nation of Oklahoma, Absentee Shawnee Tribe of Oklahoma, Eastern Shawnee Tribe of Oklahoma, and the Shawnee Tribe.

By this letter, TVA is providing notification of these findings and is seeking your comments regarding this undertaking and any properties that may be of religious and cultural significance and may be eligible for listing in the NRHP pursuant to 36CFR §§§ 800.2 (c)(2)(ii), 800.3 (f)(2), and 800.4(a)(4)(b). TVA is also inviting you to participate in the development of the PA.

Please respond by July 9, 2015, if you have any comments on the proposed undertaking or if you would like to participate in the PA. If you have any questions, please contact me in Knoxville, Tennessee, at (865) 632-6461 or by email at [pbezzell@tva.gov](mailto:pbezzell@tva.gov).

Sincerely,

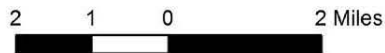
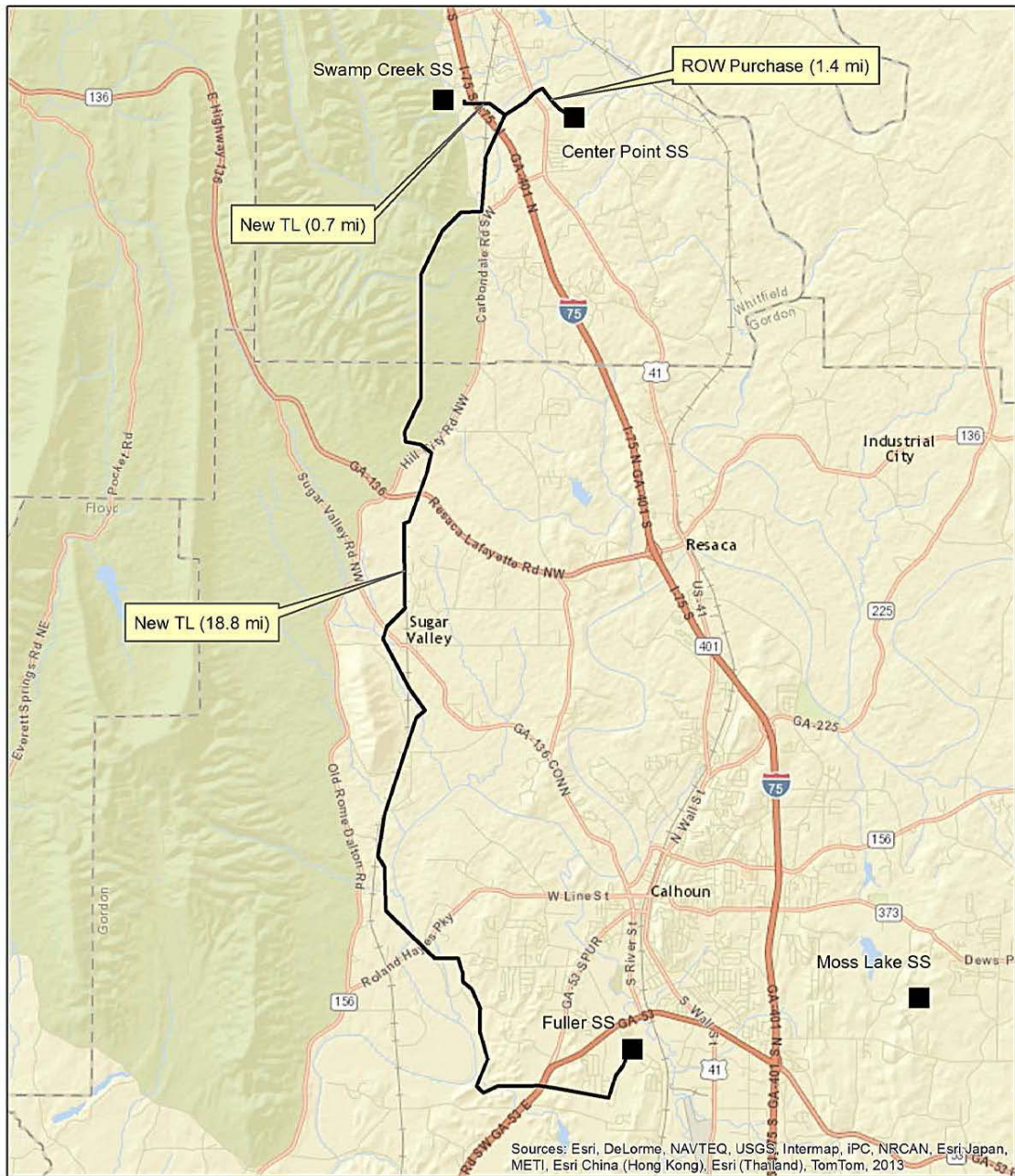


Pat Bernard Ezzell  
Senior Program Manager  
Tribal Relations and Corporate Historian  
Communications  
WT7D-K

SCC:CSD:PBE



### Center Point-Moss Lake #2 TL



#### Legend

- Substations
- Centerline

## Calhoun, Georgia – Area Power System Improvements

IDENTICAL LETTER MAILED TO THE FOLLOWING ON JUNE 9, 2015:

Dr. Richard Allen  
Policy Analyst  
Cherokee Nation  
Post Office Box 948  
Tahlequah, Oklahoma 74465

Mr. Joseph Blanchard  
Tribal Historic Preservation Officer  
Absentee Shawnee Tribe of Oklahoma  
2025 S. Gordon Cooper  
Shawnee, Oklahoma 74801

Mr. Bryant Celestine  
Tribal Historic Preservation Officer  
Alabama-Coushatta Tribe of Texas  
571 State Park Rd. 56  
Livingston, Texas 77351

Mr. Charles Coleman  
NAGPRA Representative  
Thlopthlocco Tribal Town  
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Weleetka, Oklahoma 74880

Ms. Natalie Deere  
Tribal Historic Preservation Officer  
Seminole Nation of Oklahoma  
Post Office Box 1498  
Wewoka, Oklahoma 74884

Ms. Robin DuShane  
Tribal Historic Preservation Officer  
Eastern Shawnee Tribe of Oklahoma  
127 West Oneida  
Seneca, Missouri 64865

Ms. Kara Gann  
Cultural Resources Director  
Kialegee Tribal Town  
Post Office Box 332  
Wetumka, Oklahoma 74883

Ms. Dee Gardner  
NAGPRA/Cell Tower Coordinator  
Eastern Shawnee Tribe of Oklahoma  
127 West Oneida  
Seneca, Missouri 64865

Mr. Tyler Howe  
Historic Preservation Specialist  
Eastern Band of Cherokee Indians  
Post Office Box 45  
Cherokee, North Carolina 28719

cc: Mr. Russell Townsend  
Tribal Historic Preservation Office  
Eastern Band of Cherokee Indians  
Post Office Box 455  
Cherokee, North Carolina 28719

Ms. Miranda Panther  
NAGPRA Coordinator  
Eastern Band of Cherokee Indians  
Post Office Box 455  
Cherokee, North Carolina 28719

Ms. Johnnie Jacobs  
Manager  
Cultural Preservation Department  
Muscogee (Creek) Nation  
P.O. Box 580  
Okmulgee, Oklahoma 74447

cc: Mr. Jeff Fife  
Secretary of Department of Interior Affairs  
Muscogee (Creek) Nation  
P.O. Box 580  
Okmulgee, Oklahoma 74447

Ms. Odette Freeman  
Assistant Manager  
Muscogee (Creek) Nation  
P.O. Box 580  
Okmulgee, Oklahoma 74447

Ms. Johnnie Wesley  
Secretary  
Cultural Preservation Department  
Muscogee (Creek) Nation  
Post Office Box 580  
Okmulgee, Oklahoma 74447

Mr. David Proctor  
Traditional Cultural Advisor  
Cultural Preservation Department  
Muscogee (Creek) Nation  
Post Office Box 580  
Okmulgee, Oklahoma 74447

## Calhoun, Georgia – Area Power System Improvements

Ms. Lee Anne Wendt  
Tribal Archaeologist  
Cultural Preservation Department  
Muscogee (Creek) Nation  
Post Office Box 580  
Okmulgee, Oklahoma 74447

Mr. Tim Thompson  
Traditional Cultural Advisor  
Cultural Preservation Department  
Muscogee (Creek) Nation  
Post Office Box 580  
Okmulgee, Oklahoma 74447

Ms. Kim Jumper  
Tribal Historic Preservation Officer  
Shawnee Tribe  
Post Office Box 189  
Miami, Oklahoma 74355

cc: Jodi Hayes  
NAGPRA Representative  
Shawnee Tribe  
PO Box 189  
Miami, OK 74355

Mr. Steven Landsberry  
Administrative Assistant  
Alabama Quassarte Tribal Town  
Post Office Box 187  
Wetumka, Oklahoma 74883

Mrs. Lisa C. LaRue-Baker  
Acting Tribal Historic Preservation Officer  
United Keetoowah Band  
of Cherokee Indians in Oklahoma  
Post Office Box 746  
Tahlequah, Oklahoma 74464

Mr. Kirk Perry  
Administrator  
Department of Homeland Affairs  
The Chickasaw Nation  
Post Office Box 1548  
Ada, Oklahoma 72821-1548

cc: Ms. Virginia (Gingy) Nail  
Assistant Tribal Historic Preservation Officer  
Department of Homeland Affairs  
The Chickasaw Nation  
Post Office Box 1548  
Ada, Oklahoma 72821-1548

Ms. Amber Jarrett  
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MARK WILLIAMS  
COMMISSIONER

DR. DAVID CRASS  
DIVISION DIRECTOR

July 25, 2015

Richard Yarnell  
Tennessee Valley Authority  
400 West Summit Hill Drive  
Knoxville, Tennessee 37902

RE: TVA: Point-Moss Lake Transmission Lines and Substation  
Gordon and Whitfield counties, Georgia  
HP-050112-004

Dear Mr. Yarnell:

The Historic Preservation Division (HPD) has reviewed the report entitled, *A Phase I Cultural Resources Survey of the Tennessee Valley Authority's Planned Center Point-Moss Lake No. 2 Transmission Line in Gordon and Whitfield Counties*, prepared by Tennessee Valley Archaeological Research and dated May 2015. Our comments are offered to assist the Tennessee Valley Authority and its applicants in complying with the provisions of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA). **In order for us to complete our review, we will need additional information.**

Based on the information contained in the report regarding archaeological resources, HPD concurs that sites 9GO350-353, 9GO358-359, 9GO363, 9GO366, 9GO368-369, 9GO371, 9GO374, 9GO377-378, 9GO380-385, 9GO387-389, 9WD160-163, 9WD166-170, 9CW172-173 are not eligible for listing in the National Register of Historic Places (NRHP). Additionally, HPD concurs that sites 9GO354-357, 9GO361-362, 9GO364-365, 9GO367, 9GO372-373, 9GO375-376, 9GO379, 9GO386, 9GO390, 9WD164-165, and 9WD171 are of unknown eligibility for listing in the NRHP pending further investigations. HPD concurs that if avoidance of these sites is not possible, then additional work is warranted in order to assess their eligibility under Criterion D.

HPD is unable to concur with the NRHP eligibility determinations under Criterion D for IS-15/Liberty Cumberland Church and IS-22/Dickey Cemetery. Although HPD concurs that resource IS-15 is eligible for listing under Criterion A, HPD recommends expanding the boundary of the resource to include the burial pit on the property due to the direct association between the church and the burial pit. Therefore, it is HPD's opinion that IS-22 is eligible for listing in the NRHP under both Criteria A and D. Regarding resource IS-22, while HPD concurs that IS-22 is eligible for listing in the NRHP under Criteria A, B, and C, HPD finds the Cemetery to have unknown NRHP-eligibility under Criterion D.

Furthermore, since IS-22/Dickey Cemetery is located within the direct area of potential effect (APE), HPD concurs with the recommendation for avoidance and the creation of an Environmentally Sensitive Area (ESA). However, HPD is in need of additional information in order to determine where the ESA should be located and to avoid adverse effects. Please submit the full mapping and delineation of the cemetery, including documentation of all graves, depressions, headstones, stone piles, and markers of any kind. These features should be mapped in relation to the stone wall, fence, and the APE. The documentation plan should consist of either Ground Penetrating Radar (GPR) or a system of probing every two (2)-feet along transects in order to detect any burials that may not be visible, and to positively identify the boundary of the cemetery and any outlier burials. Work should be conducted under the direct

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supervision of a Secretary of the Interior's qualified archaeologist. Also, HPD requests the visual effects of the project should be addressed concerning the Dickey Cemetery.

HPD offers the following comments to be taken into consideration:

1. Although HPD concurs with the eligibility recommendations for all archaeological sites, not all sites appear to be fully delineated. Within each site description where the typical two (2) negative shovel tests were not reached, please address whether the site has been fully bounded (not just within the APE) or include a very brief description for why it could not be fully delineated (landform change, artifact count tapers off, deflated soils, disturbances, etc.). Any portion of the site that could not be fully delineated should be denoted with a dashed line. This delineation should also be reflected on the site forms.
2. Please fill out site forms for both the Liberty Cumberland Church burial pit and the Dickey Cemetery and submit to the Georgia Archaeological Site File for an official state site number.

Additionally, HPD requests identification and evaluation of any structures that are 50 years of age or older that are located within the 0.5 mile APE, including any nearby properties that could have visual or other indirect effects. HPD noted that not all structures 50 years and older that are located within the established APE were identified in the submitted report. HPD recommends reviewing topographic maps, the county tax assessor site, historic aerial photographs, and if necessary, completing additional field survey, in order to identify resources, some of which may be eligible for listing in the NRHP. Further, previous experience has shown that transmission line projects of this type take a number of years to complete; therefore, we recommend including properties that are 40 to 45 years old, depending upon the anticipated construction completion date.

We look forward to reviewing the requested information and working with you as this project progresses. Please refer to project number **HP-050112-004** in any future correspondence regarding this project. If we may be of further assistance, please do not hesitate to contact Jennifer Bedell, Archaeological Compliance Unit Manager, at (770) 389-7861 or [jennifer.bedell@dnr.ga.gov](mailto:jennifer.bedell@dnr.ga.gov) or Christine Quinn, Environmental Review Historian, at (770) 389-7853 or [christine.quinn@dnr.ga.gov](mailto:christine.quinn@dnr.ga.gov).

Sincerely,



Jennifer Dixon, MHP, LEED Green Associate  
Program Manager  
Environmental Review & Preservation Planning

JAD/cqd

cc: Kevin McAuliff, Northwest Georgia Regional Commission



Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, TN 37902

August 12, 2015

Dr. David Crass, Division Director  
Georgia Department of Natural Resources  
Historic Preservation Division  
Attn: Environmental Review  
254 Washington Street, SW  
Ground Level  
Atlanta, GA 30334

Dear Dr. Crass:

TENNESSEE VALLEY AUTHORITY (TVA), CENTER POINT-MOSS LAKE #2  
TRANSMISSION LINE (TL), PHASE I CULTURAL RESOURCES SURVEY, GORDON AND  
WHITFIELD COUNTIES, GEORGIA

TVA has reviewed your July 25, 2015 letter concerning the draft report of the Phase I cultural resources survey performed in compliance with Section 106 of the National Historic Preservation Act (NHPA) for TVA's proposed Center Point-Moss Lake #2 TL project. As stated in your letter, our agencies are in agreement on the eligibility of the identified archaeological resources for inclusion in the National Register of Historic Places (NRHP). We agree on the need for avoidance of, or additional work on, sites 9GO354-357, 9GO361, 9GO362, 9GO364, 9GO365, 9GO367, 9GO372, 9GO373, 9GO375, 9GO376, 9GO379, 9GO386, 9GO390, 9WD164, 9WD165, and 9WD171; and with the need for avoidance of IS-22/Dickey Cemetery. However, there are points needing clarification, and some areas where we may not be in full agreement. We are in the process of revising the draft survey report in response to some of the comments in your letter and will send that revised report for your continuing review in the near future. In this letter, we discuss all of the comments in the order they appear in your letter, in the hopes that the clarification this adds will assist in completing your review.

One archaeological site that was not included in your list of ineligible sites is 9GO360, which we determined as ineligible for the NRHP. Also, the list you gave of the sites of "undetermined" NRHP eligibility did not include 9GO370. We assume these are inadvertent omissions, but we would like your comment on the NRHP eligibility of these two sites.

You recommend expanding the boundary of IS-15 to include the "burial pit". The boundary for IS-15 given in the report does include the burial pit, but this was not very clear in the description or photos in the report. To correct this, TVA is asking Tennessee Valley Archaeological Research (TVAR) to revise the description and to add the locations of the church and burial pit to Figure 3.97.



Dr. David Crass  
Page Two  
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Your letter states you are unable to concur with "the NRHP eligibility determinations under Criterion D for IS-15/Liberty Cumberland Church and IS-22/Dickey Cemetery". Your letter also states your opinion that "IS-22 [we assume you intended to write IS-15] is eligible for listing in the NRHP under both Criteria A and D." TVA cannot offer any comment on this recommendation. We are aware of no scientific investigations into the content, age, or condition of the burial pit. As this archaeological feature lies outside of the archaeological area of potential effect (APE) for TVA's undertaking, it will not be affected by the undertaking and was not part of the archaeological investigation. Therefore, TVA has no information that would permit us to comment on the possible eligibility of the burial pit under Criterion D. TVA can only comment on the eligibility of the historic structure as an above-ground resource, and our agencies agree that IS-15 is eligible under Criterion A for its association with the Civil War battles of Lay's Ferry and Resaca and its use as a field hospital by Union forces.

Similarly, we have no information that would allow us to make an informed determination of the eligibility of IS-22/Dickey Cemetery under Criterion D. Although this resource is partially within the archaeological APE, we did not include subsurface investigations of the graves as part of the Phase I survey. Instead, in order to respect Georgia burial laws, we have offered an avoidance plan that we believe would ensure that the undertaking does not disturb the cemetery. This avoidance plan was based on the overall boundary of the cemetery as determined by surface survey, as we lack detailed information on the locations of subsurface features. However, to satisfy your request for additional information on the number and location of graves, we are preparing to carry out an investigation to include both probing and a ground penetrating radar study of the area within a 20-m buffer surrounding the perimeter of the observed grave markers and depressions. Should the investigation reveal burial features within that buffer, the buffer will be expanded to include additional areas so that when the investigation is completed, a 20-m area surrounding the cemetery (within the proposed transmission line (TL) right-of-way (ROW)) has been verified to be free of burial features. All graves, depressions, headstones, stone piles, and other markers will be mapped and further documented, and the results will be presented in a draft report. TVA's avoidance plan will take the results of this study into consideration. We will consult with your office on the results of this investigation under separate cover, once TVA has received the report of the investigation.

Your letter requests that TVA address the visual effects of the project on the Dickey Cemetery (IS-22). However, neither of our offices has determined this resource to be eligible under Criteria A, B, or C. Your office believes it is eligible under Criterion D, which pertains to its potential to provide information important in history. TVA does not evaluate visual effects to properties, the eligibility of which is based solely on Criterion D. TVA has asked TVAR to include in the draft report a statement that the undertaking will not result in a visual effect to the Dickey Cemetery.

You asked further that we prepare an archaeological site form for the burial pit associated with IS-15 and for the Dickey Cemetery, which we are happy to do. TVAR has prepared those site forms, submitted them to the Georgia Archaeological Site File, obtained site numbers 9GO398 for the burial pit and 9GO399 for the Dickey Cemetery, and has revised the survey report to include these numbers and the site forms.

Dr. David Crass  
Page Three  
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With regard to your request that we further delineate the boundaries of the identified archaeological sites: As stated in our letter, the study was confined to the APE, which is limited by the width of the ROW that will be acquired for the proposed transmission line. TVA has no permission to conduct investigations outside the ROW, with the exception of the access roads to be used in construction and maintenance of the proposed TL. TVA has not yet completed designing the TL, and consequently has not yet planned the locations of these access roads. TVA will modify the undertaking's APE, and will carry out additional Phase I investigations within those access roads, in consultation with your office, once the design has been completed. There may be cases in which this additional survey allows TVA to further delineate site boundaries. However, it is very unlikely that all of these sites will be fully bounded within the APE; we expect that many sites will necessarily remain incompletely delineated. We have asked TVAR to revise the figures in the report, to show where site boundaries are undetermined due to limitations on the scope of the study.

Finally, your letter requests identification and evaluation of any structures that are 50 years of age or older and located within the 0.5 mile APE. You state that not all such structures were identified in the report. However, our survey did include all structures 50 years or older within the APE. We believe that your concern may have arisen from a lack of total clarity on how we defined the visual APE. In the report and our letter, the architectural APE was defined as "a 0.8-km (0.5-mi) radius surrounding the center lines of the planned transmission lines, as well as any areas where the project would alter existing topography or vegetation in view of a historic resource." In our view, it is understood that areas within this APE (that would not have a direct line of sight to the proposed TL) should not be considered part of the APE. In areas where views to the project are blocked by vegetation, topography, or modern development, the undertaking has no potential to affect historic structures. Therefore, all such areas are outside the APE.

TVA follows this practice (excluding from an architectural APE those areas from which the project would not be visible) for Section 106 purposes in all of its undertakings. For examples, you may refer to recent architectural surveys involving TVA transmission lines, such as *Cultural Resources Survey of the Proposed Gregory's Mill Transmission Line, Murray County, Georgia/HP-061010-005* (2007) and *Cultural Resource Survey for the Proposed Center Point-Moss Lake Transmission Line, Gordon and Whitfield Counties, Georgia/HP-051112-004* (2007), both authored by TRC Environmental Corporation. In these studies, the APE for the architectural survey was defined as a 0.5-mile radius surrounding the project center line. In both cases, the documentation of architectural resources 50 years of age or older was limited to properties located within the viewshed to and from the project area. As a result, architectural resources that were not within view of the project area due to terrain and/or vegetation were "...excluded from the APE" (Tucker et al 2007: ii). A more recent example exhibiting this same approach is TVA's architectural assessment for the proposed construction of a warehouse building in Fannin County (Karpynek and Weaver 2015). In each of these instances, the Georgia Historic Preservation Division (GHPD) accepted the author's architectural survey methods; in neither case did GHPD request that all architectural resources older than 50 years within the 0.5-mile APE be identified (GHPD 2006 and 2007). This is the same approach utilized by TVAR in its architectural survey for the current project.

Dr. David Crass  
Page Four  
August 12, 2015

In every historic architectural survey TVA performs, the APE is field verified by the qualified architectural historian or historic architect performing the survey. For the current project, TVAR “field checked” all previously documented architectural resources identified at the GHPD and on the GNAHRGIS online database that fell within the 0.5-mile APE in order to determine if these properties were extant and visible to the project area. All accessible paved and gravel roads within the 0.5-mile APE were driven by TVAR staff, in order to thoroughly canvass the APE for undocumented architectural resources 50 years of age or older (Figures 6-8). Given the nature of the proposed undertaking, it is TVA’s opinion that this approach to the architectural survey, as documented in its draft report, sufficiently identified all architectural resources 50 years of age or older located within the established 0.5-mile APE that could be directly or indirectly affected by the proposed undertaking.

Had we been more explicit about this practice, we may have been able to avoid this misunderstanding regarding the visual APE. In revising the report, TVAR will include a revised APE definition that clarifies how the visual APE is not simply a matter of the 0.5-mile radius, but is also a function of the viewshed. The revised report will also include graphic depictions of a viewshed analysis that TVAR is currently preparing. The viewshed analysis utilizes mathematical algorithms that take vegetation, topography, and the location and heights of the proposed TL structures into account in order to identify areas within the 0.5-mile radius where the project would be visible. TVA will be sure to clarify its definition of APEs, and to include maps showing the viewshed, in future reports in order to avoid misunderstandings.

Finally, we would like to reiterate our request that you comment on the need for a Programmatic Agreement (PA) between our offices regarding the management of historic properties within the APE. This PA will be sufficiently broad to account for all of TVA’s responsibilities under Section 106 for all parts of the undertaking, and it will include measures to be followed by TVA in the event that unavoidable adverse effects to an historic property are identified, as well as a plan for inadvertent discoveries that may occur as a result of the undertaking.

Please contact Richard Yarnell at 865/632-3463 or [wryarnell@tva.gov](mailto:wryarnell@tva.gov) with any further questions or comments.

Sincerely,



Clinton E. Jones  
Manager, Biological and Cultural Compliance  
Safety, River Management, and Environment

SCC:CSD

cc: Jennifer Dixon, MHP, LEED Green Associate Program Manager  
GA Department of Natural Resources, Environmental Review & Preservation Planning  
Attn: Environmental Review  
254 Washington Street, SW, Ground Level, Atlanta, GA 30334

REFERENCES CITED

Georgia Historic Preservation Division

2006 Karen Anderson-Cordova to Thomas O. Maher, Tennessee Valley Authority, Knoxville, Tennessee, 9 November. RE: Construct Gregory's Mill Transmission Line and Substation, Murray County, Georgia. HP-061010-005.

2007 Karen Anderson-Cordova to Thomas O. Maher, Tennessee Valley Authority, Knoxville, Tennessee, June 20. RE: Point-Moss Lake Transmission Line and Substation, Near Dalton and Calhoun, Gordon and Whitfield Counties, Georgia. HP-051112-004.

Karpynek, Ted and Meghan Weaver

2015 *Phase I Architectural Assessment for the Proposed Construction of a Speculative Warehouse Building, Fannin County, Georgia*. Prepared by Tennessee Valley Archaeological Research, Nashville, Tennessee. Submitted to Tennessee Valley Authority, Knoxville, Tennessee.

Tucker, Emily Kate, James J. D'Angelo, Price K. Laird, and Jeffery L. Holland

2007 *Cultural Resource Survey of the Proposed Gregory's Mill Transmission Line, Murray County, Georgia*. Prepared by TRC Environmental Corporation, Atlanta, Georgia. Submitted to Tennessee Valley Authority, Knoxville, Tennessee.

Wild, Michal J., Emily Tucker, and James D'Angelo

2007 *Cultural Resource Survey for the Proposed Center Point-Moss Lake Transmission Line, Gordon and Whitfield Counties, Georgia*. Prepared by TRC Environmental Corporation, Atlanta, Georgia. Submitted to Tennessee Valley Authority, Knoxville, Tennessee.



Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, Tennessee 37902

October 23, 2015

Dr. David Crass, Division Director  
Georgia Department of Natural Resources  
Historic Preservation Division  
Attention: Environmental Review  
254 Washington Street, SW  
Ground Level  
Atlanta, Georgia 30334

Dear Dr. Crass:

TENNESSEE VALLEY AUTHORITY - CENTER POINT-MOSS LAKE #2 TRANSMISSION  
LINE - PHASE I CULTURAL RESOURCES SURVEY - GORDON AND WHITFIELD COUNTIES,  
GEORGIA - HPC-050112-004

Enclosed are three bound copies of the revised draft survey report titled *A Phase I Cultural Resources Survey of Tennessee Valley Authority's Planned Center Point-Moss Lake No. 2 Transmission Line in Gordon and Whitfield Counties, Georgia*, in two volumes along with CDs containing digital copies. The revisions take into consideration the comments you made on the initial draft report, which we submitted to your office on June 9, 2015, as those comments were stated in your July 25, 2015 letter to us. Our August 12, 2015, letter to your office summarizes the changes and explains areas where no revisions are needed; the following is a brief synopsis of our responses:

- We are asking for your comment on the National Register of Historic Places (NRHP) eligibility of sites 9GO360 and 9GO370.
- The depiction of the NRHP boundary of IS-15 (Liberty Cumberland Church) has been corrected, and the "burial pit" location added to the map of the property.
- A comment has been added regarding the NRHP eligibility of the Liberty Cumberland Church "burial pit."
- The Dickey Cemetery boundary has been confirmed through additional fieldwork. This fieldwork is documented in a separate report, and the revised Phase I survey report reflects the corrected and updated information.
- A comment has been added regarding the NRHP eligibility of the Dickey Cemetery.
- Site forms for 9GO398 (burial pit associated with Liberty Cumberland Church) and 9GO399 (Dickey Cemetery) have been added.
- Where archaeological boundaries are undetermined or hypothetical, due to the presumed extension of the site beyond the area of potential effect (APE), those boundaries are displayed as dashed lines in the site maps.
- The issue you raised concerning structures  $\geq 50$  years in age has been addressed through clarification of how the APE for above ground resources is defined.

Dr. David Crass  
Page Two  
October 23, 2015

Each of these points is discussed and explained in our August 12, 2015 letter to your office. We ask that you refer to that letter as you continue your review of the undertaking. The revisions also include changes made in response to Christine Quinn's October 2, 2015 e-mail to Richard Yarnell. Ms. Quinn expressed a concern that some resources from which the project would be visible were not identified and evaluated for NRHP eligibility, and provided a list of 27 properties that she identified as needing to be identified and evaluated, or shown to be outside the APE. We forwarded this request Tennessee Valley Archaeological Research (TVAR), who prepared the draft report, and they have addressed those properties and incorporated the results into the revised report. To facilitate your review, we asked them to include the results of this additional analysis in a stand-alone appendix; Appendix I presents those results and addresses Ms. Quinn's concerns. Of the 27 properties in the list, 13 were found to be extant and within the visual APE of the undertaking based on both desktop review and field survey. TVAR has recommended that all 13 are ineligible for inclusion in the NRHP. The Tennessee Valley Authority (TVA) has reviewed the revised draft survey report and agrees with TVAR's recommendations.

Because the additional work we performed on the Dickey Cemetery required detailed documentation, we asked TVAR to prepare a stand-alone draft report. However, the findings of that study are directly relevant to the findings of the Phase I survey, and so we include this second report as part of the current consultation. We have enclosed three bound copies of that report titled *A Geophysical Survey at Dickey Cemetery (9GO399) Near Sugar Valley, Gordon County, Georgia*, along with CDs containing digital copies. This report contains the full mapping and delineation of the cemetery as you requested.

Based on the results of this additional survey work at Dickey Cemetery, TVAR recommends that the cemetery is confined to the area within the cemetery fence and wall. No evidence of any graves was found in the surveyed area outside of the cemetery fence and wall. TVA has reviewed the report and agrees with TVAR's recommendation. TVA finds that the cemetery is confined to the area within the cemetery fence and wall, much of which is inside the APE. We continue to find that the cemetery is ineligible for inclusion in the National Register, as it does not satisfy any of the criteria at 36 C.F.R. Section 60.4, nor does it satisfy criteria considerations for graves or cemeteries. The most prominent person buried in the Dickey Cemetery, Burgess Yon Dickey (1882-1938), served three terms in the Georgia House of Representatives, where he was known for opposition to a state sales tax, and was postmaster of Calhoun from 1934 until 1939. TVA finds that no "historical figure of outstanding importance" or "transcendent importance" is buried in Dickey Cemetery, and that the cemetery is not significant in its age or design features, and is not associated with important historical events.

Nevertheless, TVA will mark the cemetery as an environmentally sensitive area (ESA), and this ESA will be marked on all project plans and drawings. No construction related to this undertaking will take place within the ESA. TVA will not disturb the cemetery, including the fence and wall. Any required vegetation clearing within the ESA will be accomplished using low ground pressure equipment, such as a feller buncher, and no heavy equipment will be used inside the cemetery boundary. These restrictions will be permanently noted on TVA's project drawings, and will apply to all future maintenance activities associated with this proposed new transmission line.

Pursuant to 36 C.F.R. Part 800.4(d)(1), we are seeking your comments on the enclosed reports

Dr. David Crass  
Page Three  
October 23, 2015

and your concurrence with the following:

- TVA's determinations concerning the NRHP eligibility of the resources identified within the APE;
- TVA's finding that the Dickey Cemetery is confined to the area within the cemetery fence and wall;
- TVA's determination that the cemetery is ineligible for inclusion in the NRHP; and
- TVA's finding that the undertaking would result in no adverse effects to any architectural property included, potentially eligible, or eligible for inclusion in the NRHP.

In addition, we are seeking your agreement to review a draft Programmatic Agreement (PA) between our offices regarding the management of historic properties within the APE. TVA proposes to develop, with your office, a PA to govern the evaluation and resolution of adverse effects as project designs are developed, as provided for under 36 C.F.R. § 800.14(b)(1)(ii). This PA would stipulate specific steps for TVA to follow for avoiding or minimizing project effects to historic properties, evaluating the NRHP eligibility of any archaeological sites that are currently of undetermined eligibility and could not be avoided, evaluating project effects to any sites that our offices agree are eligible for the NRHP (once project designs have become available), and resolving any adverse effects to historic properties resulting from the undertaking. The PA would follow steps prescribed by the Advisory Council's regulations at 36 C.F.R. §§ 800.4 to 800.13.

Please contact Richard Yarnell at (865) 632-3463 or [wryarnell@tva.gov](mailto:wryarnell@tva.gov) with any further questions or comments.

Sincerely,



Clinton E. Jones  
Manager, Biological and Cultural Compliance  
Safety, River Management, and Environment

SCC:CSD  
Enclosures

cc: Ms. Jennifer Dixon, MHP, LEED  
Green Associate Program Manager  
Georgia Department of Natural Resources  
Environmental Review and Preservation Planning  
Attention: Environmental Review  
254 Washington Street, SW  
Ground Level  
Atlanta, Georgia 30334



Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, TN 37902

November 10, 2015

Dr. David Crass, Division Director  
Georgia Department of Natural Resources  
Historic Preservation Division  
Attn: Environmental Review  
254 Washington Street, SW  
Ground Level  
Atlanta, GA 30334

Dear Dr. Crass:

TENNESSEE VALLEY AUTHORITY (TVA), ACCESS ROADS, CENTER POINT-MOSS LAKE #2 TRANSMISSION LINE, PHASE I ARCHAEOLOGICAL SURVEY, GORDON AND WHITFIELD COUNTIES, GEORGIA –HPC-050112-004

We initiated consultation on the subject undertaking in June of this year. Most recently (in a letter dated October 23), we have asked for your comments on a revised draft survey report, and for your agreement to review a draft programmatic agreement for the management of historic properties in relation to the undertaking. At the time of our initial consultation TVA had not yet developed specific project construction plans and did not know the locations where transmission line (TL) structures (steel poles ) would be installed, nor the locations of the access roads to be used in construction and maintenance of the proposed new TL. TVA recently developed such plans and is now considering the potential effects of TL structures and access roads on historic properties. As the TL structures will be in the right-of-way (ROW), TVA will evaluate potential impacts to archaeological sites based on the above-mentioned phase I archaeological survey. Once our agencies have reached agreement on the findings and determinations based on that survey, TVA will evaluate (in consultation with your office) the need for evaluative testing at any affected sites that are of undetermined eligibility for listing in the National Register of Historic Places (NRHP) and will evaluate adverse effects to any such properties, pursuant to 36 CFR part 800.5(a).

However, some of the proposed access roads extend outside the proposed TL ROW that was surveyed earlier this year. Therefore, TVA has expanded the area of potential effects (APE) for archaeology to include these off-ROW access roads. This expanded portion of the APE includes portions of 12 access roads with a total combined length of 3.57 miles. Each access road would be approximately 16 feet wide. TVA would utilize existing dirt, gravel, and paved roads whenever possible.

TVA contracted with Tennessee Valley Archaeological Research (TVAR) for a phase I archaeological survey of the off-ROW access roads. Enclosed are three bound copies of the draft report, titled *A Phase I Archaeological Survey of Tennessee Valley Authority's Access Roads Associated with the Center Point-Moss Lake No. 2 Project in Gordon and Whitfield Counties, Georgia*, along with three CDs containing digital copies of the report.



Dr. David Crass  
Page Two  
November 10, 2015

One of the access roads partially overlaps archaeological site 9GO379, which was identified in the TL ROW survey. Based on that survey, we recommended that the site's NRHP eligibility status should be considered "undetermined", and that TVA should avoid the site if possible, or conduct Phase II testing to evaluate the site's eligibility if it cannot be avoided. You agreed with this determination in your July 25, 2015 letter to TVA. Based on their investigation in the current survey, TVAR expanded the site's boundary to include the portion investigated within access road 18. The findings are consistent with earlier findings at this site and do not change TVAR's initial eligibility recommendation. The survey also identified three previously unrecorded sites: 9GO400, 9GO401, and 9GO402, as well as one isolated find. TVAR recommends that these three sites and one isolated find are ineligible for inclusion in the NRHP.

TVA has reviewed the enclosed report and agrees with the findings and recommendations of the authors. TVA finds that the use of access road 18 could result in an adverse effect to site 9GO379, from compaction or ground disturbance resulting from vehicular traffic. As stated in earlier consultations with your office, TVA proposes to develop, with your office, a Programmatic Agreement (PA) to govern the evaluation and resolution of adverse effects as project designs are developed, as provided for under 36 CFR §800.14(b)(1)(ii). We propose to defer consideration of possible avoidance, minimization, or mitigation measures concerning site 9GO379 until such time as the PA has been executed.

Pursuant to 36 CFR Part 800.4(d)(1), we are seeking your concurrence with TVA's findings and determinations.

Pursuant to 36 CFR Part 800.3(f)(2), TVA is consulting with federally recognized Indian tribes regarding historic properties within the proposed project's APE that may be of religious and cultural significance and are eligible for the NRHP.

Should you have any questions or comments, please contact Richard Yarnell at 865/632-3463 or [wryarnell@tva.gov](mailto:wryarnell@tva.gov).

Sincerely,



Clinton E. Jones, Manager  
Biological and Cultural Compliance  
Safety, River Management, and Environment

SCC:CSD  
Enclosures

cc (Enclosures):

Karen Anderson-Cordova, Program Manager  
Georgia Department of Natural Resources  
Environmental Review and Preservation Planning  
Att: Environmental Review  
254 Washington Street, SW  
Ground Level  
Atlanta, GA 30334



HISTORIC PRESERVATION DIVISION

MARK WILLIAMS  
COMMISSIONER

DR. DAVID CRASS  
DIVISION DIRECTOR

December 8, 2015

Clinton E. Jones  
Manager, Biological and Cultural Compliance  
Safety, River Management, and Environment  
Tennessee Valley Authority  
400 West Summit Hill Drive  
Knoxville, Tennessee 37902  
**Attn: Richard Yarnell**

**RE: Center Point-Moss Lake #2 Transmission Line and Substation near Dalton and Calhoun  
Gordon County et al, Georgia  
HP-050112-004**

Dear Mr. Jones:

The Historic Preservation Division (HPD) has reviewed the survey report entitled, *Phase I Archaeological Survey of Tennessee Valley Authority's Access Roads Associated with the Center Point-Moss Lake No. 2 Project, Gordon and Whitfield Counties, Georgia*, prepared by Tennessee Valley Archaeological Research and dated October 2015. Our comments are offered to assist the Tennessee Valley Authority (TVA) in complying with the provisions of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA).

Based on the information contained in the report, HPD concurs that archaeological sites 9GO400, 9GO401, and 9GO402 are not eligible for listing in the National Register of Historic Places (NRHP). Additionally, HPD concurs that site 9GO379 is of unknown or "undetermined" eligibility for listing in the NRHP. Furthermore, HPD concurs with the boundary expansion of site 9GO379.

Regarding a Programmatic Agreement (PA), HPD concurs that the creation of a PA between our offices, in addition to appropriate tribal entities, to govern the evaluation and resolution of adverse effects as project designs are developed is a prudent course of action. HPD looks forward to reviewing a draft document submitted by TVA, or meeting to discuss the creation of the agreement document.

HPD looks forward to receiving the remote sensing study report for IS-22/Dickey Cemetery and the revised Cultural Resource Survey. Please refer to project number **HP-050112-004** in any future correspondence regarding this project. If we may be of further assistance, please do not hesitate to contact Jennifer Bedell, Archaeological Compliance Unit Manager, at (770) 389-7861 or [jennifer.bedell@dnr.ga.gov](mailto:jennifer.bedell@dnr.ga.gov) or Meg Richardson, Environmental Review Historian, at (770) 389-7852 or [meg.richardson@dnr.ga.gov](mailto:meg.richardson@dnr.ga.gov).

Sincerely,

A handwritten signature in blue ink, appearing to read "JD", with a small mark above the "i".

Jennifer Dixon, MHP, LEED Green Associate  
Program Manager  
Environmental Review & Preservation Planning

JAD/mcr

cc: Kevin McAuliff, Northwest Georgia Regional Commission

JEWETT CENTER FOR HISTORIC PRESERVATION  
2610 GA HWY 155, SW | STOCKBRIDGE, GA 30281  
770.389.7844 | FAX 770.389.7878 | [WWW.GEORGIAHPO.ORG](http://WWW.GEORGIAHPO.ORG)



Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, TN 37902

January 8, 2016

Dr. David Crass, Division Director  
Historic Preservation Division  
Georgia Department of Natural Resources  
Attn: Environmental Review  
2610 GA Hwy 155, SW  
Stockbridge, GA 30281

Dear Dr. Crass:

TENNESSEE VALLEY AUTHORITY (TVA), ACCESS ROADS, CENTER POINT-MOSS LAKE #2 TRANSMISSION LINE, GORDON AND WHITFIELD COUNTIES, GEORGIA, DRAFT PROGRAMMATIC AGREEMENT –HPC-050112-004

Pursuant to recent communications between our offices<sup>1</sup>, TVA has prepared a draft Programmatic Agreement (MOA) to satisfy TVA's responsibility under Section 106 of the National Historic Preservation Act (NHPA) with regard to TVA's proposed construction of the Center Point-Moss Lake No. 2 Transmission Line in Gordon and Whitfield Counties, Georgia. You have agreed that executing a PA to govern the evaluation and resolution of adverse effects of the undertaking as project designs are developed, as provided for under 36 CFR §800.14(b)(1)(ii), is a prudent course of action.

Enclosed is a copy of the draft PA for your review. The draft PA stipulates steps for TVA to follow for avoiding or minimizing project effects to historic properties, evaluating the NRHP eligibility of any historic properties that are currently of undetermined eligibility for which adverse effects cannot be avoided, evaluating project effects to any properties that our offices agree are eligible for the NRHP (once project designs have become available), and resolving any adverse effects to historic properties resulting from the undertaking. The PA would follow steps prescribed by the Advisory Council's regulations at 36 CFR §§ 800.4 to 800.13.

TVA has notified the Advisory Council on Historic Preservation of the adverse effect, and has provided the Council with documentation of the adverse effect pursuant to 36 CFR § 800.6(a)(1). In addition, TVA will invite the United Keetoowah Band of Cherokee Indians in Oklahoma to participate in the PA as a Concurring Party.

TVA is seeking your comments on the enclosed draft PA. If you have any questions or comments, please contact Richard Yarnell in Knoxville at [wryarnell@tva.gov](mailto:wryarnell@tva.gov) or (865) 632-3463.

Sincerely,

A handwritten signature in black ink, appearing to read 'Clinton E. Jones'.

Clinton E. Jones  
Manager, Biological and Cultural Compliance  
Safety, River Management and Environment

SCC:CSD  
Enclosures

<sup>1</sup> Letter from TVA to your office dated November 10, and your response dated December 8, 2015.

**Dudley, Cynthia S**

---

**From:** Shuler, Marianne M  
**Sent:** Tuesday, January 12, 2016 11:19 AM  
**To:** 'Lisa LaRue-Baker - UKB THPO'; 'section106@mcn-nsn.gov'  
**Cc:** Ezzell, Patricia Bernard  
**Subject:** TVA-Center Point Moss Lake #2 TL Draft PA, Gordon & Whitfield Co. GA 1-12-16  
**Attachments:** TVA Center Point Moss Lake Draft PA Gorgon Whitfield Co GA 20160112.pdf; CP\_ML PA for Phased Compliance\_REV per KM Formatted 20160111.pdf

Good Morning

By this email, I am sending the attached letter regarding TVA's proposed Center Point-Moss Lake #2 transmission line project in Gordon and Whitfield Counties, Georgia. Per previous consultation with your office TVA has drafted a PA to govern the evaluation and resolution of adverse effects of the undertaking as project designs are developed, as provided for under 36 CFR §800.14(b)(1)(ii).

Attached is the draft PA for your review and comment.

Please let me know if you have any questions or comments on this undertaking by February 11, 2016.

Thanks  
Marianne



Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, TN 37902

January 12, 2016

TO THOSE LISTED:

TENNESSEE VALLEY AUTHORITY (TVA), ACCESS ROADS, CENTER POINT-MOSS LAKE #2 TRANSMISSION LINE, GORDON AND WHITFIELD COUNTIES, GEORGIA, DRAFT PROGRAMMATIC AGREEMENT

Pursuant to our consultation with your office<sup>1</sup>, TVA has prepared a draft Programmatic Agreement (PA) to satisfy TVA's responsibility under Section 106 of the National Historic Preservation Act (NHPA) with regard to TVA's proposed construction of the Center Point-Moss Lake No. 2 Transmission Line in Gordon and Whitfield Counties, Georgia. TVA has drafted a PA to govern the evaluation and resolution of adverse effects of the undertaking as project designs are developed, as provided for under 36 CFR §800.14(b)(1)(i).

Enclosed is a copy of the draft PA for your review. The draft PA stipulates steps for TVA to follow for avoiding or minimizing project effects to historic properties, evaluating the NRHP eligibility of any historic properties that are currently of undetermined eligibility for which adverse effects cannot be avoided, evaluating project effects to any properties that are eligible for the NRHP (once project designs have become available), and resolving any adverse effects to historic properties resulting from the undertaking. The PA would follow steps prescribed by the Advisory Council's regulations at 36 CFR §§ 800.4 to 800.13.

TVA has notified the Advisory Council on Historic Preservation of the adverse effect, and has provided the Council with documentation of the adverse effect pursuant to 36 CFR § 800.6(a)(1).

By this letter, TVA is inviting you to participate as a concurring party to this agreement document. Therefore, TVA requests your review and comment on this PA.

Please respond with your comments by February 11, 2016. If you have any questions, please contact me at (865) 632-6461 or by email at [pbezzell@tva.gov](mailto:pbezzell@tva.gov).

Sincerely,

A handwritten signature in cursive script that reads "Pat Bernard Ezzell".

Patricia Bernard Ezzell  
Senior Program Manager  
Native American Tribal Relations and Corporate Historian  
Public Relations and Corporate Information  
Communications, WT460 7D-K

MSH:CSD  
Enclosure

<sup>1</sup> Letter from TVA to your office dated November 16

Calhoun, Georgia – Area Power System Improvements

IDENTICAL LETTER MAILED TO THE FOLLOWING ON JANUARY 12, 2016:

Ms. Raelynn Butler  
Tribal Historic Preservation Officer  
Muscogee (Creek) Nation  
P.O. Box 580  
Okmulgee, Oklahoma 74447

Ms. Lisa C. LaRue-Baker  
United Keetoowah Band of Cherokee Indians in Oklahoma  
Post Office Box 746  
Tahlequah, Oklahoma 74465



## HISTORIC PRESERVATION DIVISION

MARK WILLIAMS  
COMMISSIONER

DR. DAVID CRASS  
DIVISION DIRECTOR

January 20, 2016

Clinton E. Jones  
Manager, Biological and Cultural Compliance  
Safety, River Management, and Environment  
Tennessee Valley Authority  
400 West Summit Hill Drive  
Knoxville, Tennessee 37902  
Attn: Richard Yarnell

RE: **Center Point-Moss Lake #2 Transmission Line  
Gordon and Whitfield Counties, Georgia  
HP-050112-004**

Dear Mr. Jones:

The Historic Preservation Division (HPD) has reviewed the revised report entitled, *A Phase I Cultural Resources Survey of the Tennessee Valley Authority's Planned Center Point-Moss Lake No. 2 Transmission Line in Gordon and Whitfield Counties, Georgia*, prepared by Tennessee Valley Archaeological Research and dated October 2015. Our comments are offered to assist the Tennessee Valley Authority (TVA) in complying with the provisions of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA).

Based on the information contained in the report, HPD concurs that archaeological site 9GO360 is not eligible for listing in the National Register of Historic Places (NRHP). Additionally, HPD concurs that site 9GO370 is of unknown or "undetermined" eligibility for listing in the NRHP. Furthermore, HPD concurs with the recommendation to avoid all sites of unknown eligibility within the subject project's area of potential effects (APE). If avoidance is not possible, additional investigations may be necessary.

Regarding historic structures, HPD concurs that resources 36431, 36432, 36434, 36435, 36444, 36461, 36463, 36464, 36465, 36466, 36566, 36587, 36622, 63601, 63627, 63665, 63666, 63668, 63669, 63673, HPD-2, HPD-3, HPD-4, HPD-5, HPD-10, HPD-11, HPD-18, HPD-21, HPD-23, HPD-25, and HPD-27 are not within the subject project's APE for the proposed project and finds that resources 36469 and 36475 are also outside of the APE. Additionally, HPD concurs that resources 36433, 36443, 36449, 36459, 36468, 36470, 36586, 36588, 63635, 63678, HPD-13, and HPD-24 are not eligible for listing in the NRHP, due to no longer being extant, along with resources 63627 and 63669. Furthermore, HPD concurs that resources IS-1, IS-2, IS-3, IS-5, IS-6, IS-7, IS-8, IS-9, IS-10, IS-11, IS-12, IS-13, IS-14, IS-17, IS-18, IS-19, IS-20, IS-21, IS-24, IS-25, IS-26, IS-27, IS-28, IS-29, IS-30, IS-31, IS-32, IS-33, IS-34, IS-35, IS-36, 36580, 36644, 63634, 63671, 63674, 63676, 63677, 63679, 63695, 63701, 219130, 219148, 219077, and WD-758 are not eligible for listing in the NRHP. HPD also concurs that resources 4, 15, 23, 36458, 36460, 36462, and 36467 are eligible for listing in the NRHP. Finally, HPD finds that resources 16 and 22 are eligible for listing in the NRHP. As submitted, the subject project cannot be evaluated for effects to historic resources within its APE. HPD looks forward to receiving an assessment of effects for the NRHP-eligible resources noted above, which should include photographs detailing the views from each resource toward the proposed transmission line/poles and indications of the approximate height and location of poles.

JEWETT CENTER FOR HISTORIC PRESERVATION  
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770.389.7844 | FAX 770.389.7878 | WWW.GEORGIASHPO.ORG

Calhoun, Georgia – Area Power System Improvements

Mr. Jones  
January 20, 2016  
HP-050112-004  
Page 2

Regarding a Programmatic Agreement (PA), as stated in our letter dated December 8, 2015, HPD concurs that the creation of a PA between our offices, in addition to appropriate tribal entities, to govern the evaluation and resolution of adverse effects as project designs are developed is a prudent course of action. HPD received the draft PA on January 11, 2016, and will submit comments to TVA under separate cover by February 10, 2016, at the latest. Regarding Dickey Cemetery/IS-22/9GO399, HPD received the full cemetery report on December 31, 2015, and will submit comments to TVA under separate cover by January 29, 2016.

Please refer to project number HP-050112-004 in any future correspondence regarding this project. If we may be of further assistance, please do not hesitate to contact Jennifer Bedell, Archaeological Compliance Unit Manager, at (770) 389-7861 or [jennifer.bedell@dnr.ga.gov](mailto:jennifer.bedell@dnr.ga.gov) or Meg Richardson, Environmental Review Historian, at (770) 389-7852 or [meg.richardson@dnr.ga.gov](mailto:meg.richardson@dnr.ga.gov).

Sincerely,



Jennifer Dixon, MHP, LEED Green Associate  
Program Manager  
Environmental Review & Preservation Planning

JAD/mcr

cc: Kevin McAuliff, Northwest Georgia Regional Commission

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HISTORIC PRESERVATION DIVISION

MARK WILLIAMS  
COMMISSIONER

DR. DAVID CRASS  
DIVISION DIRECTOR

January 29, 2016

Clinton E. Jones  
Manager, Biological and Cultural Compliance  
Safety, River Management, and Environment  
Tennessee Valley Authority  
400 West Summit Hill Drive  
Knoxville, Tennessee 37902  
Attn: Richard Yarnell

**RE: Center Point-Moss Lake #2 Transmission Line  
Gordon and Whitfield Counties, Georgia  
HP-050112-004**

Dear Mr. Jones:

The Historic Preservation Division (HPD) has reviewed the reports entitled, *A Geophysical Survey at Dickey Cemetery (9GO399) Near Sugar Valley, Gordon County, Georgia* and *Phase I Cultural Resources Survey of the Tennessee Valley Authority's Planned Center Point-Moss Lake No. 2 Transmission Line in Gordon and Whitfield Counties, Georgia*, prepared by Tennessee Valley Archaeological Research and dated October 2015. Our comments are offered to assist the Tennessee Valley Authority (TVA) in complying with the provisions of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA).

Based on the information contained in the above reports regarding Dickey Cemetery (IS-22/9GO399) and as stated in our letter dated January 20, 2016, HPD finds Dickey Cemetery eligible for listing in the National Register of Historic Places (NRHP) under Criterion C and meets Criteria Consideration D as a good and representative example of a rural family cemetery featuring an obelisk monument. Additionally, as noted in our letter dated July 25, 2015, HPD finds that Dickey Cemetery is of unknown eligibility for listing in the NRHP under Criterion D.

HPD would like to note that Dickey Cemetery is protected under *Official Code of Georgia (OCGA) 36-72-1 et seq. Abandoned Cemeteries and Burial Grounds*. Therefore, HPD concurs with avoidance during all ground disturbing activities. Additionally, since no geophysical or probing data was recorded within a 10- to 20-foot (ft) area immediately adjacent to the cemetery wall along the southern and western edges, HPD recommends that a 30-ft environmentally sensitive area be established around the walled perimeter of the cemetery. Furthermore, since eligibility was discussed in the Phase I report, HPD recommends that the geophysical survey report be appended to the Phase I and not a separate, stand-alone document.

Please refer to project number **HP-050112-004** in any future correspondence regarding this project. If we may be of further assistance regarding Dickey Cemetery, please do not hesitate to contact Rachel Black, Deputy State Archaeologist, at (770) 389-7862 or [Rachel.Black@dnr.ga.gov](mailto:Rachel.Black@dnr.ga.gov) or Meg Richardson, Environmental Review Historian, at (770) 389-7852 or [meg.richardson@dnr.ga.gov](mailto:meg.richardson@dnr.ga.gov).

Sincerely,

A handwritten signature in blue ink, appearing to read "JD", with a stylized flourish.

Jennifer Dixon, MHP, LEED Green Associate  
Program Manager  
Environmental Review & Preservation Planning

JAD/mcr

cc: Kevin McAuliff, Northwest Georgia Regional Commission

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## Calhoun, Georgia – Area Power System Improvements

**From:** [Yarnell, W Richard](#)  
**To:** [Jones, Clinton F](#)  
**Cc:** [Liskey, Todd C](#); [Pearman, Paul Jonathan](#); [Dudley, Cynthia S](#)  
**Subject:** FW: Draft PA, Center Point-Moss Lake #2 Transmission Line, Gordon and Whitfield Counties, HP 050112-004  
**Date:** Monday, February 01, 2016 4:33:34 PM  
**Attachments:** [image001.png](#)  
[image004.png](#)  
[image005.png](#)  
[image006.png](#)  
[image007.png](#)  
[PAR Guidelines 2014.pdf](#)  
[image016.png](#)  
[image017.png](#)  
[image018.png](#)  
[image019.png](#)

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Clint, we will prepare a response to GA's comments, I would prefer to respond by the end of the week or sooner. We can discuss after further review- thank you, Richard.

---

**From:** Richardson, Meg [mailto:[Meg.Richardson@dnr.ga.gov](mailto:Meg.Richardson@dnr.ga.gov)]  
**Sent:** Monday, February 01, 2016 10:46 AM  
**To:** Yarnell, W Richard  
**Subject:** Draft PA, Center Point-Moss Lake #2 Transmission Line, Gordon and Whitfield Counties, HP 050112-004

**TVA External Message. Please use caution when opening.**

Richard,

We've reviewed the draft PA for the above project and we have a few questions and comments. See below. Let me know if you have any questions!

Title Block: It needs to be the "GEORGIA STATE HISTORIC PRESERVATION OFFICE**R**". Please put the HP # on the last line (HP-050112-004). Also, have you contacted the ACHP to see if they want to participate?

3<sup>rd</sup> Whereas Clause: Remove the last part of this clause starting with "as defined..." and add "included in or eligible for inclusion in the National Register of Historic Places (NRHP) and therefore require compliance with Section 106 of the National Historic Preservation Act (54 U.S.C. 306108) and its implementing regulations (36 CFR Part 800); and"

11<sup>th</sup> Whereas Clause: Based on our last response letter, we also found resources 16 and 22 to be eligible for listing in the NRHP.

12<sup>th</sup> Whereas Clause: Based on our last response letter, we requested additional information in order to determine effects.

14<sup>th</sup> Whereas Clause: HPD prefers the use of "unknown" or "undetermined" instead of "potentially eligible".

17<sup>th</sup> Whereas Clause: Please be specific and list the local governments you've consulted with about the PA and note who has decided to sign and who will not sign. This can either be listed out in the clause or in an Appendix.

Stipulations: TVA needs to ensure that the following stipulations are carried out by a person(s) that are SOI-qualified.

Stipulation I.A: Please use "unknown" or "undetermined" instead of "potentially eligible".

Stipulation I.B(2)(a) and (b): Evaluation of resources should not be predicated on the assumption of an adverse effect. If there is a resource in the APE, the eligibility needs to be evaluated. Also, you can combine these stipulations to read "archaeological sites which are of undetermined NRHP eligibility and above-ground resources which have not been previously evaluated or require further evaluation in order to determine their eligibility for listing in the NRHP".

Stipulation I.C: This section should be titled "Effects" or something along those lines. This stipulation needs to be fleshed out a little bit more. The first paragraph discusses the procedure for a determination of "not eligible". It needs to cover both "NHPA" and "NAE" findings. We understand that you are streamlining the process through avoidance measures, however, we can't skip or gloss over any steps/findings in the S106 process. Explain that you are utilizing the avoidance measures to achieve a NHPA or NAE determination. Something along those lines.

Stipulation II.A: Define/clarify "project elements".

Stipulation II.B: For greater protection, HPD prefers maps and plans to be labeled "sensitive area" instead of "archaeological site".

Stipulation III.A: Remove "realistically". We may have different opinions on what constitutes realistic.

Stipulation III.B(2): HPD would like to have the option for additional mitigation alternatives, or creative mitigation, such as public education or interpretation

Stipulation III.B(3): HABS/HAER documentation only needs to be completed if the property in question is a National Historic Landmark, a resource eligible at the national level, or an eligible bridge. Otherwise, you can document the property to our Guidelines for Establishing a Photographic Permanent Archival Record (PAR) and you will need to insert our guidelines as an Appendix. I've attached our most recent PAR for your use (Attach Guidelines).

Stipulation V.B: Add "until such time the State Archaeologist can be consulted".

Stipulation VI: The end of last sentence in the first paragraph should have "unless additional information is needed to concur with determinations" or something similar.

Stipulation VII: A Reporting stipulation should be added. We would like to see an annual report of

activities completed under this PA.

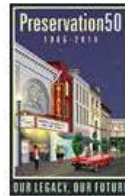
Signatory: Dr. David Crass, Division Director and Deputy State Historic Preservation Officer, signs all of our agreement documents.

Meg Richardson, MSHP

**Environmental Review Historian**

Historic Preservation Division  
Jewett Center for Historic Preservation  
2610 GA Hwy 155, SW  
Stockbridge, GA 30281

P 770.389.7852 | [www.georgiashpo.org](http://www.georgiashpo.org)





Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, TN 37902

February 23, 2016

Dr. David Crass, Division Director  
Historic Preservation Division  
Georgia Department of Natural Resources  
Attn: Environmental Review  
2610 GA Hwy 155, SW  
Stockbridge, GA 30281

Dear Dr. Crass:

TENNESSEE VALLEY AUTHORITY (TVA), CENTER POINT-MOSS LAKE #2 TRANSMISSION LINE,  
GORDON AND WHITFIELD COUNTIES, GEORGIA, DRAFT PROGRAMMATIC AGREEMENT - HPC-  
050112-004

Enclosed is one copy of the subject PA with five signature pages. Our offices have agreed to develop this PA to govern the management of historic properties that may be affected by TVA's Center Point-Moss Lake #2 Transmission Line project. We have revised the draft following the comments and recommendations that Meg Richardson provided by email on February 1. We now ask for your signature on the enclosed signature pages.

Please provide TVA with a final copy of the executed PA with signatures. Once all signatures have been obtained, we will provide your office with a complete copy with all signatures. If you have any questions or comments, please contact Richard Yarnell by phone at (865) 632-3463 or by e-mail at [wryarnell@tva.gov](mailto:wryarnell@tva.gov).

Sincerely,

A handwritten signature in black ink, appearing to read 'Clinton E. Jones'.

Clinton E. Jones  
Manager, Biological and Cultural Compliance  
Safety, River Management and Environment  
WT11C-K

SCC:CSD  
Enclosures



Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, TN 37902

February 24, 2016

Karen Pritchett  
Acting THPO  
United Keetoowah Band of Cherokee Indians in Oklahoma  
Post Office Box 1245  
Tahlequah, Oklahoma 74465

Ms. Karen Pritchett:

TENNESSEE VALLEY AUTHORITY (TVA), CENTER POINT-MOSS LAKE #2 TRANSMISSION LINE, GORDON AND WHITFIELD COUNTIES, GEORGIA, DRAFT PROGRAMMATIC AGREEMENT - HPC-050112-004

Enclosed is one copy of the subject PA with five signature pages. Our offices have agreed to develop this PA to govern the management of historic properties that may be affected by TVA's Center Point-Moss Lake #2 Transmission Line project. We now ask for your tribe's signature on the enclosed signature pages. Please return to TVA all five signed signature pages. Once all signatures have been obtained, we will provide your office with an executed copy with all signatures.

TVA wishes to thank you for your assistance in executing this agreement document and we look forward to working with you in the implementation of its terms. Also, if you have any questions, please contact me at (865)632-6461 or by email at [pbezzell@tva.gov](mailto:pbezzell@tva.gov)

Sincerely,

A handwritten signature in cursive script that reads "Pat Bernard Ezzell".

Pat Bernard Ezzell  
Senior Program Manager  
Tribal Relations and Corporate History  
WT7D-K

MMS:CSD  
Enclosure

**PROGAMMATIC AGREEMENT  
BETWEEN THE TENNESSEE VALLEY AUTHORITY  
AND THE  
GEORGIA STATE HISTORIC PRESERVATION OFFICER  
REGARDING THE MANAGEMENT OF HISTORIC PROPERTIES AFFECTED BY  
THE CENTER POINT-MOSS LAKE TRANSMISSION LINE PROJECT  
(GEORGIA HISTORIC PRESERVATION DIVISION NUMBER HP-050112-004)**

**WHEREAS**, the Tennessee Valley Authority (TVA) proposes to construct approximately 19.5 miles of new transmission line (TL) on new and existing right-of-way (ROW) from North Georgia Electric Membership Corporation (NGEMC)'s existing Swamp Creek Substation located south of Dalton, Georgia to their Fuller Substation located on the south side of Calhoun, Georgia, and to purchase an additional 1.4 miles of ROW from the new TL to TVA's existing Center Point Substation (Appendix A); and

**WHEREAS**, TVA considers this action meets the definition of "undertaking" at 36 CFR § 800.16(y); and

**WHEREAS**, the Center Point-Moss Lake Transmission Line Project is a complex undertaking that is subject to 36 CFR § 800.14(b)(3); and

**WHEREAS**, this Undertaking has the potential to affect historic properties included in or eligible for inclusion in the National Register of Historic Places (NRHP), and therefore requires compliance with Section 106 of the National Historic Preservation Act (54 U.S.C. 306108) and its implementing regulations (36 CFR Part 800); and

**WHEREAS**, TVA, in consultation with the Georgia State Historic Preservation Officer (GA SHPO) and pursuant to 36 CFR § 800.4(a)(1), has determined the area of potential effects (APE) for this proposed federal undertaking, for archaeological resources, to be the 20.9-mile proposed TL ROW, which includes some 100-foot wide ROW, but would primarily consist of a 150-ft wide ROW, and portions of 12 planned access roads (with a total combined length of 3.57 miles) that extend outside the proposed ROW; and

**WHEREAS**, TVA, in consultation with GA SHPO and pursuant to 36 CFR § 800.4(a)(1), has determined the APE for historic architectural resources to be a one-half mile radius surrounding the centerline of the proposed new TL, as well as any areas where new construction or vegetation clearing would occur within view of an historic resource; and

**WHEREAS**, TVA has consulted with GA SHPO regarding this undertaking, in accordance with 36 CFR Part 800, regulations of the Advisory Council on Historic Preservation ("Council") implementing Section 106 of the National Historic Preservation Act (NHPA); and,

**CONCURRING PARTY**

By: \_\_\_\_\_  
Lisa C. Baker, Acting THPO  
United Keetoowah Band of Cherokee Indians in Oklahoma

Date: \_\_\_\_\_



**From:** Yarnell, W Richard  
**Sent:** Wednesday, February 24, 2016 1:34 PM  
**To:** 'Richardson, Meg'  
**Cc:** Cole, Stephen C  
**Subject:** Center Point-Moss Lake No. 2, Gordon & Whitfield Counties, GA.

Dear Meg,

We've reviewed the comments you kindly provided on the draft Programmatic Agreement for the Center Point-Moss Lake No. 2 transmission line project (HP-05112-004). The changes have been incorporated into a revised PA, which also includes additional changes that we made that hopefully make TVA's intentions more clear and clean up the logical flow of the document. We yesterday mailed the revised PA to your office asking for signatures.

Simultaneously, we are working on preparing a revised draft report of the Phase I cultural resources survey, based on your recent comments on the last report revision and the Dickey Cemetery Delineation report. The primary changes in the report will be the following:

- Additional information about IS-16, the Colonial Revival Ranch house. TVAR re-visited this property and discovered the owner has recently made significant revisions including replacing all the original wooden window sashes with vinyl window sashes (as well as the removal of the original interior walls, floor plan, flooring, and tile). Based on these changes, TVA finds this house is no longer NRHP eligible.
- Evaluations of effect for the seven above-ground resources that our offices agree are NRHP-eligible (IS-4, IS-15, IS-23, 36458, 36460, 36462, and 36467). TVA has provided the final project design (proposed TL pole locations and heights), and we'll use this to assess affects. As for IS-22, the Dickey Cemetery, we continue to disagree on its NR status but we will address your office's eligibility opinion in the revised report.
- The Dickey Cemetery delineation report will be included with the revised report, as requested (as an appendix).

I also recently sent you our proposed scopes of work for Phase II testing at 20 archaeological sites of undetermined NRHP eligibility in the proposed ROW, and will welcome your input. We do not agree with your statement that all resources in an APE must be evaluated (if that was intended as a blanket statement about identification). TVA agrees with the Advisory Council's position on this question as expressed in their guidance document, *Section 106 Archaeology Guidance* (January 1, 2009 revision), particularly items 18-23 in section C, Determining Which Archaeological Sites Are Significant: Identification. However, we have decided to carry out phase II testing at each of the 20 sites of undetermined eligibility. In making this decision, TVA considered a range of factors including the magnitude of the undertaking, the extent of TVA's involvement in the undertaking, limitations on TVA's control over historic properties in the ROW in future, possible cumulative effects from future maintenance of the transmission line and ROW, and the likelihood of these sites satisfying Criterion D. Determining eligibility for all 20 of the undetermined sites will allow us to address possible cumulative effects, even for sites that

will not be directly affected by the current undertaking. To make sure we have addressed your concerns about Stipulation I.B(2) of the PA, we revised the document so that it agrees with both TVA's decision and your position on the question of identifying resources in an APE.

I just wanted to make you aware of these forthcoming changes as HPD reviews the PA. It is our intent that the PA, once executed, will allow our offices to continue to resolve any issues that may arise regarding this undertaking.

Sincerely,

Richard Yarnell  
Archaeologist III  
Natural Resources Compliance Programs  
Tennessee Valley Authority  
400 W. Summit Hill Drive  
Knoxville, TN 37902-1401

865.632.3463



Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, TN 37902

March 3, 2016

Dr. David Crass  
Division Director  
Historic Preservation Division  
Georgia Department of Natural Resources  
Attn: Environmental Review  
2610 GA Hwy 155, SW  
Stockbridge, GA 30281

Dear Dr. Crass:

TENNESSEE VALLEY AUTHORITY (TVA), CENTER POINT-MOSS LAKE #2  
TRANSMISSION LINE, GORDON AND WHITFIELD COUNTIES, GEORGIA, CHANGES TO  
PROGRAMMATIC AGREEMENT (PA) (HPC-050112-004)

Last week, we sent you a revised version of the PA for the above-cited project, asking for your consideration and signature. The revised version reflects our effort to address the comments you had earlier sent on the draft PA. Unfortunately, as Richard Yarnell explained in an email to Meg Richardson this week, after sending the revised PA we discovered a small number of errors in the document. To rectify this, Richard emailed Ms. Richardson a PDF of the corrected copy, and enclosed is a hard copy on acid-free paper, minus the signature pages (which you should already have). The corrections are listed below. We would be grateful if you would please replace pages 1-9 of the document we sent two weeks ago with the enclosed pages. We apologize for the error and any inconvenience it may have caused.

Changes reflected in the enclosed version:

1. "Programmatic" in the title was misspelled; that has been corrected.
2. The 9th "Whereas" gave the number of archaeological sites identified in the APE as 55; this was corrected to 58.
3. Some place holder text in the 16th "Whereas" has been replaced with "the United Keetoowah Band of Cherokee Indians in Oklahoma."
4. Under Part I.B.1, on page 3, the earlier version contained this language: "TVA shall evaluate the NRHP eligibility of any cultural resources within the APE that TVA and GA SHPO have agreed are eligible for the NRHP." This did not make sense. That language has been replaced with the following: "TVA shall evaluate the NRHP eligibility of any cultural resources within the APE that TVA and GA SHPO have agreed are of 'undetermined' NRHP eligibility for the NRHP and that would be adversely affected by the Undertaking, pursuant to 36 CFR § 800.4(c)."

Dr. David Crass  
Page Two  
March 3, 2016

If you have any questions or comments, please contact Richard Yarnell by phone at (865) 632-3463 or by e-mail at [wryarnell@tva.gov](mailto:wryarnell@tva.gov).

Sincerely,

A handwritten signature in black ink, appearing to read "Clinton E. Jones". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Clinton E. Jones  
Manager, Biological and Cultural Compliance  
Safety, River Management and Environment  
WT11C-K

SCC:CSD  
Enclosures



HISTORIC PRESERVATION DIVISION

MARK WILLIAMS  
COMMISSIONER

DR. DAVID CRASS  
DIVISION DIRECTOR

March 15, 2016

Clinton E. Jones  
Manager, Biological and Cultural Compliance  
Safety, River Management, and Environment  
Tennessee Valley Authority  
400 West Summit Hill Drive  
Knoxville, Tennessee 37902  
Attn: Richard Yarnell

**RE: Center Point-Moss Lake #2 Transmission Line and Substation, Dalton  
Gordon and Whitfield Counties, Georgia  
HP-050112-004**

Dear Mr. Jones:

The Historic Preservation Division (HPD) has received additional information concerning the above referenced project. Our comments are offered to assist the Tennessee Valley Authority (TVA) in complying with the provisions of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA).

HPD has reviewed the scope of work for Phase II testing of twenty (20) archaeological sites associated with the planned Center Point-Moss Lake No. 2 Transmission Line and Substation, prepared by Tennessee Valley Archaeological Research and dated February 17, 2016. Based on the information provided, HPD finds that the documentation is inadequate and is, therefore, unable to comment on the scope of work without additional information. HPD recommends resubmitting the documentation as a formal Phase II archaeological Research Design/Workplan. This document should discuss the plan of action(s) necessary to consider and complete the following elements:

1. Explicit statements of theoretical and methodological approaches proposed to conduct background/archival research, field investigations, laboratory analysis, and curation.
2. Each site should be addressed separately and information needs to include general site details, discussion on the necessity of, and specific plan for, conducting additional shovel testing versus test units in specific areas (why each should be utilized in each particular instance), include relevant research questions for each site and how the Phase II plans to answer them, detail of the techniques that will be used to reveal information concerning site stratification, presence of features, paleoenvironment, artifact variability, and culturally determined horizontal and vertical artifact patterning in relation to potential site function.

Please refer to project number **HP-050112-004** in future correspondence regarding this project. If we may be of further assistance, please do not hesitate to contact Jennifer Bedell, Archaeology Compliance Manager, at (770) 389-7861, or [jennifer.bedell@dnr.ga.gov](mailto:jennifer.bedell@dnr.ga.gov) or Meg Richardson, Environmental Review Historian, at (770) 389-7852 or [meg.richardson@dnr.ga.gov](mailto:meg.richardson@dnr.ga.gov).

Sincerely,

A handwritten signature in blue ink, appearing to read "JD" or "J.D.", with a stylized flourish.

Jennifer Dixon, MHP, LEED Green Associate  
Program Manager  
Environmental Review & Preservation Planning

JAD/mcr  
cc: Scott C. Meeks, TVAR  
Steve Cole, TVA

JEWETT CENTER FOR HISTORIC PRESERVATION  
2610 GA HWY 155, SW | STOCKBRIDGE, GA 30281  
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Tennessee Valley Authority, 400 West Summit Hill Drive, Knoxville, Tennessee 37902

March 29, 2016

Dr. David Crass, Division Director  
Georgia Department of Natural Resources  
Historic Preservation Division  
Attn: Environmental Review  
Ground Level  
254 Washington Street, SW  
Atlanta, Georgia 30334

Dear Dr. Crass:

TENNESSEE VALLEY AUTHORITY, CENTER POINT-MOSS LAKE #2 TRANSMISSION LINE,  
SCOPE OF WORK FOR PHASE II TESTING OF ARCHAEOLOGICAL SITES, GORDON AND  
WHITFIELD COUNTIES, GEORGIA, HPC-050112-004

The Tennessee Valley Authority (TVA) has reviewed your March 15, 2016, letter containing comments on our scopes of work (SOWs) for Phase II testing of archaeological sites in the area of potential effects (APE) for the above-cited project. Based on those comments, it appears there may be some confusion about TVA's purpose on conducting the Phase II testing. In this letter, we provide some explanation of our goals and how TVA will use the information generated by these additional studies in hopes of clarifying the situation.

Your letter asks TVA to provide (1) "explicit statements of theoretical and methodological approaches to conduct background/archival research, field investigations, laboratory analysis, and curation" and (2) individual detailed discussions of each site, including justifications for the field methods chosen. While TVA recognizes these types of information to be important, or even critical, when Phase III (data recovery) investigations are conducted at archaeological sites, they are not typically part of Phase II testing. Our purpose in testing these sites is to determine their National Register eligibility. The additional investigations are necessary because the Phase I investigation, which was limited to pedestrian survey and systematic shovel testing, proved insufficient to determine whether each of these sites meets Criterion D of the National Historic Preservation Act. Thus, as we see it, the Phase II testing is a continuation of the Phase I study and falls within TVA's efforts to comply with 36 C.F.R. § 800.4(c). As you know in Section 106, finding a property to be NRHP eligible under Criterion D merely requires determining that it yields or may be likely to yield data that is considered important in prehistory or history. In our view, it does not require a research program grounded in theory and aimed at addressing specific research questions. The Phase II investigations will provide the information we need in order to determine whether Criterion D is satisfied. That information will include depths of deposits, site stratigraphy, ages of the deposits, the presence of buried features and likely nature of those features, degree of preservation of organic remains, the horizontal distributions of artifacts and features, and the nature and extent of modern disturbance. We believe that the methods outlined in the SOWs we submitted are adequate to provide these kinds of data.

Dr. David Crass  
Page 2  
March 29, 2016

Moreover, in preparing the SOWs, TVA closely followed the *Georgia Standards and Guidelines For Archaeological Surveys, Revised April 2014*, prepared by the Georgia Council of Professional Archaeologists and available through your web site.

Should the results of the Phase II testing lead us to find that any of the sites is NRHP eligible, we will consult further with your office and seek your comments. If TVA and your office agree that such sites are eligible, and that the undertaking would result in an adverse effect, TVA will seek your views on appropriate mitigation. If our offices agree that a Phase III data recovery investigation would serve as appropriate mitigation, TVA will be sure to provide SOWs for the Phase III investigation for your review; those SOWs will address the two items requested in your letter. In other words, we do not wish to disregard the suggestions in your recent letter; rather, we believe they are more appropriate in the context of a Phase III data recovery investigation.

As TVA's time line for completing Section 106 consultation on this project is becoming shorter, we have elected to initiate our Phase II testing at five selected sites of undetermined eligibility in the project's APE. We anticipate completing these studies within four weeks and submitting the reports to your office for review within approximately eight weeks from the present time.

Should you have any questions or if you would like to discuss this further, please contact Richard Yarnell at (865) 632-3463 or [wryarnell@tva.gov](mailto:wryarnell@tva.gov). We will also be more than happy to discuss the Phase II testing at the upcoming meeting between our respective offices on March 31, 2016.

Sincerely,



Clinton E. Jones  
Manager, Biological and Cultural Compliance  
Safety, River Management, and Environment

cc: Ms. Jennifer Dixon, MHP, LEED Green Associate Program Manager  
Georgia Department of Natural Resources  
Environmental Review and Preservation Planning  
Attention: Environmental Review  
254 Washington Street, SW  
Ground Level  
Atlanta, Georgia 30334





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**Appendix B – Stream Crossings along the Proposed  
Transmission Line and Access Roads**

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**Stream Crossings along the Proposed 19.2-mile Transmission Line Right-of-Way and Associated Access Roads Located in Gordon and Whitfield Counties, Georgia**

<b>Stream ID</b>	<b>Stream Type</b>	<b>Streamside Management Zone Category</b>	<b>Stream Name</b>	<b>Field Notes</b>
001	Perennial	Category A (50 ft)	Unnamed Tributary of Oothkalooga Creek	Approximately 3ft wide x 1ft deep channel with clay/ silt substrate.
002	Perennial	Category A (50 ft)	Unnamed Tributary of Oothkalooga Creek	10ft wide x 3ft deep channel with clay substrate.
003	Perennial	Category A (50 ft)	Unnamed Tributary of Oothkalooga Creek	Channel width various with approximate depth of 3-5 ft. Clay appears to be dominate substrate.
004	Perennial	Category A (50 ft)	Unnamed Tributary of Oothkalooga Creek	Channel width various with approximate depth of 3-5 ft. Clay appears to be dominate substrate.
005	Intermittent	Category A (50 ft)	Unnamed Tributary of Oostanaula River	2ft wide x 1ft deep channel with clay substrate.
006	Perennial	Category A (110 ft)	Unnamed Tributary of Oostanaula River	3ft wide x 2ft deep channel with mostly clay substrate. Slope bumps up SMZ width
007	Perennial	Category A (50 ft)	Unnamed Tributary of Oostanaula River	2ft wide x 2ft deep spring run with bedrock substrate.
008	Perennial	Category B (70 ft)	Unnamed Tributary of Oostanaula River	4ft wide x 4ft deep channel with bedrock/ clay substrate with cattle impacts. Direct tributary to DCH.
009	Perennial	Category B (70 ft)	Unnamed Tributary of Oostanaula River	4ft wide x 4ft deep channel with bedrock/ clay substrate with cattle impacts. Direct tributary to DCH.
010	Perennial	Category B (70 ft)	Unnamed Tributary of Oostanaula River	4ft wide x 4ft deep channel with bedrock/ clay substrate with cattle impacts. Direct tributary to DCH.
011	Perennial	Category B (70 ft)	Unnamed Tributary of Oostanaula River	4ft wide x 4ft deep channel with bedrock/ clay substrate with cattle impacts. Direct tributary to DCH.
012	Perennial	Category B (70 ft)	Unnamed Tributary of Oostanaula River	4ft wide x 4ft deep channel with bedrock/ clay substrate with cattle impacts. Direct tributary to DCH.

013	Intermittent	Category A (50 ft)	Unnamed Tributary of Oostanaula River	3ft wide x 3ft deep channel with clay substrate.
014	Intermittent	Category A (50 ft)	Unnamed Tributary of Oostanaula River	3ft wide x 3ft deep channel with clay substrate.
015	Intermittent	Category B (70 ft)	Unnamed Tributary of Oostanaula River	6ft wide x 6ft deep channel. Direct tributary to DCH
016	Intermittent	Category A (50 ft)	Unnamed Tributary of Oostanaula River	4ft wide x 2ft channel. Channelized in field.
017	Intermittent	Category A (50 ft)	Unnamed Tributary of Oostanaula River	3ft wide x 2ft deep channel with clay/ gravel substrate.
018	Perennial	Category A (50 ft)	Unnamed Tributary of Oostanaula River	10ft wide x 5ft deep channel with clay/ gravel substrate.
019	Other	Category A (50 ft)	NA	Pond outside of ROW.
020	Perennial	Category A (50 ft)	Unnamed Tributary of Oostanaula River	10ft wide x 5ft deep channel with clay/ gravel substrate.
021	Perennial	Category A (50 ft)	Unnamed Tributary of Oostanaula River	3ft wide x 3ft deep channel with clay substrate.
022	Perennial	Category A (50 ft)	Unnamed Tributary of Oostanaula River	12ft wide x 8ft deep channel with clay/ gravel substrate.
023	Perennial	Category C (90 ft)	Oostanaula River (mainstem)	Oostanaula River DCH. 90ft minimum SMZ width.
024	Perennial	Category B (70 ft)	Unnamed Tributary of Oostanaula River	26ft wide x 8ft deep channel with clay substrate. Direct trib to DCH
025	Perennial	Category B (70 ft)	Unnamed Tributary of Oostanaula River	26ft wide x 8ft deep channel with clay substrate. Direct trib to DCH
026	Other	Category A (50 ft)	NA	Pond.
027	Perennial	Category B (70 ft)	Spring Branch	28ft wide x 7ft deep channel with cobble/ gravel substrate. Tributary to DCH

Calhoun, Georgia – Area Power System Improvements

028	Perennial	Category B (70 ft)	Unnamed Tributary of Oostanaula River	14ft wide x 4ft deep channel with cobble/ gravel substrate. Tributary to DCH
029	Perennial	Category B (70 ft)	Bow Creek	28ft wide channel with mostly bedrock/ cobble substrate.
030	Other	Category A (50 ft)	NA	Pond.
031	Perennial	Category A (50 ft)	Unnamed Tributary of Snake Creek	4ft wide x 2ft deep channel with clay substrate.
032	Perennial	Category A (50 ft)	Snake Creek	20ft wide x 4ft deep channel with gravel/ cobble substrate.
033	Intermittent	Category A (50 ft)	Unnamed Tributary of Snake Creek	4ft wide x 2ft deep channel with clay substrate.
034	Intermittent	Category A (50 ft)	Unnamed Tributary of Snake Creek	Small stream out of banks at time of survey approximately 1- 2ft deep with clay/ silt substrate.
035	Perennial	Category A (50 ft)	Snake Creek	Snake Creek.
036	Perennial	Category A (50 ft)	Snake Creek	Snake Creek.
037	Perennial	Category A (50 ft)	Unnamed Tributary of Snake Creek	10ft wide x 3ft deep channel with cobble/ gravel substrate.
038	Perennial	Category A (50 ft)	Unnamed Tributary of Snake Creek	10ft wide x 3ft deep channel with cobble/ gravel substrate.
039	Perennial	Category A (50 ft)	Unnamed Tributary of Lick Creek	5ft wide x 3ft deep channel with gravel/ silt substrate
040	Perennial	Category A (50 ft)	Unnamed Tributary of Blue Springs Creek	10ft wide x 8ft deep channel with bedrock / cobble/ sand/ gravel substrate. Fish, snails, caddis fly cases observed.
041	Other	Category A (50 ft)	NA	Pond.
042	Intermittent	Category A (50 ft)	Unnamed Tributary of Blue Springs Creek	12ft wide x 2ft deep channel with cobble/ gravel substrate. Dry at time of survey.
043	Intermittent	Category A (110 ft)	Unnamed Tributary of Blue Springs Creek	Channel with gravel/ small cobble. Aquatic salamander observed. SMZ bumped up due to slope of back lying land.
044	Intermittent	Category A (50 ft)	Unnamed Tributary of Blue Springs Creek	4ft wide x 1ft deep channel with gravel substrate.
045	Perennial	Category A (50 ft)	Unnamed Tributary of Dry Creek	6ft wide x 4ft deep channel with bedrock/ gravel/ sand substrate.

046	Perennial	Category A (50 ft)	Unnamed Tributary of Dry Creek	6ft wide x 3 foot deep channel with cobble/ gravel substrate.
047	Perennial	Category A (50 ft)	Dry Creek	10ft wide x 5ft deep channel with cobble/ gravel/ sand substrate. Snails, salamanders, and caddis fly cases observed.
048	Intermittent	Category A (50 ft)	Unnamed Tributary of Dry Creek	4ft wide x 2ft deep channel.
049	Intermittent	Category A (70 ft)	Unnamed Tributary of Dry Creek	3ft wide x 1ft deep with gravel substrate. SMZ width bumped up due to slope.
050	Perennial	Category B (70 ft)	Swamp Creek	15ft wide x 3ft deep with bedrock/ cobble/ gravel substrate.
051	Perennial	Category B (70 ft)	Swamp Creek	15ft wide x 3ft deep with bedrock/ cobble/ gravel substrate.
052	Perennial	Category B (70 ft)	Swamp Creek	15ft wide x 3ft deep with bedrock/ cobble/ gravel substrate. Access road AR04 crosses this stream within the right-of-way at an existing "ford".
053	Perennial	Category B (70 ft)	Swamp Creek	Swamp Creek.
054	Intermittent	Category A (50 ft)	Unnamed Tributary of Swamp Creek	4ft wide x 4ft deep channel with gravel substrate.
055	Perennial	Category B (70 ft)	Unnamed Tributary of Swamp Creek	3ft wide x 3ft deep channel with cobble substrate.
056	Intermittent	Category A (50 ft)	Unnamed Tributary of Swamp Creek	2ft wide x 2ft deep channel with gravel substrate.
057	Perennial	Category B (70 ft)	Swamp Creek	Swamp Creek.
058	Intermittent	Category A (50 ft)	Unnamed Tributary of Swamp Creek	3ft wide x 1ft deep channel with silt substrate.



**Appendix C – Noise During Transmission Line  
Construction and Operation**

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## Noise During Transmission Line 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 (USEPA) and the Department of Housing and Urban Development (HUD) have established noise guidelines. USEPA 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 gives consideration to 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 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 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 in order 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, nonrainy 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 Operation, Building Equipment, and Home Appliances*. U.S. Environmental 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.