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COLBERT ASH POND 4 SEISMIC PROJECT (CANE CREEK RELOCATION & BUTTRESS PLACEMENT)

DRAFT ENVIRONMENTAL ASSESSMENT

Colbert Fossil Plant, Colbert County, Alabama

Prepared by:
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LIST OF ACRONYMS

ADEM	Alabama Department of Environmental Management
AHC	Alabama Historical Commission
APE	Area of Potential Effect
BMP	Best Management Practice
CCR	Coal Combustion Residuals
COF	Colbert Fossil Plant
CT	Combustion Turbine
DMM	Deep Mixing Method
EA	Environmental Assessment
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
HUC	Hydrologic Unit Code
IPaC	Information for Planning and Consultation
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
RM	River Mile
TVA	Tennessee Valley Authority
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

CHAPTER 1 - INTRODUCTION

1.1 Purpose and Need for Action

The Tennessee Valley Authority (TVA) Colbert Fossil Plant (COF) is located in northwestern Alabama, approximately 14 miles west of Muscle Shoals in Colbert County. COF is adjacent to the southern bank of the Tennessee River. COF ceased all coal-fired power generation on March 23, 2016. TVA manages coal combustion residuals (coal ash or CCR) in closed on-site units, including in Ash Pond 4, which is located on TVA property south of COF and north of U.S. Highway 72. Ash Pond 4 is approximately 52 acres in area and is enclosed by a perimeter dike system that is approximately 6,700 feet in total length. Ash Pond 4 was closed and capped in early 2018.

The Ash Pond 4 facility has undergone multiple slope stability evaluations since 2009 and remediation efforts to improve safety factors in accordance with federal and state safety factor criteria. In 2011, the U.S. Environmental Protection Agency (EPA) performed structural assessments of TVA's CCR impoundments and provided results of the assessments in plant-specific reports in 2013. In the COF report, Ash Pond 4 received a fair rating; EPA stated that the potential for liquefaction had not been evaluated and requested an action plan to resolve the issue. TVA completed a liquefaction analysis in September 2014 and reported to the EPA that a section along the Cane Creek side of Ash Pond 4 was susceptible to liquefaction during a design earthquake with an approximate return period of 2,500 years (i.e., an earthquake with 2% probability of occurrence in 50 years).

A project was initiated to improve the soils by a deep mixing method (DMM; i.e., cement grout mixed with soil) where walls were installed in the subgrade soils to stabilize the east dike (on the Cane Creek side) for earthquake loading. During installation of the DMM walls, TVA identified an anomalous foundation condition where competent rock, on which to found the DMM walls, was deeper than previously estimated. The anomalous area is approximately 500 feet long, as measured along the alignment of the Ash Pond 4 perimeter dike, and is clay filled with large boulders. See Figure 1. TVA completed the remainder of the 3,200-foot DMM wall in 2016, and elected to discontinue the DMM wall installation in the 500-foot area and to observe the performance of the DMM wall during and subsequent to the Ash Pond 4 closure, particularly evaluating the reduction in pore pressures from imbedded instrumentation. As noted above, Ash Pond 4 closure was completed in early 2018.

In 2018 and 2019, TVA evaluated the instrumentation and performed additional subsurface investigation to monitor the current closed condition and to evaluate whether the liquefaction potential in the anomalous area improved from the previous evaluation. TVA determined that the pore water had dropped significantly but not enough to completely improve the safety factors in the liquefaction analysis.

TVA has evaluated and developed a constructible alternative to improve post-earthquake stability of the 500-foot-long portion of the east dike. The primary design constraint in developing a proposal has been the proximity of Cane Creek running along the toe of the east dike. The primary objective to improving stability is to reduce the risk that a design earthquake (i.e., 2,500-year return period) could cause during or after the earthquake. Although the likelihood of a seismic event occurring at any given time is very low, TVA considers the probability of an earthquake-induced failure of the dike to be a concern that warrants upgrades to the 500-foot area of the dike. Completing the upgrades to the dike at this time would allow TVA to avoid potential significant environmental and economic impacts that may result from a potential earthquake.

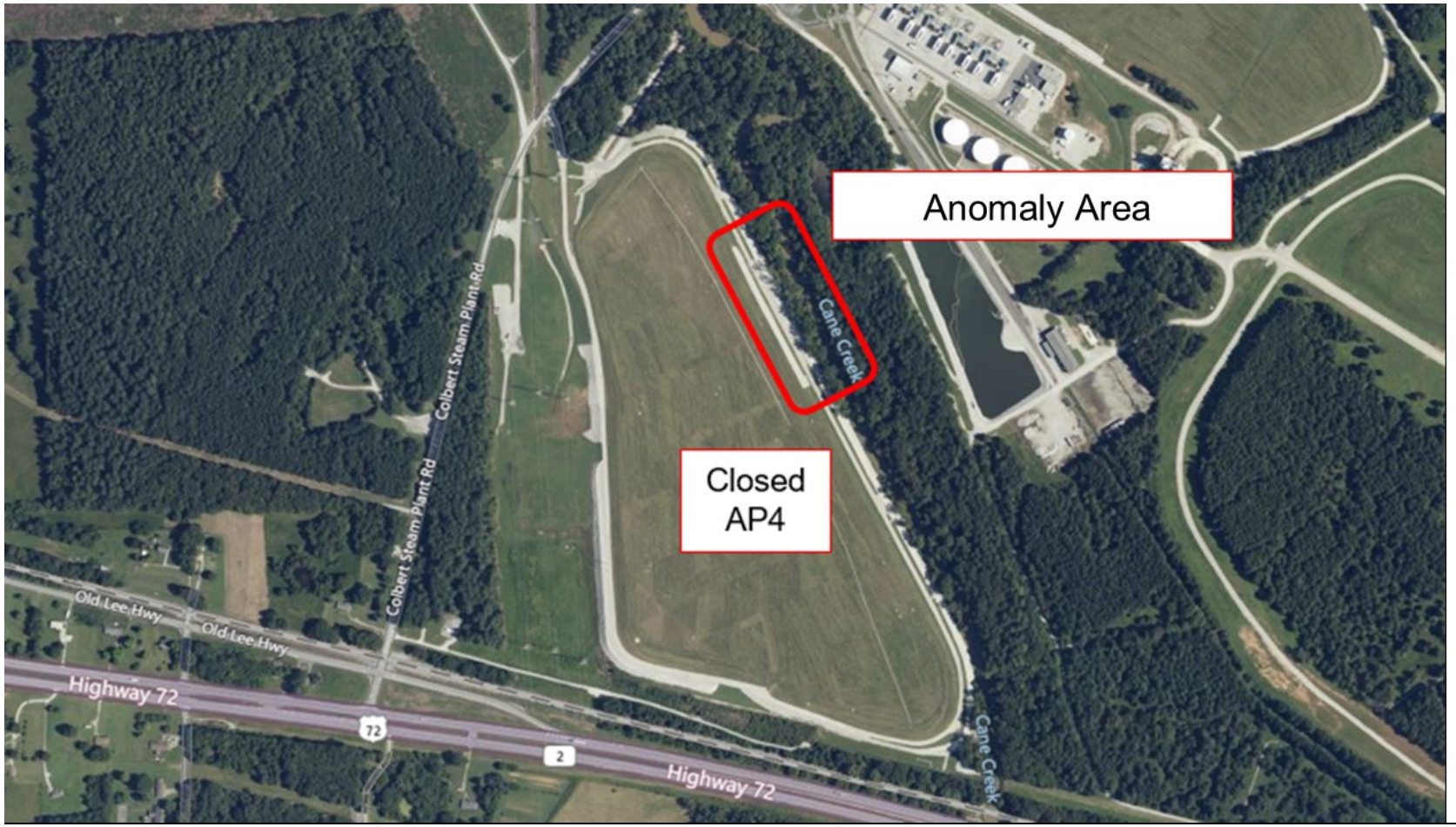

Figure 1. Colbert Ash Pond 4 Anomaly Area

1.2 TVA's Proposed Action

To address the potential seismic vulnerability of this portion of the east dike, TVA proposes to place a soil- and rock-fill buttress against the east dike of Ash Pond 4 within the anomaly area, which would require relocating approximately 1,700 linear feet of Cane Creek to the east of its present alignment.

Under the proposed action, TVA would excavate a new stream channel and realign the creek to allow for the installation of a buttress. The current channel of the creek that would be relocated would be filled and graded with soil and rock. This would allow TVA to construct the buttress against the east dike of the closed Ash Pond 4. After the channel is relocated and the buttress is installed, TVA would implement a planting and seeding plan to reclaim the disturbed areas and minimize erosion. The new creek channel (stream bed and banks) would be designed to resemble and function as a natural stream with improved features. See Figure 2. Pending the outcome of TVA's environmental review and TVA's final decision on this project, construction could begin in Spring 2022 and be completed by late 2022 (approximately 8 months, as scheduled).

TVA estimates that the stream realignment and buttress placement would disturb approximately 11 acres, including 3 acres of land excavated to create a new stream channel and 3 acres of the old stream channel. In addition, a laydown area would be created near the project location on previously disturbed lands, affecting an additional 7 acres. A total of 18 acres would be disturbed under the proposal. As the project is implemented, the extent of disturbance may differ from these acreage estimates to a minor extent.

For the sake of this Environmental Assessment (EA), TVA identifies a 58-acre area in Figure 2 as the broader "project area," the area in which project activities would occur or resources may be impacted.

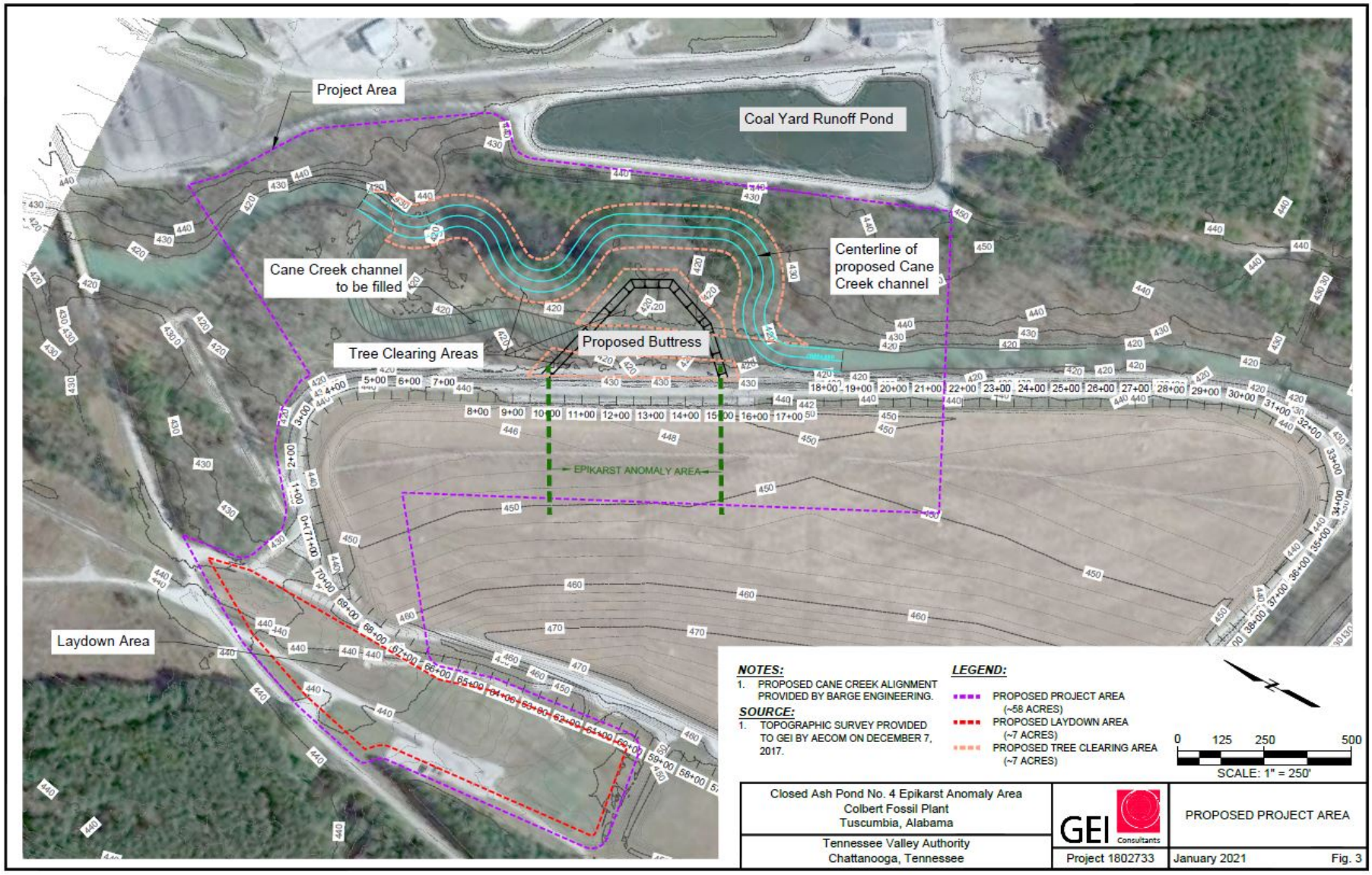

Figure 2. Project Area (with Proposed Laydown, Cane Creek Realignment, Buttress, and Tree Clearing Areas).

1.3 Other Relevant Environmental Reviews and Documentation

Related environmental documents and materials were reviewed concerning this assessment. These items included environmental assessments and reviews at COF and the surrounding area for actions related to the impoundment of coal ash and the deconstruction of the facility. The contents of these documents serve as background and provide relevant descriptions of the facilities and resources present and/or near the project area. Documents reviewed are listed below.

- TVA, June 2016, *Final Ash Impoundment Closure Programmatic Environmental Impact Statement, Parts I and II (Site-Specific NEPA Review: Colbert Fossil Plant)*. (TVA 2016a)
- TVA, 2016, *Colbert Fossil Plant Decontamination and Deconstruction Final Environmental Assessment*. (TVA 2016b)

1.4 Agencies Consulted, Permits, Licenses, and Approvals

TVA would secure any permits necessary to undertake the Proposed Action Alternative. All permits would be held by TVA.

- A National Pollutant Discharge Elimination System (NPDES) Stormwater Construction Permit is required for clearing, grading or excavating the project area to ensure proper stormwater management and treatment throughout the project. A Notice of Intent for Construction Activities and site-specific Construction Best Management Practices Plan would be developed and submitted to the State of Alabama Department of Environmental Management (ADEM) for approval.
- TVA must also obtain a permit under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act to implement dredge or fill activities in jurisdictional waters of the U.S. TVA would coordinate with the United States Army Corps of Engineers (USACE) to obtain these permits.
- In compliance with Section 401 of the Clean Water Act, a Section 401 Water Quality Certification would be coordinated through the ADEM's Water Division for the proposed discharge of fill material and dredging in streams
- ADEM is expected to issue a solid waste permit for Ash Pond 4 pursuant to ADEM Administrative Code Chapter 335-13-15, and depending on the timing of the permit issuance and timing of the project, these improvements may need to be incorporated into the permit. If the permit has been issued prior to the project beginning, a permit modification may be required.

Consistent with Executive Order (EO) 11988, TVA will analyze the proposed project using the hydraulic model in the effective Flood Insurance Study to determine whether the Base Flood Elevation of the Tennessee River would increase greater than 0.00 foot as a result of the project. Based upon the outcome of the hydraulic analyses, TVA would either document that the project would cause no rise in flood elevations, or TVA would begin coordination of a Letter of Map Revision with the Colbert County Floodplain Administrator.

The project site includes potential summer roosting habitat for Indiana bat and northern long-eared bat. Because potential habitat for these species may be affected by a number of activities associated with the proposed project, TVA would comply with TVA's 2018 programmatic consultation with the U.S. Fish and Wildlife Service (USFWS) on routine actions and federally listed bats in accordance with the Endangered Species Act (ESA) Section 7(a)(2). For those activities with potential to affect bats, TVA agreed to implement specific conservation measures. If the Proposed Action Alternative is selected, TVA would implement identified conservation measures to ensure compliance under this programmatic agreement. TVA has determined that the proposed actions would not impact any additional federally listed species; thus, no additional consultation is required under Section 7 of the ESA.

TVA has previously consulted under Section 106 of the National Historic Preservation Act (NHPA) with the Alabama Historical Commission (AHC) and federally recognized Indian tribes regarding two sites that were located within the area of potential effect during a survey of the area conducted in 2016 associated with the COF Decommissioning Project. The AHC agreed with TVA's determination that the two sites are ineligible for inclusion on the National Register of Historic Places (NRHP). Based on this prior survey and consultation, TVA finds that the area of potential effect contains no NRHP-listed or -eligible archaeological sites and that there would be no effects on historic properties. Given these previous consultations, TVA will not consult with the AHC or tribes regarding this undertaking.

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CHAPTER 2 - ALTERNATIVES

Two alternatives are under consideration: the No Action Alternative and TVA's Proposed Action Alternative. Below are descriptions of each alternative under consideration and a comparison of the alternatives.

2.1 Alternatives

In addition to the Proposed Action, TVA considered other alternatives, including the No Action Alternative. Consideration of this alternative in the EA serves as a baseline for the comparison of impacts. Some alternatives considered by TVA were eliminated from further consideration; these are discussed below.

2.1.1 The No Action Alternative

Under the No Action Alternative, TVA would not take action to reduce the risk of an earthquake-induced breach of the Ash Pond 4 earthen dike in the 500-foot anomaly area. TVA considers this alternative to be unreasonable because it does not address the potential seismic vulnerability of the dike. While this alternative does not meet TVA's purpose and need for taking action, the alternative is considered in the EA to comply with National Environmental Policy Act (NEPA) requirements.

2.1.2 TVA's Proposed Action Alternative

As noted above, TVA proposes to place a buttress against the east dike of Ash Pond 4 within the anomaly area, which would require relocating approximately 1,700 linear feet of Cane Creek to the east of its present alignment. Under the proposed action, TVA would excavate a new stream channel of approximately the same length and realign the creek to allow for the installation of a buttress. The current channel of the creek that would be relocated would be filled and graded with soil and rock. This would allow TVA to construct the soil- and rock-fill buttress against the east dike of the closed Ash Pond 4 and extending to the east. The buttress would cover approximately 3 acres, 1 acre of which would be installed over the old stream channel. In the event of the design earthquake occurring, the buttress would prevent CCR from leaving the boundary of Ash Pond 4.

The stream realignment and buttress placement would disturb approximately 11 acres, including 3 acres of land excavated to create a new stream channel and 3 acres of the old stream channel. The 11-acre area consists of a strip of forested land along Cane Creek between Ash Pond 4 to the west and the coal yard runoff pond to the east. In addition, a 7-acre laydown area would also be established to the west of Ash Pond 4 in a previously disturbed clearing. A total of 18 acres would be disturbed under the proposal. As the project is implemented, the extent of disturbance may differ from these acreage estimates to a minor extent.

Construction activities to relocate the stream channel and place the buttress would include the following (generally in sequential order):

- Installation of temporary erosion and sediment controls prior to ground disturbing activities;
- Clearing approximately 7 acres of vegetation and trees from the project site;
- Excavation of new Cane Creek channel alignment approximately 8 to 10 feet deep to the east of the present location;
- Building cofferdams at the upstream and downstream ends of the channel to isolate the portion of Cane Creek channel that would be filled and allowing surface water between the cofferdams to be removed so work within the creek channel can be performed in-the-dry;
- Diverting flow to the new channel and dewatering the old Cane Creek channel (including surface water in between the cofferdams and groundwater within the footprint of the buttress to stabilize the subgrade);
- Relocating the discharge point of the Coal Yard Runoff Pond outfall pipe;
- Excavating loose sands and muck from the old channel down to firm rock or clay (sands and muck would be reused on site);
- Grading and filling the dewatered stream channel with compacted soils;
- Stripping riprap from the face of the east dike and removing topsoil (approximately 1 foot in depth) from areas where the new buttress would be built;
- Hauling up to 100 trucks of soil/rock material each day for approximately 125 days from a nearby quarry for use in filling the old channel within the buttress footprint;
- Building the soil/rock buttress against the east dike;
- Placing riprap on the buttress side slopes;
- Restoring the site, including placement of topsoil and seeding; and
- Removing the temporary erosion controls once grass has established.

The new stream channel (stream bed and banks) would be designed to resemble a natural creek bed, based on engineering software applications, regional curve guidance and natural channel design techniques. TVA would apply these techniques to establish a new natural meandering pattern of the channel and a natural riffle-pool sequence. In-stream structures such as log vanes and brush toes would be installed to improve bedform diversity. The creek banks would be designed and installed in a manner to limit erosion; the creek banks would be planted and seeded with native vegetation to establish a protected riparian corridor and improve sediment control. A planting and seeding plan would be implemented to reclaim each disturbed area and to minimize erosion.

TVA would also create a work area near the site of the relocation and buttress for the laydown of equipment and materials in support of construction activities. The “laydown area” would be located at an easily accessible clearing that is adjacent to Ash Pond 4 on its western edge. See Figure 2. The laydown area is approximately 7 acres and is an open field that has previously been disturbed by TVA activities. Any vegetation on the site would be cleared and equipment would be used to scrape the topsoil (approximately 3 to 4 inches) and crushed stone would be placed. The laydown area would be used for parking, equipment and material storage and staging, placement of a temporary office trailer(s), and other project management activities. TVA would either use generators or establish a hard-

line power connection to provide electricity to the lay down area. After completion of the project, TVA would remove the stone, revegetate, and restore the area to its current condition.

TVA would haul materials for the buttress from the Vulcan Materials quarry located in the community of Pride, just east of the project location. Standard over-the-road dump trucks would travel a 3.6-mile route to and from the project location and the quarry using two minor local roads and one major highway.

Other types of heavy equipment that would be involved in the project include bulldozers, excavators, front-end loaders, motor graders, compactor/rollers, water trucks, drill rigs for dewatering wells, and pumps for surface water and groundwater control.

Pending the outcome of TVA's environmental review and TVA's final decision on this project, construction could begin in Spring 2022 and be completed by the end of 2022 (approximately 8 months, as scheduled).

2.1.3 Other Alternatives Reviewed by TVA

TVA's engineers and external experts evaluated a wide range of alternatives for stabilizing the anomalous area of the east dike. During internal review and challenge sessions, they evaluated options through a formal process using several considerations, including durability and reliability of the potential methods, the risks associated with uncertainties, time required to complete the repair, environmental factors, and costs to ratepayers. In addition to the No Action and Proposed Action Alternatives, this team evaluated 13 alternative methods for stabilizing this area of the dike. Of these alternative methods, six concepts were determined not to be viable and were removed from further consideration. Seven methods were determined to be viable and were further evaluated before ultimately being dismissed from further consideration by the team. These alternative methods are listed below, with a rationale for their dismissal:

The following methods were determined not to be feasible/viable:

- Install buttress without relocating Cane Creek. This alternative was considered not to be feasible because there is not enough space between the dike and creek for installation of the buttress.
- Improve problematic soils using DMM. This alternative was considered not to be technically feasible because the equipment would not be able to penetrate boulders in the foundational material.
- Improve problematic soils using large-diameter jet grouting. This alternative was considered not to be technically feasible because the equipment would not be able to penetrate boulders in the foundational material.
- Improve problematic soils using stone columns in predrilled hollow-stem auger holes. This alternative was considered not to be feasible because an auger cannot

advance through soils with cobbles and boulders, and drilled holes would need to remain open, which is unlikely due to site conditions.

- Improve problematic soils using vibro-replacement stone columns. This alternative was considered not to be feasible because a vibratory head cannot advance through soils with cobbles and boulders.
- Increase slope stability by driving steel H-piles through working platform. This alternative was considered not to be feasible due to high likelihood that cobbles and boulders in the foundational material would prevent the necessary number of piles to be driven to sound bedrock.

The following methods were determined to be feasible/viable and evaluated further but were eventually removed from consideration:

- Improve problematic soils using compaction grouting in predrilled holes. This alternative was determined to be technically feasible but is considered to be risky because the method may raise excess pore water pressures in the soft clay soils and could cause foundation instability.
- Increase slope stability by installing drilled shafts. This alternative was determined to be feasible, but the highly variable depth-to-bedrock in the anomaly area increases uncertainties relating to design life and costs.
- Increase slope stability by installing anchored king-pile/sheet-pile bulkhead through working platform. This alternative was determined to be feasible, but there would be unacceptable uncertainty associated with constructability and design life due to the extreme variability of conditions in the foundation.
- Increase slope stability by installing anchored secant pile wall through working platform. This alternative was determined to be feasible, but there would be a high degree of uncertainty due to variable soil/rock conditions in the anomaly area, potentially limiting the design life.
- Increase slope stability by installing a cantilever secant pile wall socketed into sound bedrock upstream of the anomaly area at the upper dike. This alternative was determined to be feasible, but there would be a high degree of uncertainty due to variable soil/rock conditions and drilling mud and cuttings during installation would contain some ash and need to be contained and properly managed.
- Increase slope stability by regrading an area of Ash Pond 4. This alternative was determined to be feasible but involved a high degree of uncertainty and a number of unacceptable risks. Uncertainty relating to subsurface conditions would limit TVA's ability to define the extent of ash that would need to be removed in order to develop a regrading plan of the pond. The excavation of a portion of the ash pond would risk the stability of fly ash during construction activities and may risk the stability of other portions of the containment dike. The alternative would also complicate the Ash Pond's surface water and drainage systems. A portion of the capped unit would have to be opened which would disrupt the effects of source control that have been achieved since closure. Exposed areas of fly ash would be susceptible to erosion, stormwater runoff, and infiltration caused by rainfall. Stormwater runoff would need

to be monitored, managed, and possibly treated before discharge. While BMPs would be implemented to reduce impacts, infiltration of rainwater into the closed unit through the opened area could potentially lead to changes in groundwater quality and negatively impact the progress made from closing the unit.

- Relocating Cane Creek (without the buttress) was determined to be feasible but would not prevent the potential seismic failure of the dike. In addition, some coal ash would leave the boundary of the unit and move toward the creek during a seismic event.

2.2 Mitigation Measures

Under the Proposed Action Alternative, TVA would ensure compliance with the National Flood Insurance Program by coordinating with the Colbert County Floodplain Administrator prior to implementing the project. As noted in Section 1.4, a hydraulic analysis would be conducted and, based upon the outcome of that analysis, TVA would either document that the project would cause no rise in flood elevations, or TVA would begin coordination of a Letter of Map Revision with the Colbert County Floodplain Administrator.

TVA would apply the following timing restrictions to address potential impacts to sensitive species:

- To minimize potential impacts to sensitive bat species, tree removal would occur between October 15 and March 15, and TVA would implement the conservation measures identified in Attachment A. TVA will track and document removal of potentially suitable summer roost trees and include it in annual reporting in accordance with consultation conducted with USFWS under Section 7(a)(2) of the ESA.
- To avoid potential effects to osprey, TVA would not remove vegetation within 660 feet of an osprey nest near the project site between March 1 and August 1 while osprey may be present and nesting.

In addition to the requirements of any necessary permits, TVA would implement various best management practices to avoid or minimize potential adverse environmental effects resulting from the proposed activities.

2.3 Comparison of Alternatives

A summary comparison of the potential impacts associated with implementing the No Action Alternative and the Proposed Action Alternative is provided in Table 1. Although the No Action Alternative would not result in the impacts associated with the Proposed Action Alternative, it would not address the risk of a dike breach in the event of a large seismic event.

Table 1. Comparison of Impacts of the No Action Alternative and the Proposed Action Alternative

Resource Area	No Action Alternative	Proposed Action Alternative
Terrestrial Biology (Wildlife)	No impacts to terrestrial ecology. Current conditions would continue.	Minor impacts associated with displaced species during construction; seven acres of habitat loss; no impacts to migratory birds or osprey due to avoidance.
Botany	No impacts to botany. Current conditions would continue.	Minor impacts associated with removal of common vegetation; no unique or important habitat present.
Aquatic Ecology	No impacts to aquatic ecology. Current conditions would continue.	Approximately 1,700 feet of Cane Creek would be relocated and two ponds would be eliminated, resulting in temporary adverse impacts and long-term aquatic habitat improvements.
Threatened and Endangered Species	No impacts to threatened and endangered species.	Removal of seven acres of bat habitat, associated conservation measures to be implemented; no impacts to other species.
Surface Water Quality	No impacts to surface water quality. Current conditions would continue.	Sediment and erosion control BMPs would be installed to minimize surface water impacts. The configuration of the new stream channel, with pools, riffles, and improved riparian features, would have minor beneficial effects on the water quality over time.
Floodplains	No impacts to floodplains.	Flood elevations would not increase more than 1.0 foot and any increases in flood elevations would be limited to TVA property. No significant impact on floodplains and their natural and beneficial values.
Transportation	No transportation impacts.	Minor, temporary impacts, potentially moderate cumulative impacts.
Socioeconomics and Environmental Justice	No socioeconomic impacts. Communities would not be affected.	Minor beneficial economic effects associated with employment; no disproportionate impacts to communities.

CHAPTER 3 - AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Scope of Analysis

Pursuant to NEPA and implementing regulations promulgated by the Council on Environmental Quality (40 CFR 1500–1508, updated in September 2020), federal agencies are required to evaluate the potential environmental impacts of any proposals for major federal actions. Based on an interdisciplinary review of the proposed action and TVA's experience with conducting environmental reviews of similar projects, the potential effects to the following resources are considered in this environmental review: terrestrial ecology (wildlife), botany, aquatic ecology, threatened and endangered species, surface water quality, floodplains, transportation, and socioeconomics and environmental justice.

TVA determined that detailed analysis was unnecessary for the following resource areas because of the nature of the proposed action and/or these resources are not present in the project area or its vicinity: cultural resources, wetlands, prime farmlands, and natural areas. Further, because there would be no potential for discernible effects on recreational opportunities, groundwater, climate change, or the generation of hazardous materials, these issues are not analyzed in detail.

As noted above, the entire project area is approximately 58 acres. The area of disturbance affected by the project includes approximately 11 acres adjacent to Ash Pond 4, including 3 acres of land excavated to create a new stream channel, 3 acres of the old stream channel, and approximately 3 acres where the buttress would be placed. In addition, approximately 7 acres would be disturbed where TVA would establish a lay down area. Except for the previously-disturbed clearing that would serve as a lay down area and a small portion of Ash Pond 4, the project area consists of the current creek channel adjacent to Ash Pond 4 and forested lands along Cane Creek.

3.2 Terrestrial Ecology (Wildlife)

The project footprint occupies approximately 58 acres. Landscape features within and surrounding the project area consist of a variety of fragmented riparian forest habitat, the stream channel, early successional habitat (i.e., grassland), and developed or otherwise disturbed areas. Almost half (28.6 acres) of the total 58-acre project footprint consists of mixed deciduous-evergreen riparian forest. This forested acreage provides habitat for an array of terrestrial animal species.

Birds typical of this habitat include Acadian flycatcher, chuck-will's-widow, downy and hairy woodpecker, eastern screech owl, eastern wood-pewee, great horned owl, red-headed woodpecker, red-tailed hawk, summer tanager, wood thrush, wild turkey, 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 partially open. Common bat species likely found within this habitat include big brown bat, eastern red bat,

evening bat, and silver-haired bat. Eastern chipmunk, gray fox, and woodland vole are other mammals likely to occur within this habitat (Kays and Wilson 2002). Eastern black kingsnake, eastern box turtle, gray ratsnake, and ring-necked snake are reptiles that can be found in deciduous forests in this region (Conant and Collins 1998, Dorcas and Gibbons 2005, Buhlman et al. 2008).

Pastures and agricultural fields comprise approximately 12 acres of the project area (including the laydown area and a portion of Ash Pond 4). Common inhabitants of this type of early successional habitat include brown-headed cowbird, brown thrasher, common yellowthroat, dickcissel, eastern bluebird, eastern kingbird, eastern meadowlark, field sparrow, and grasshopper sparrow (National Geographic 2002). Bobcat, coyote, eastern cottontail, hispid cotton rat, red fox, and white tailed deer are mammals typical of fields and cultivated land (Kays and Wilson 2002). Reptiles including common gartersnake, DeKay's brownsnake, northern copperhead, and southern black racer are also are known to occur in this habitat type (Dorcas and Gibbons 2005).

Developed areas and areas previously disturbed by human activity occupy approximately 17 acres within the project area and are home to a large number of common species. American robin, Carolina chickadee, blue jay, European starling, house sparrow, mourning dove, northern cardinal, northern mockingbird, black vulture, and turkey vulture are birds commonly found along road edges, industrial properties, and residential neighborhoods (National Geographic 2002). Mammals found in this community type include eastern gray squirrel, northern raccoon, and Virginia opossum (Kays and Wilson 2002). Roadside ditches provide potential habitat for amphibians including American toad, upland chorus frog, and spring peeper. Reptiles potentially present include gray ratsnake and yellow-bellied kingsnake (Conant and Collins 1998, Dorcas and Gibbons 2005).

Review of the TVA Regional Natural Heritage database on November 6, 2020, indicated that seven caves have been documented within three miles of the project area, the nearest of these occurs approximately 1,062 feet from the Area of Potential Effect (APE). No other unique or important terrestrial habitats were identified within the project area. As well, one osprey nest has documented presence approximately 457 feet from the APE. No additional aggregations of migratory birds or wading bird colonies have been documented within three miles of the project area. Additional review of USFWS's Information for Planning and Consultation (IPaC) online database in January 2021 resulted in three migratory bird species of conservation concern identified as having the potential to occur in the project action area (LeConte's sparrow, prairie warbler, and red-headed woodpecker). Suitable foraging habitat exists in the APE for all three of these species, and suitable prairie warbler nesting habitat is also present (USFWS 2021).

Under the No Action Alternative, TVA would not stabilize the anomaly area of the east containment dike or relocate Cane Creek to the east of its present alignment. Tree clearing and earth moving would not be a foreseeable action. Trees, soil, water features, and vegetation would remain in their current state, and terrestrial animals and their habitats would not be affected under the No Action Alternative.

Under the Action Alternative, TVA would stabilize the east containment dike around the existing anomaly. Cane Creek would be relocated to the east of its present alignment. The old creek bed and channel would be filled and a buttress would be placed against the east dike within the anomaly area. As noted above, TVA would disturb approximately 18 acres in total of the 58-acre project area. Approximately 7 acres of tree clearing is proposed along the new stream channel corridor and where the buttress would be installed. Both forested and herbaceous vegetation that may provide habitat for common wildlife species would be removed. The disturbance and vegetation clearing would be an unavoidable effect of the proposed action. See Figure 3 (Area of Tree and Vegetation Clearing) below.

Wildlife currently using these habitats would be displaced by habitat removal. Construction-associated disturbances and habitat removal would disperse mobile wildlife into surrounding areas in an attempt to find new food and shelter sources and to reestablish territories. These adjacent areas would be relatively pervious to terrestrial animal species dispersing from the action area. In the event that surrounding areas are already overpopulated, further stress to wildlife populations presently utilizing these areas may result, as well as to those attempting to relocate. The landscape surrounding the project area is relatively forested; thus, it is unlikely that species currently occupying adjacent habitat would be negatively impacted by the influx of new residents. It is expected that upon completion of project actions, species that utilize early successional and forested habitat would return to the project area. Some immobile individuals may be lost as a result of these proposed actions, particularly if clearing activities take place during breeding/nesting seasons. Cumulative effects of the project activities on common wildlife species are expected to be negligible.

Some migratory birds of conservation concern identified during review of the USFWS IPaC online database could be impacted by the proposed action. LeConte's sparrow, prairie warbler, and red-headed woodpecker may forage throughout the herbaceous and forested portions of the project footprint throughout the year (USFWS 2021). Suitable nesting habitat is not present within the project footprint for Le Conte's sparrow or red-headed woodpecker. If individuals are present on site during implementation of project activities, they are expected to flush if disturbed. No direct mortality is anticipated. Suitable nesting habitat for prairie warbler is present within the project footprint; however, the project has committed to removing vegetation between October 15 and March 15, when this species is not reproductively active. Given the lack of breeding habitat for Le Conte's sparrow or red-headed woodpecker, the relative abundance of similarly suitable habitat nearby, the size of the area slated for vegetation removal, and the timing of vegetation removal, populations of these migratory bird of conservation concern would not be impacted by the proposed project activities.

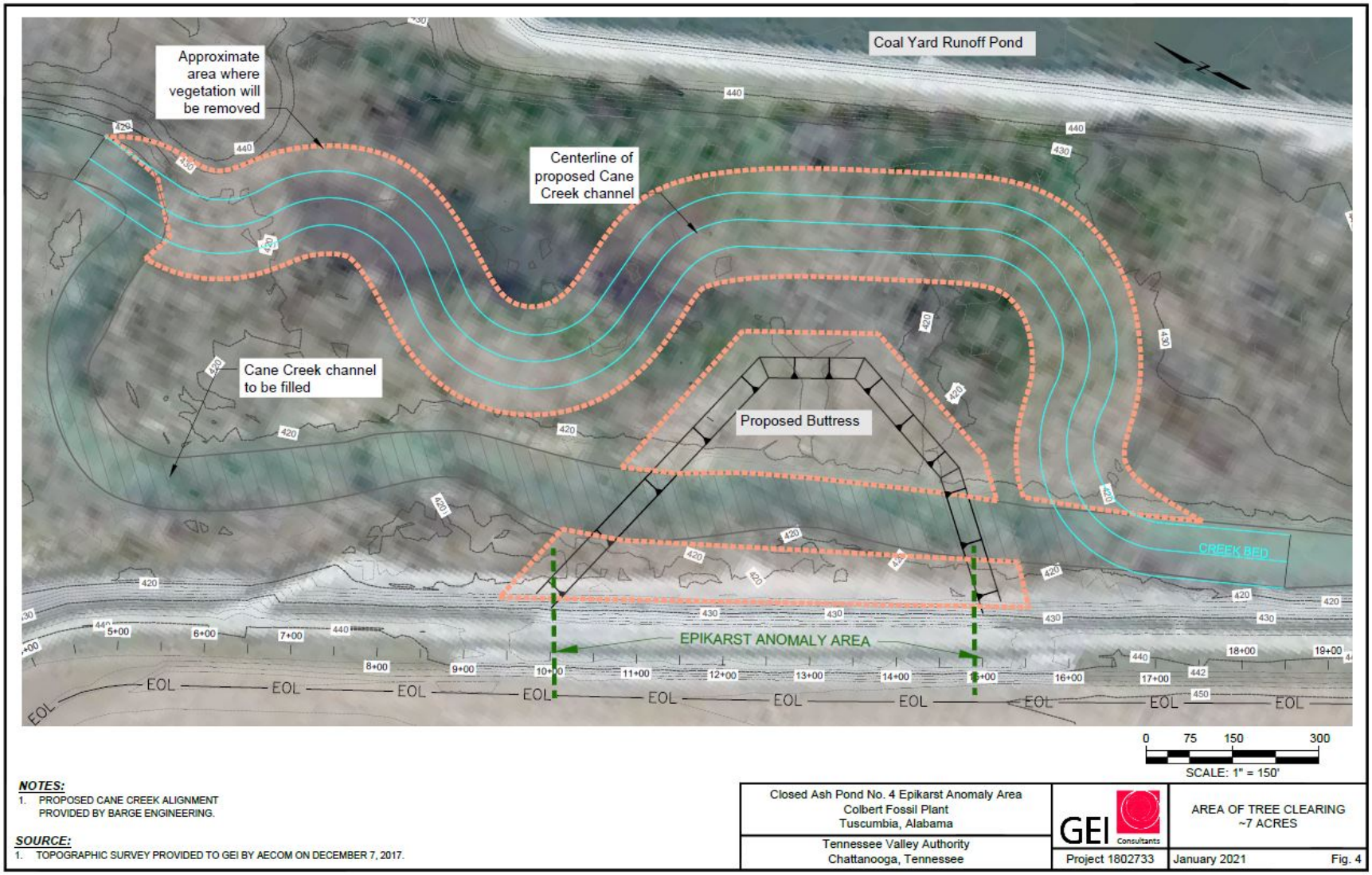

Figure 3. Area of Tree and Vegetation Clearing.

One osprey nest is known approximately 457 feet from the project area. This nest was determined to be active during the 2020 breeding season. Ospreys are known to exhibit a high level of nest site fidelity, returning to the same nest year after year. Tree removal activities and the relocation of Cane Creek could potentially impact individuals utilizing this nest if these activities occur during breeding season (March through September). However, this nest was built on top of a lighting tower in the west central portion of Colbert Fossil Plant, between a parking lot and a large open dirt lot, directly adjacent to an actively used plant roadway. This nest was built in the midst of routine, daily plant activities; as such, these individuals are likely habituated to the elevated level of disturbance surrounding the nest. To avoid adverse effects to the osprey, TVA would not remove vegetation within 660 feet of the nest between March 1 and August 1 while the osprey may be present and nesting. Therefore, proposed project activities are not expected to adversely affect ospreys that may return to use this nest during the breeding season.

Impacts to threatened or endangered wildlife species, including bats, are addressed in Section 3.5.1 below.

3.3 Botany

As noted above, the project location consists of a variety of fragmented riparian forest habitat, the stream channel habitat, early successional habitat (i.e., grassland), and developed or otherwise disturbed areas. Approximately 28.6 acres of the total 58-acre project footprint consists of mixed deciduous-evergreen riparian forest.

Under the No Action Alternative, TVA would not stabilize the anomaly area of the east containment dike or relocate Cane Creek to the east of its present alignment. Tree clearing and earth moving would not be a foreseeable action. The vegetation, soils, and water features in the location would remain in their current locations. There would be no effects to botanical resources under this alternative.

Under the Proposed Action Alternative, an area of approximately 7 acres of trees and vegetation would be cleared. See Figure 3. Common vegetation species occur in these areas and would be removed. No uncommon plant communities have been previously reported from within and near the project area. The site has been heavily disturbed in the past (including the laydown area and the ash pond itself) and is incapable of supporting plant communities with significant conservation value. Implementation of the proposed project would not potentially affect unique or important terrestrial habitat. There is no potential for the proposed action to affect unique or important terrestrial habitat.

In addition, the proposed project would not contribute to the spread of exotic or invasive plant species because the project area already contains a sizable proportion of non-native species. These non-native, invasive plants are distributed widely throughout the region and implementation of the proposed project would not change this situation.

After relocation of the stream channel and placement of the buttress, TVA would implement a seeding and planting plan to revegetate the disturbed areas and stream channel with native vegetation species. The reclamation of the disturbed areas would return the site to a more natural habitat.

3.4 Aquatic Ecology

A December 2020 field survey verified that there is one perennial stream, three ephemeral streams, and two ponds located within the project area (Table 2).

Table 2. Stream and Pond crossings along Ash Pond 4 Project Location.

ID	Stream Type	Stream Name	Field Notes	Latitude	Longitude
BWA04	Perennial	Cane Creek	Major Stream, right bank mapped, fish present	34.735283	-87.848261
BWA03	Ephemeral	NA	Ephemeral wet weather conveyance, 3x2 feet, draining into Cane Creek	34.732431	-87.846357
BWA02	Ephemeral	NA	Wet weather conveyance, eroded, 3x1 feet, washes out before entering Cane Creek.	34.731538	-87.845818
BWA01	Ephemeral	NA	Massive eroded wet weather conveyance, 20x15 feet that bottlenecks to 8x4 feet before Cane Creek	34.73146	-87.845717
Pond1	Other	NA	Pond (1.25 acres)	34.737212	-87.848665
Pond2	Other	NA	Small pond in forested area	34.736149	-87.848449

Of these 6 aquatic features, only Cane Creek and two ponds (Pond1 and Pond2) are located in the 18-acre area where ground disturbing activities are proposed. Through the project area, the Cane Creek channel flows in a relatively straight course in the vicinity of the ash pond dike. The proximity of the ash pond dike to the creek limits the riparian vegetation growth along the left bank, with less vegetation and trees growing than on the creek's right bank.

One additional pond is located adjacent to and outside of the project area; however, this pond is a man-made pond that is part of the COF water treatment infrastructure. Ephemeral wet weather conveyances BWA01, BWA02 and BWA03 are to the south of the site of the stream relocation and buttress and outside the disturbance area.

There is no designated critical aquatic habitat in the Tennessee River-Pickwick Lake 10-digit hydrologic unit code (HUC) watersheds where the proposed work would occur.

Under the No Action Alternative, TVA would not stabilize the anomaly area of the east containment dike or relocate Cane Creek to the east of its present alignment. There would be no clearing or earth moving activities at the project site. Cane Creek would not be relocated and two ponds lying within the area proposed for the new stream channel would remain in their current condition. There would be no effects to aquatic resources under this

alternative, absent a seismic event of a certain magnitude. This alternative does not reduce the risk of an earthquake-induced breach of the earth dike in the anomaly area, which would likely release dike fill, fly ash, and bottom ash into Cane Creek, should a seismic event of a certain magnitude take place. Such a failure would result in major impacts to Cane Creek. The creek may likely be blocked by the contents of the adjacent ash pond for some period, with flooding upstream. Over time, ash would move downstream. The entire Cane Creek ecosystem below the site would be impacted by such a breach.

Under the Proposed Action Alternative, Cane Creek would be relocated to east of its present alignment. The old creek bed (consisting of a 3-acre area) would be filled and a buttress would be placed against the east dike within the anomaly area. The Cane Creek stream channel relocation would eliminate a 1,700-linear-foot portion of the stream as it flows through the project site, affecting the water flow, stream banks, the stream channel and the aquatic habitat along this stretch of Cane Creek. Two ponds that are located within the delineation of the proposed new stream channel (one of which is approximately 1.25 acres in size) would be eliminated under this alternative. While the relocation and elimination of the ponds would be unavoidable effects, these reaches are not unique or important aquatic habitats and, as noted above, there is no designated critical habitat in the watershed where the proposed work would occur. Therefore, the adverse effects would be minor.

A new stream channel of 1,700 linear feet would be established within a 3-acre corridor. As noted in the description of the Proposed Action Alternative, TVA would design and establish the new 1,700-foot stream channel to resemble a natural meandering stream channel using engineering software applications, regional curve guidance and natural channel design techniques. TVA would apply these techniques to create a new natural and static creek setting. The creek banks would be designed and installed in a manner to limit erosion; the creek banks would be planted and seeded with native vegetation to create a protected riparian corridor and improve sediment control. The relocation of the creek would establish bedform diversity and floodplain connectivity in the section of Cane Creek by reintroducing a natural meandering pattern of the channel, establishing a natural riffle-pool sequence, and installing in-stream structures such as log vanes and brush toe. The design is intended to improve the aquatic setting and function of the relocated Cane Creek segment by creating more diverse stream features, improving habitat for a variety of organisms that prefer either deeper or more shallow water conditions. In addition to reducing flood scouring, the new channel would be expected to create more residence time in this stream section and potentially decreasing stream velocity, which would also be beneficial to stream organisms and communities.

The proposed activities include isolating the portion of Cane Creek using a coffer dam, diverting flows to the new channel, and dewatering the old creek channel. While the relocation of Cane Creek would permanently change this portion of the creek, the construction activities would result in temporary adverse effects to the stream. However, these temporary adverse effects would be offset by the long term beneficial effects on the creek's aquatic and riparian habitat resulting from the proposed activities.

TVA would implement standard procedures and best management practices (BMPs) to minimize the effects of the ground disturbing activities in the project area (TVA 2017). These BMPs are designed in part to minimize erosion and subsequent sedimentation of water resources. Therefore, with proper implementation of BMPs, no long term impacts from the associated action are anticipated to water flow, stream channels, or stream banks. The proposed action would be unlikely to contribute to the spread of exotic or invasive aquatic species. Construction activities would not involve moving aquatic species or water from different locations, and equipment and materials used for the project would be clean and free of debris that could introduce exotic species and adversely affect aquatic habitat. Thus, the project is not expected to contribute to the spread of exotic or invasive aquatic species.

3.5 Threatened and Endangered Species

3.5.1 Animal Species

A review of terrestrial animal species in the TVA Regional Natural Heritage Database on November 6, 2020, did not result in records for any state or federally listed species within three miles of the APE. One federally protected species (bald eagle), and two federally listed species (gray bat and red-cockaded woodpecker) are known from Colbert County. Additionally, the USFWS has determined that the federally listed Indiana and northern long-eared bats have the potential to occur within the project footprint; as such, habitat suitability and potential impacts to these species also would be addressed (Table 3).

Table 3. Federally listed terrestrial animal species reported from Colbert County, Alabama and other species of conservation concern documented within three miles of the Project Location [1]

Common Name	*Scientific Name*	Status[2]	
		Federal (Rank[3])	State
BIRDS			
Bald eagles [4]	*Haliaeetus leucocephalus*	LE	SP (S1)
Red-cockaded woodpecker [4]	*Picoides borealis*	LT	SP (S1)
MAMMALS			
Gray bat	*Myotis grisescens*	LE	SP(S2)
Indiana bat [5]	*Myotis sodalis*	LE	SP(S2)
Northern long-eared bat [5]	*Myotis septentrionalis*	LT	SP(S2)

[1] Source: TVA Regional Natural Heritage Database, extracted 11/6/2020; USFWS Information for Planning and Consultation (IPaC) resource list (https://ecos.fws.gov/ipac/), accessed 1/7/2021.
[2] Status Codes: D = Deemed in Need of Management; DM = Recovered, Delisted, and Being Monitored; LE = Endangered; LT = Listed Threatened; SP = State Protected.
[3] State Ranks: S1 = Critically Imperiled; S2 = Imperiled.
[4] Federally listed species known from Colbert County, Alabama, but not within three miles of the project footprint.
[5] Federally listed species whose known range includes Colbert County, but no documented presence from Colbert County to date.

Three bald eagle records are known from Colbert County, the nearest of which occurs approximately 13.6 miles from the area of impact. No additional bald eagle nests were observed within the project footprint during field surveys in August 2020. Suitable nesting and foraging habitat exists for bald eagles within the APE.

One red-cockaded woodpecker record is known from Colbert County, approximately 16.5 miles from the APE. This record is historical, having been documented in 1890. These woodpeckers are thought to be extirpated from most of their previous range and habitat. Suitable habitat for red-cockaded woodpecker is not present within the project footprint.

Six gray bat records are known from Colbert County, the nearest of which occurs approximately 3.2 miles from the APE. Suitable gray bat foraging habitat is present within the project footprint over Cane Creek; however, suitable roosting habitat is not known within 1,000 feet of the project footprint. No caves were observed during field surveys of the project footprint in August 2020.

Indiana bats hibernate in caves during winter and inhabit forested areas around these caves for swarming (mating) in the fall and staging in the spring, prior to migration to summer habitat. During summer, Indiana bats roost under exfoliating bark, and within cracks and crevices of trees, typically located in mature forests with an open understory and a nearby source of water. Indiana bats are known to change roost trees frequently throughout the season, yet still maintain site fidelity, returning to the same summer roosting areas in subsequent years (Pruitt and TeWinkel 2007, Kurta et al. 2002). The 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 also roosts in abandoned buildings and under bridges. Both Indiana bats and northern long-eared bats emerge at dusk to forage below the canopy of mature forests on hillsides and roads, over forest clearings and along riparian areas, and along forested edges and tree lines (USFWS 2014). The USFWS has determined that both Indiana bat and northern long-eared bat have the potential to occur in Colbert County, Alabama; however, no records are known for either species from Colbert County, to date (USFWS 2015a, USFWS 2015b).

Seven caves are known within three miles of the project footprint, the nearest of which occurs approximately 1,062 feet from the APE and would not be impacted by the proposed project activities. No suitable winter roosting structures are known within 1,000 feet of the APE. Based on the 2019 Range-Wide Indiana Bat Survey Guidelines (USFWS 2019), TVA has determined that approximately seven acres of suitable summer roosting habitat for Indiana bat and northern long-eared bat occur within the fragmented riparian forest surrounding Cane Creek and within the project area. Suitable summer roosting areas were comprised of both forested wetland and mature mixed evergreen deciduous hardwood

stands. These forested fragments and edges also offer suitable foraging habitat for Indiana and northern long-eared bat. Additional foraging habitat and sources of drinking water occurs over Cane Creek within the action area.

Under the No Action Alternative, TVA would not stabilize the anomaly area of the east containment dike or relocate Cane Creek to the east of its present alignment. Tree clearing and earth moving would not be a reasonable and foreseeable action. Trees, soil, water features, and vegetation would remain in their current state. Threatened and Endangered terrestrial animals and their habitats would not be affected under the No Action Alternative.

Under the Proposed Action Alternative, TVA would stabilize the east containment dike around the existing anomaly. Cane Creek would be relocated to the east of its present alignment. The old creek bed would be filled with imported rock-fill and reused on-site soils, and a buttress would be placed against the east dike within the anomaly area. TVA would disturb approximately 18 acres in total and clear trees and vegetation on approximately 7 acres within the 58-acre project area. Both forested and herbaceous vegetation that may provide habitat for common wildlife species would be removed in association with the proposed actions.

Neither bald eagle nor red-cockaded woodpecker would be impacted by the proposed project, as the closest known bald eagle nest occurs 13.6 miles from the APE, and red-cockaded woodpeckers are extirpated from the area.

There is potential for three additional federally listed species to occur in the project footprint. These species (gray bat, Indiana bat, and northern long-eared bat) have the potential to utilize the project area to varying degrees. Suitable foraging habitat exists within the APE for gray bat, Indiana bat, and northern long-eared bat over Cane Creek. The relocation of Cane Creek could adversely impact bat foraging habitat; however, an abundance of similarly suitable aquatic foraging habitat is plentiful in the surrounding area, and any sedimentation associated with the relocation of Cane Creek would be localized and is expected to be temporary. Additional foraging habitat for Indiana and northern long-eared bats occurs within and alongside forested areas within the APE.

Approximately seven acres of vegetative foraging habitat would be removed under the proposed project activities. However, an abundance of similarly suitable forested foraging habitat occurs across the landscape surrounding the project footprint such that the removal of this habitat would not significantly impact foraging bats. The project footprint was also surveyed for potential summer roosting sites. Habitat suitability was determined by the number of trees with exfoliating bark (snags and live trees) and their proximity to water sources. A proposed seven acres of suitable summer roosting habitat for Indiana bat and northern long-eared bat would be removed in association with the proposed actions.

TVA has committed to remove this suitable habitat between October 15 and March 15 to minimize the potential effects to these species. The proposed project activities fall under actions covered in TVA's 2018 programmatic agreement with the USFWS regarding

federally listed bats. Some of these activities may affect but are not likely to adversely affect gray bat, Indiana bat, or northern long-eared bat. These activities include tree cutting and grading and are listed in Table 3 of the TVA Bat Strategy Project Review Form that documents TVA's compliance with the programmatic agreement (Attachment A); TVA would implement the associated conservation measures listed in Table 4 of the TVA Bat Strategy Project Review Form during the project to minimize potential impacts to these species. No project activities may occur until completion of the steps outlined in the TVA Bat Strategy Project Review Form has been verified by a TVA compliance biologist.

3.5.2 Plant Species

A December 2020 query of the TVA Regional Natural Heritage Database indicates that two federally listed and six state-listed plant species have been previously reported from within five miles of the proposed project (Table 4). No additional federally listed plant species are known from Colbert County, Alabama.

Table 4. Plant species of conservation concern known from within five miles of Ash Pond project area in Colbert County, Alabama state.[1]

Common Name	*Scientific Name*	Federal Status	State Status[2]	State Rank[2]
PLANTS				
Leafy Prairie-clover	*Dalea foliosa*	E	SLNS	S1
Dutchman's Breeches	*Dicentra cucullaria*	-	SLNS	S2
False Rue-anemone	*Enemion biternatum*	-	SLNS	S2
Alabama Glade-cress	*Leavenworthia alabamica*	-	SLNS	S2
Lyre-leaf Bladderpod	*Lesquerella lyrata*	T	SLNS	S1
Prairie-dock	*Silphium pinnatifidum*	-	SLNS	S2

[1] Source: TVA Regional Natural Heritage Database, queried 01/07/2021
[2] Status Codes: C = Candidate for listing; E = Listed Endangered; E-P = Listed Endangered/ Possibly Extirpated; SLNS = State Listed, no status assigned; T = Listed Threatened
[3] State Ranks: S1 = Critically Imperiled; S2 = Imperiled

Review of maps, aerial photography, and knowledge of rare plants known from the region suggest that habitat for these species are not present in the project area. While plant species of conservation concern have previously been reported from near the project location, those species occupy shallow soils associated with limestone cedar glades and mesic forest slopes adjacent to the Tennessee River. Neither habitat type occurs within the action area.

Under the No Action Alternative, there would be no creek relocation or ground disturbing activities at the project site. The area's environmental resources would not be disturbed. There are no Threatened and Endangered plant species or habitat in the area.

The Proposed Action Alternative would not affect federally listed or state-listed plants because there are no such species or habitat at the project location.

3.5.3 Aquatic Species

A query of the TVA Regional Natural Heritage Database (December 31, 2020) for records of listed aquatic animal species indicated that four listed fish species, fifty-two freshwater mussel species, and eight aquatic snail species have been documented to occur within the Tennessee River-Pickwick Lake (0603000508) 10-digit HUC watersheds encompassing the proposed project area (Table 5). The aquatic features contained within the proposed project habitat have previously been heavily disturbed, and as a result, they do not provide suitable habitat for the state and federally listed species in Table 5 below.

Table 5. Records of federal and state-listed aquatic animal species within the Tennessee River-Pickwick Lake 10-digit HUC watersheds.[1]

Common Name	*Scientific Name*	Element Rank[2]	Federal Status[3]	State Status (rank[4])
FISH				
Alabama Cavefish	*Speoplatyrhinus poulsoni*	E	LE	SP (S1)
Snail Darter	*Percina tanasi*	AB	LT	SP (S1)
Southern Cavefish	*Typhlichthys subterraneus*	H		SP (S3)
Spotfin Chub	*Erimonax monachus*	X	LT	SP (SX)
MUSSELS				
Alabama Lampmussel	*Lampsilis virescens*	X	LE	SP (S1)
Angled Riffleshell	*Epioblasma biemarginata*	H	LE	PSM (SX)
Birdwing Pearlymussel	*Lemiox rimosus*	H	LE	SP (S1)
Black Sandshell	*Ligumia recta*	E		PSM (S2)
Clubshell	*Pleurobema clava*	X	LE	SP (SX)
Cracking Pearlymussel	*Hemistena lata*	H	LE	SP, P1 (S1)
Cumberland Leafshell	*Epioblasma stewardsonii*	X		PSM (SX)
Cumberland Moccasinshell	*Medionidus conradicus*	H		SP (S1)
Cumberland Monkeyface	*Quadrula intermedia*	C		SP (SX)
Cumberlandian Combshell	*Epioblasma brevidens*	H	LE	SP (S1)
Deertoe	*Truncilla truncata*	E		PSM (S1)
Dromedary Pearlymussel	*Dromus dromas*	E	LE	SP (SX)
Fanshell	*Cyprogenia stegaria*	C	LE	SP (S1)
Fine-rayed Pigtoe	*Fusconaia cuneolus*	H	LE	SP (S1)
Fluted Kidneyshell	*Ptychobranchus subtentum*	H	LE	SP (SX)
Hickorynut	*Obovaria olivaria*	H		PSM (SX)
Kidneyshell	*Ptychobranchus fasciolaris*	E		PSM (S2)
Longsolid	*Fusconaia subrotunda*	H	PT	PSM (S1)
Monkeyface	*Quadrula metanevra*			

Common Name	*Scientific Name*	Element Rank[2]	Federal Status[3]	State Status (rank[4])
Mountain Creekshell	*Villosa vanuxemensis*	H?		PSM (S3)
Ohio Pigtoe	*Pleurobema cordatum*	E		PSM (S2)
Orange-foot Pimpleback	*Plethobasus cooperianus*	H	LE	SP (SX)
Oyster Mussel	*Epioblasma capsaeformis*	E	LE	SP (SX)
Painted Creekshell	*Villosa taeniata*	H		PSM (S2)
Pink Mucket	*Lampsilis abrupta*	E	LE	SP (S1)
Pocketbook	*Lampsilis ovata*	E		PSM (S2)
Purple Catspaw	*Epioblasma obliquata obliquata*	H	LE	SP (SX)
Purple Lilliput	*Toxolasma lividus*	E		PSM (S2)
Pyramid Pigtoe	*Pleurobema rubrum*	H		SP (S1)
Rayed Bean	*Villosa fabalis*	H	LE	(SX)
Ring Pink	*Obovaria retusa*	C	LE	SP (SH)
Rock Pocketbook	*Arcidens confragosus*	D		PSM (S3)
Rough Pigtoe	*Pleurobema plenum*	E	LE	SP (S1)
Round Combshell	*Epioblasma personata*	X		PSM (SX)
Round Hickorynut	*Obovaria subrotunda*	H	PT	PSM (S2)
Round Pigtoe	*Pleurobema sintoxia*	E		SP (S1)
Sheepnose	*Plethobasus cyphyus*	E	LE	SP (S1)
Shiny Pigtoe Pearlymussel	*Fusconaia cor*	X	LE	SP (S1)
Slabside Pearlymussel	*Pleuronaia dolabelloides*	H	LE	SP (S1)
Smooth Rabbitsfoot	*Quadrula cylindrica cylindrical*	H	LT	SP (S1)
Snuffbox	*Epioblasma triquetra*	H	LE	PSM (S1)
Spectaclecase	*Cumberlandia monodonta*	E	LE	SP (S1)
Spike	*Elliptio dilatata*	H		PSM (S1)
Sugarspoon	*Epioblasma arcaeformis*	H		PSM (SX)
Tennessee Clubshell	*Pleurobema oviforme*	H		PSM (S1)
Tennessee Pigtoe	*Pleuronaia barnesiana*	H		PSM (S1)
Tuberculed Blossom Pearlymussel	*Epioblasma torulosa torulosa*	X	LE	SP (SX)
Turgid Blossom Pearlymussel	*Epioblasma turgidula*	X	LE	SP (SX)
Wavy-rayed Lampmussel	*Lampsilis fasciola*	H		PSM (S2)
White Wartyback	*Plethobasus cicatricosus*	E	LE	SP (S1)
Yellow-blossom Pearlymussel	*Epioblasma florentina florentina*	X	LE	SP (SX)
SNAILS				
Armored Rocksnail	*Lithasia armigera*	E		S1
Muddy Rocksnail	*Lithasia salebrosa*	H		S1
Ornate Rocksnail	*Lithasia geniculate*	H		S1

Common Name	*Scientific Name*	Element Rank[2]	Federal Status[3]	State Status (rank[4])
Rugged Hornsnail	*Pleurocera alveare*	H		S1
Shortspire Hornsnail	*Pleurocera curta*	H		S1S2
Spiral Hornsnail	*Pleurocera brumbyi*	E		S2S3
Telescope Hornsnail	*Pleurocera walker*	H		S3
Warty Rocksnail	*Lithasia lima*	H		S1

[1] Source: TVA Regional Natural Heritage Database, queried on 12/31/2020
[2] Heritage Element Occurrence Rank; E = extant record ≤25 years old; H=historical record ≥ 25 years old; H?=possibly historical; AC= Excellent, good, or fair estimated viability
[3] Status Codes: LE or E = Listed Endangered; LT or T = Listed Threatened; PSM = Partial Status Mussel; SP = State Protected; X = Extirpated
[4] State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; SH = Historical (Possibly Extirpated); SNA = Not Applicable

Under the No Action Alternative, there would be no creek relocation or ground disturbing activities at the project site and the environmental resources at the site would not be disturbed. There are no threatened and endangered aquatic species or their habitat in the project area.

Under the Proposed Action Alternative, Cane Creek would be relocated and a buttress would be installed to address the seismic vulnerability of the dike. However, since no suitable habitat for the state or federally listed species was documented within the project area, there would be no impacts to these species under this alternative.

3.6 Surface Water Quality

The project area is located on TVA's Pickwick Reservoir on the Tennessee River in Alabama at Tennessee River Mile (RM) 244 near the community of Barton. The site is drained by Cane Creek, which is classified for the uses of swimming and fish and wildlife. The Tennessee River/Pickwick Reservoir is classified for the uses of public water supply, fish and wildlife, swimming, and other whole body water contact sports (ADEM 2017). Both Cane Creek and The Tennessee River/Pickwick Reservoir are listed as impaired by nutrients due to agricultural discharges on the latest ADEM 303(d) report (ADEM 2018a).

National Pollution Discharge Elimination System (NPDES) Permit number AL0003867 (ADEM 2018b) covers water discharges at the Colbert Fossil Plant and the combustion turbine (CT) plant. Drainage from the Colbert Reservation discharges to both Cane Creek and the Tennessee River. Process wastewater discharges from the facility are permitted under the NPDES permit and include outfalls that are sampled, monitored, and reported on monthly discharge monitoring reports. The intake is no longer used and most discharges are primarily, if not all, driven by precipitation. The existing Colbert CTs discharge to a process water basin that discharges to Outfall 0011 to Cane Creek. This outfall is a high density poly ethylene (HDPE) pipe with a concrete headwall and is within the proposed

project boundary. TVA's NPDES permit requires that pH, total suspended solids, oil and gas, TSS, ammonia as N, arsenic, copper, iron and selenium be monitored/reported.

As noted above, TVA Aquatics specialists conducted field surveys in December 2020 that identified one perennial stream, three ephemeral streams, and two ponds in the proposed project area. These features are summarized in Table 1 above.

Under the No Action Alternative, the 500-foot length of the east dike would not be repaired. The site would remain as is. This alternative does not reduce the risk of an earthquake-induced breach of the earth dike in the anomaly area, which would likely release dike fill, fly ash, and bottom ash into Cane Creek, should a seismic event of a certain magnitude take place. The surface water management on-site would remain unchanged; however, the impacts to Cane Creek and The Tennessee River water quality would be significantly impacted if fill were released into identified surface waters.

Under the Proposed Action Alternative, to stabilize the east dike within the anomaly area, Cane Creek would be relocated to east of its present alignment. The old creek bed would be filled with imported rock-fill and reused on-site soils, and a buttress would be placed against the east dike within the anomaly area. Wastewaters generated during the proposed project may include construction storm water runoff, dewatering of work areas, domestic sewage, non-detergent equipment washings, dust control, and hydrostatic test discharges.

The proposed activities have the potential to temporarily affect surface water via storm water runoff. TVA would comply with all appropriate state and federal permit requirements. Construction and demolition activities of the associated project would be located on the plant property. TVA would obtain a Construction Storm Water Permit from ADEM prior to beginning demolition. Surface water impacts resulting from disturbances would be mitigated by the use of storm water pollution prevention BMPs to minimize the extent of disturbance and erosion. Storm water and pumped surface water and groundwater from dewatering systems within the cofferdams would discharge via either NPDES permitted discharge points or the designated construction storm water outfalls. Silt fences, sediment basins and/or other sediment and erosion control measures, as described in *Erosion Control, Sediment Control and Stormwater management on Construction Sites and Urban Areas* (Alabama 2018), would be installed, inspected, and maintained for the duration of the project as needed to avoid contamination of surface water adjacent to the project area. Therefore, no significant impacts to surface water would be expected due to surface water runoff from the construction site. All proposed project activities would be conducted in a manner to ensure that waste materials are contained, and the introduction of pollution materials to the receiving waters would be minimized.

Under the proposal, approximately 1,700 linear feet of Cane Creek would be removed and the proposed relocated stretch of stream would be approximately the same length. Mitigation would be conducted to mitigate these stream impacts according to permit conditions. Work conducted in waters of the State or of the United States would require ADEM and/or USACE permits. The anticipated impacts to Waters of the State or United

States associated with the proposal would be mitigated with the use of BMPs and implementation of a maintenance program. Any mitigation would be identified through the joint USACE and ADEM Section 404/401 permitting process, providing for compensation for the loss of wetlands and/or stream reaches.

The proposal would require relocating Outfall 0011 that discharges into Cane Creek from the Colbert CTs. The new outfall location would be closer to the coal yard runoff pond, generally along its current alignment. Potential surface water impacts from the site work associated with adjusting the outfall and installing a headwall at a new location would be mitigated, and the impacts would be minor, with the implementation of BMPs as well as compliance with the requirements of the USACE and ADEM permitting process.

Surface water could be potentially impacted due to increased silt loading resulting from runoff during soil disturbing activities. The proper implementation of BMPs would be expected to result in minor and temporary impacts to construction activities. Direct and indirect impacts to Cane Creek would be expected from the proposed action. TVA would mitigate these impacts with mitigation that has the potential to improve the overall quality of the stream.

Under the proposed action, TVA would establish a new stream channel to resemble a natural creek, with a meandering pattern of the channel and a natural riffle-pool sequence. The meandering pattern would create more diverse stream habitats, which would better cater to a variety of organisms that prefer either deeper or more shallow water conditions. These conditions, as well as improved riparian features, would reduce the potential for scouring during flood conditions and create more residence time in this stream section. The reduction of flood scour and increased retention time would have minor beneficial effects on the water quality over time.

3.7 Floodplains

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

The proposed action would be located adjacent to Cane Creek from miles 3.0 to 3.6, left descending bank, on Pickwick Reservoir at Tennessee RM 244.1. At this location, the 100- and 500-year flood elevations of Cane Creek are 422.6 and 423.6 feet, respectively (referenced to National Geodetic Vertical Datum 1929). Based on Colbert County Flood Insurance Rate Map (Panel 01033C0300D, effective February 17, 2010), a portion of the proposed buttress and the stream relocation would be located within the Cane Creek floodplain.

As a federal agency, TVA adheres to the requirements of EO 11988, Floodplain Management. The objective of EO 11988 is "…to avoid to the extent possible the long- and

short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative." 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 (US Water Resources Council 1978). The EO requires that agencies avoid the 100-year floodplain unless there is no practicable alternative.

Under the No Action Alternative, the creek would not be relocated and a buttress to address seismic vulnerabilities of the dike would not be installed at the anomaly area. There would be no changes to the Cane Creek floodplain at the location, absent a seismic event of a certain magnitude. This alternative does not reduce the potential consequences of such a seismic event in the anomaly area, which would likely release dike fill, fly ash, and bottom ash into Cane Creek. A breach under this scenario would potentially increase flood elevations upstream of TVA property and increase the area inundated in a 100-year flood.

Under the Proposed Action Alternative, to stabilize the east dike within the anomaly area of Ash Pond 4, the existing streambed of Cane Creek would be filled with imported rock-fill and reused on-site soils and relocated to the east of its present alignment, and a buttress would be constructed against the east dike within the anomaly area to increase the dike's stability. Cane Creek would be relocated from about Cane Creek miles 3.1 to 3.5. The bottom of the Ash Pond 4 dike is located within the Cane Creek 100-year floodplain; therefore, portions of the buttress and the relocation of Cane Creek would be located in the 100-year floodplain of Cane Creek. Up to 15.5 acre-feet of fill would be located in the Power Storage Zone; up to 36.0 acre-feet of fill would be located in the Flood Storage Zone; and up to 34.1 acre-feet of fill would be located in the Cane Creek 100-year floodplain. The Power Storage Zone is the portion of Pickwick Reservoir between the elevations of 408.0 and 414.0 that is used to store water for the generation of electricity. The Flood Storage Zone is the portion of Pickwick Reservoir between the elevations of 408.0 and 423.6 that is used to store runoff from rain events.

Buttresses and stream relocations are not considered repetitive actions in the 100-year floodplain. The Ash Pond 4 dike is existing and adjacent to Cane Creek, and the portion of the dike that needs additional stability is within the Cane Creek 100-year floodplain; therefore, there is no alternative location to achieve the project objectives. The proposed action is the most favorable option to stabilize the dike. As described in Section 2.1.3, TVA reviewed a variety of alternatives with potential to increase the stability of the dike and only eight of those alternatives were technically feasible at this location, including the Proposed Action Alternative. Seven of the eight alternatives were eliminated due to the reasons provided in Section 2.1.3. TVA has therefore determined that there is no practicable alternative to relocating Cane Creek and locating a portion of the buttress in the Cane Creek floodplain and within the Pickwick Reservoir flood storage zone. TVA issued the floodplains No Practicable Alternative analysis by posting the draft of this EA for public comment.

Colbert County, Alabama, participates in the National Flood Insurance Program, and any development must be consistent with its floodplain regulations. Studies are underway to determine impacts to Cane Creek flood elevations due to the stream relocation and

construction of the buttress; however, it is expected that flood elevations would not increase more than 1.0 foot, and that any increases in flood elevations would be limited to TVA property. TVA would work with the Colbert County Floodplain Administrator to ensure that the project would comply with the National Flood Insurance Program, thereby minimizing adverse impacts to floodplains, and therefore be consistent with EO 11988.

Based on the implementation of standard BMPs and mitigation measures identified in Section 2.2, the proposed project would have no significant impact on floodplains and their natural and beneficial values.

3.8 Transportation

The COF site and Ash Pond 4 are located in Colbert County, Alabama, on the north side of U.S. Highway 72, known as Lee Highway. The highway is the major travel corridor in far northern Alabama for those traveling east and west, extending from southeastern Tennessee (near Chattanooga), through northern Alabama and Mississippi, to the Memphis, Tennessee area. In the vicinity of COF, the highway is a divided four-lane roadway with wide shoulders that passes through a rural area, and the intersections with arterial and local roadways do not have traffic signals. The highway is the primary route for access to the COF by TVA employees and those accessing the site for construction activities.

Under the No Action Alternative, there would be no construction activities or associated transport of borrow or spoil materials for the proposed buttress. Therefore, no changes to traffic in the area would occur.

Under the Proposed Action Alternative, transportation effects would be attributed to the construction workforce, transport of spoil material from an offsite quarry location to the project site, and the shipment of equipment. Under the Proposed Action Alternative, TVA would haul soils and fill materials to the project location from the Vulcan Materials quarry, located several miles to the east of the project location. The route between these locations would include the Colbert Steam Plant Road, U.S. Highway 72, and Route 53 adjacent to the Vulcan quarry. See Figure 4.

On U.S. Highway 72, just east of the intersection with Colbert Steam Plant Road, there is an Alabama Department of Transportation traffic counter (Counter # Colbert 804), which indicates that about 12,000 vehicles travel the route on a daily basis; from 2015 to 2019, there were an Average Annual Daily Traffic of 11,943 vehicles passing the location (Alabama 2021). From U.S. Highway 72, the Colbert Steam Plant Road is a low volume two-lane roadway that provides the primary access into the plant reservation and to the project location. Traffic count information of this road (Counter # Colbert 1322), just north of the intersection with the highway, indicates that an average of 370 vehicles use the road each day (Alabama 2021). Traffic count information of Route 53 (Counter # Colbert 629) at the Vulcan quarry entrance indicates that an average of 220 vehicles pass the location each day.

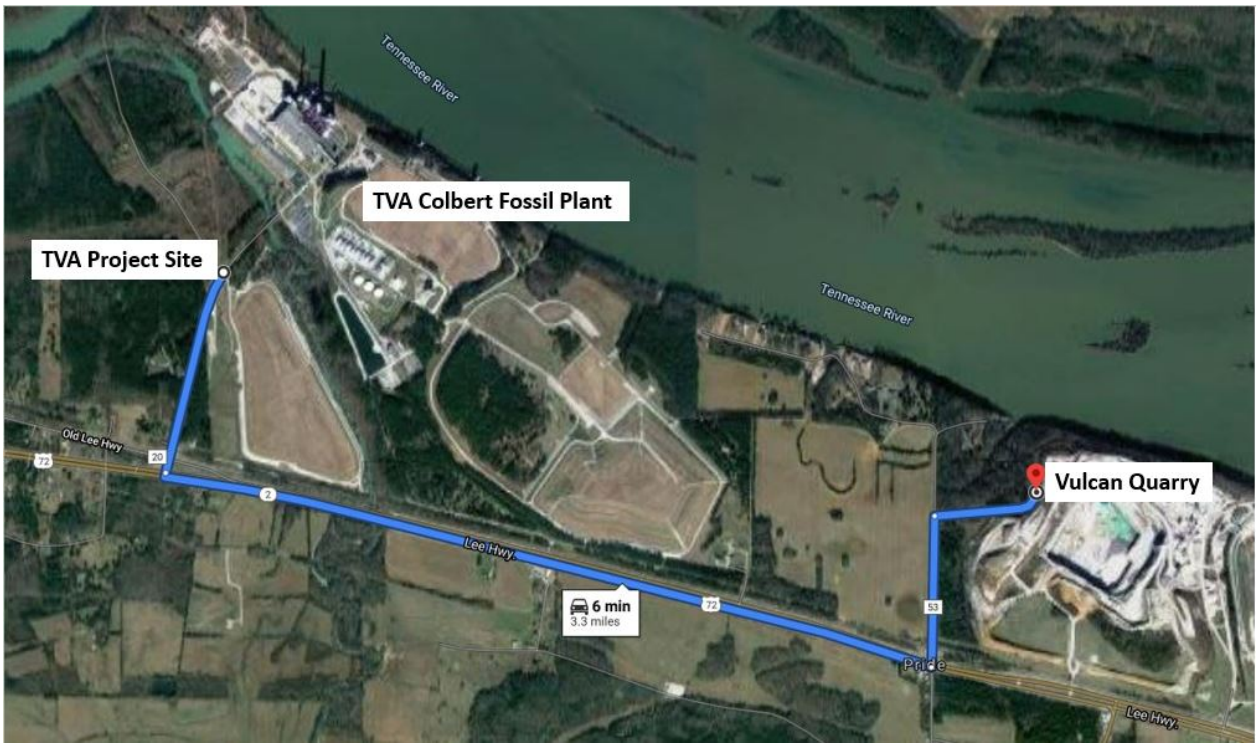

Figure 4. Proposed Transportation Route for Soil/Rock Materials.

Soil and rock material to construct the buttress would be transported onsite from a previously developed and permitted quarry site at a rate of up to 100 truckloads per day for approximately 125 days. This would result in an increase of up to 200 vehicle trips per day (100 vehicles making a round trip journey) along the 3.6 mile one-way journey along Colbert Steam Plant Road, U.S. Highway 72, and Route 53. This increase of 200 vehicles a day along the route represents a minor increase of traffic along U.S. Highway 72 and a moderate increase along the Colbert Steam Plant Road and Route 53. These effects would be temporary (approximately 125 days). TVA would utilize standard over-the-road dump trucks to transport the materials, and loads would comply with legal weight limits.

Construction-related vehicles (dozers, excavators, graders, loaders, etc.) would be delivered to the project area on flatbed trailers during both the mobilization and demobilization stages of the project, causing an increase in truck traffic in the vicinity. However, as this increase would primarily be limited to the mobilization and demobilization phases, impacts to the surrounding transportation network are not anticipated. Ongoing operations after construction would generate only occasional trips that would be minimal and would not have an impact on the surrounding traffic network.

The construction workforce traveling to and from the proposed substation site would contribute to the traffic on the local transportation network. The workforce needed to support the construction activities proposed under this proposal ranges from 10 to 35 throughout the approximate 8-month construction period. This workforce would result in a traffic increase of up to 70 vehicles per day (35 vehicles entering the site in the morning and

35 vehicles leaving the site at the end of the workday) added to the surrounding roadways during the construction period. It is assumed that workforce traffic would generally utilize the regional transportation network as they travel to/from their place of residence. Moderate traffic increases along the Colbert Steam Plant Road would occur and minor increases would occur along U.S. Highway 72 for the 8-month duration of the project.

In total, a maximum of 270 vehicles per day would be added to the roadways in the vicinity during the project, a majority of which would be limited to the 125-day period during which time the buttress is installed. This increase is unlikely to result in noticeable effects to the area's traffic or affect any of the vicinity's transportation infrastructure.

3.9 Socioeconomics and Environmental Justice

The study area for socioeconomic and environmental justice analysis are defined as any census block group that falls within a 5-mile radius of the project area, which would include portions of Colbert and Lauderdale counties in northwestern Alabama. Comparisons at multiple spatial scales provide a more detailed characterization of populations that may be affected by the proposed actions, including any environmental justice populations (e.g., minority and low-income). Demographic and economic characteristics of populations within the study areas were assessed using the 2014-2018 American Community Survey 5-year estimates provided by the U.S. Census Bureau (USCB) (USCB 2020a).

The block groups that make up the Colbert study area are predominantly rural and have a combined resident population of 12,768, accounting for approximately 0.3 percent of the total population of the state of Alabama. Most residential development is located toward the eastern end of the study area, near the city of Tuscumbia, or along US 72 which runs south of the Colbert Reservation. Since 2010, the study area has experienced a population increase of approximately 1.0 percent, slightly lower than the growth rate of Alabama as a whole (1.8 percent), but greater than that of Colbert and Lauderdale counties, which essentially stayed the same. Approximately 86 percent of the Colbert study area population is white, with Black or African American comprising the largest minority population, followed by Hispanic or Latino. Minority percentages in the study area are generally slightly lower than those of the surrounding counties and the state of Alabama (Table 6).

Table 6. Demographic and Socioeconomic Characteristics of COF Study Area and Reference Geography

	COF Study Area (Block Groups within 5-Mile Radius)	Colbert County, Alabama	Lauderdale County, Alabama	State of Alabama
POPULATION[1,2]				
Population, 2018 estimate	12,768	54,495	92,585	4,864,680
Population, 2010	12,647	54,428	92,709	4,779,736
Percent Change 2010-2018	1.0%	0.1%	-0.1%	1.8%
Persons under 18 years, 2018	22.2%	21.3%	20.0%	22.6%
Persons 65 years and over, 2018	20.2%	19.3%	19.3%	16.1%
RACIAL CHARACTERISTICS[1]				
Not Hispanic or Latino				
White alone, 2018 (a)	85.5%	78.7%	84.8%	65.7%
Black or African American, 2018 (a)	8.1%	15.7%	9.9%	26.4%
American Indian and Alaska Native, 2018 (a)	0.2%	0.7%	0.5%	0.5%
Asian, 2018 (a)	0.6%	0.4%	0.7%	1.3%
Native Hawaiian and Other Pacific Islander, 2018 (a)	0.2%	0.1%	0.1%	0.0%
Some Other Race alone, 2018 (a)	0.0%	0.0%	0.1%	0.2%
Two or More Races, 2018	1.6%	1.9%	1.4%	1.7%
Hispanic or Latino, 2018	3.8%	2.5%	2.6%	4.2%
INCOME & EMPLOYMENT[1]				
Median household income, 2018	$ 49,415	$ 47,558	$ 46,265	$ 48,486
Persons below poverty level, 2018	15.1%	16.3%	15.2%	17.5%
Persons below low-income threshold, 2018 (b)	38.0%	36.8%	37.3%	37.8%
Civilian Labor Force, 2018	5,272	23,833	42,397	2,224,606
Percent Employed, 2018	90.8%	94.1%	94.7%	93.4%
Percent Unemployed, 2018	9.2%	5.9%	5.3%	6.6%
(a) Includes persons reporting only one race.				
(b) Low-income threshold is defined as two times the poverty level.				
Sources: [1]USCB 2020a; [2]USCB 2011				

The average median household income in the block groups that make up the Colbert study area is $49,415, which is slightly higher than the median household income reported for the surrounding counties and the state (ranging from $46,265 to $48,486). Correspondingly, the percentage of the study area population falling below the poverty level (15.1 percent) is on the low end of the spectrum when compared to the larger geographies, where 15.2 to 17.5 percent of the population lives below the poverty level. The total civilian labor force within the block groups that make up the Colbert study area is 5,272, with the

unemployment rate at 9.2 percent. This unemployment rate is noted to be higher relative to the unemployment rates of Colbert and Lauderdale counties (5.9 and 5.3 percent, respectively), and the state of Alabama (6.6 percent) (Table 6).

Environmental Justice

Executive Order 12898 Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations mandates some federal-executive agencies to consider environmental justice as part of the NEPA review. Although TVA is not one of the agencies subject to this order, TVA routinely considers environmental justice impacts as part of the project decision-making process. Identification of minority populations requires analysis of individual race and ethnicity classifications as well as comparisons of all minority populations in the region. Minority populations exist if either of the following conditions is met:

- The minority population of the impacted area exceeds 50 percent of the total population.
- The ratio of minority population is meaningfully greater (i.e., greater than or equal to 20 percent) than the minority population percentage in the general population or other appropriate unit of geographic analysis (CEQ 1997).

The nationwide poverty level is determined annually by the USCB and varies by the size of family and number of related children under 18 years of age. The 2019 USCB Poverty Threshold for an individual is an annual income of $13,300, and for a family of four it is an annual household income of $26,370 (USCB 2020b). For the purposes of this assessment, low-income individuals are those whose annual household income is less than two times the poverty level. More encompassing than the base poverty level, this low-income threshold, also used by the EPA in their delineation of low-income populations, is an appropriate measure for environmental justice consideration because current poverty thresholds are often too low to capture adequately the populations adversely affected by low-income levels, especially in high-cost areas (EPA 2017). According to EPA, the effects of income on baseline health and other aspects of susceptibility are not limited to those below the poverty thresholds. For example, populations having an income level from one to two times the poverty level also have worse health overall than those with higher incomes (Centers for Disease Control and Prevention 2011). A low-income environmental justice population exists if either of the following two conditions is met:

- The low-income population exceeds 50 percent of the total population.
- The ratio of low-income population significantly exceeds (i.e., by greater than or equal to 20 percent) that of the general population or other appropriate geographic areas of analysis.

Based on a preliminary review of the EPA's EJSCREEN tool, the proposed project area is not located in an area with high concentrations of environmental justice populations; in

particular, minority populations make up relatively small percentages of the total population of the study area. A more detailed evaluation was completed using the 2014-2018 American Community Survey data to identify whether any specific block groups within the vicinity of the proposed project area exceed environmental justice thresholds.

Total minority populations comprise approximately 34 percent of the population of Alabama, 21 percent of the population in Colbert County, and 15 percent of the population in Lauderdale County. The Colbert study area as a whole (within 5 miles of the project area) has a total minority percentage of 14.5 percent, with percentages for individual block groups ranging from 3.5 to 28.9 percent of the population. According to the EPA's EJSCREEN tool, less than 100 people reside within a mile of the project area, with minority population of approximately 7 percent.

As none of the block groups within the Colbert socioeconomics and environmental justice study area have minority populations that either exceed 50 percent of the total population or significantly exceed the minority percentage of any of the reference geographies, they do not meet the criterion for consideration as minority population groups. However, because specific demographic information is not available below the block group level, there may be smaller, isolated minority populations that are not identified via this method of analysis. For example, the Red Rock/Barton community, located southwest of the plant in the vicinity of US 72 and Red Rock Road, is a predominantly Black community that has engaged with TVA in the past regarding activities at COF. Based on the proximity of this community to the plant, it is included in TVA's analysis as a sensitive minority and/or low-income population subject to environmental justice considerations. No additional such smaller, isolated communities were identified.

The percentage of the population of Alabama living below the low-income threshold is approximately 38 percent, while both Colbert and Lauderdale counties have low-income percentages of approximately 37 percent. In line with these reference geographies, 48 percent of people living within the Colbert socioeconomic and environmental justice study area are considered low income, with percentages for individual block groups ranging from 9.4 to 55.7 percent of the population. Just one of the Colbert study area block groups has a low-income population that either exceeds 50 percent of the total population or significantly exceeds the low-income percentage of one or more of the reference geographies. Figure 5 identifies the block group determined to meet the criterion for consideration as a low-income population group. The closest point of this block from the project area is approximately 2.5 miles to the west.

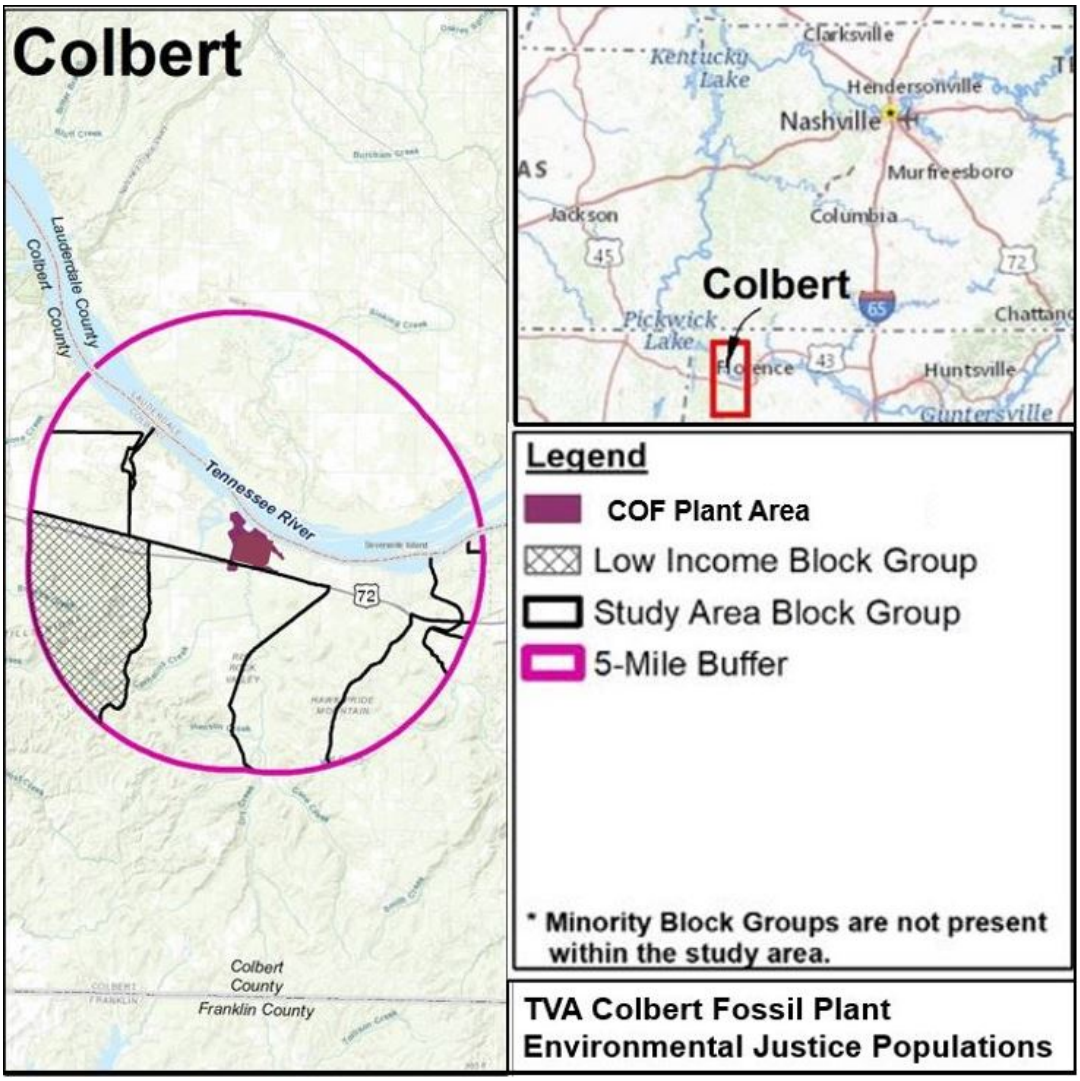

Figure 5. Environmental Justice Populations Within the Colbert Study Areas

Under the No Action Alternative, TVA would not construct a buttress or relocate portions of Cane Creek to address the anomaly area of the Ash Pond 4. Therefore, there would be no change in local demographics, economic conditions, or community services, and there would be no impacts to environmental justice populations associated with the proposed actions.

Under the Action Alternative, as described in Chapter 2, onsite construction activities associated with the proposed action would require a workforce of up to 35 personnel over the approximately 8-month construction period (potentially to begin in Spring 2022). The workforce would include those on site conducting construction activities as well as drivers of trucks moving fill material. Because it is expected that most workers could be drawn from the labor force that currently resides within the surrounding counties, impacts to local demographics and employment associated with construction activities would be beneficial

and minor over the construction period. Construction activities would not result in any impacts to any of the facilities or services of the community near the project location.

One block group within the Colbert study area, identified in Figure 5, meets the criteria for consideration as a low-income population under EO 12898. In addition, an isolated minority and/or low-income population was identified in the Red Rock/Barton community, located in the block group directly south of the plant, in the vicinity of the US 72 and Red Rock Road intersection. As described above, there would be no direct or indirect impacts to either of these communities in association with proposed action, due to their distance from the proposed plant site. The only impacts anticipated from the proposed action that would occur outside the immediate project area would be increased traffic along the roadways. Vehicles hauling fill materials would not pass through the low-income population block or the Red Rock/Barton community. Any increase in traffic during the construction period would be temporary and minor as the workforce would disperse at distances further from the reservation. This impact would not be disproportionate as impacts would be consistent across all communities (i.e., environmental justice and non-environmental justice) along the local roadways. Therefore, no impacts to environmental justice populations would occur under this alternative.

3.10 Cumulative Impacts

Past, present, and reasonably foreseeable future actions that may be relevant to the consideration in this cumulative analysis are described below. These actions were identified within the geographic areas of analysis as having the potential to, in aggregate, result in larger and potentially adverse impacts to the resources of concern.

Past and present actions include the retirement of five coal-fired generators at COF in 2013 and 2016, after which time virtually all coal unit operational measures were discontinued. The former fossil plant is currently subject to basic care and maintenance measures. TVA has continued operations of the eight frame CT units located at the facility. As previously noted, the closure of the impoundment portion of COF (Ash Pond 4) was completed in 2018. Decommissioning of the plant is currently ongoing, and the target brownfield restoration is anticipated to be complete by 2023 (note, impacts of activities associated with decommissioning were analyzed in the *Colbert Fossil Plant Decontamination and Deconstruction EA* (TVA 2016a), which included a detailed cumulative effects assessment as part of the evaluation of alternatives).

Reasonably foreseeable future actions include activities that are proposed to occur at COF and at a nearby industrial landfill. TVA is considering constructing three natural gas-fueled frame combined turbine units at the COF reservation, with construction beginning as early as 2021, if approved. Approximately one mile west of COF, the Solid Waste Disposal Authority of the cities of Muscle Shoals, Sheffield, and Tuscumbia, Alabama are proposing to expand the existing Cherokee Industrial Landfill on to adjoining acreage in Barton, Alabama, located near the Barton Riverfront Industrial Park on Cane Creek Road. The Authority submitted to the ADEM an application to renew and modify the industrial waste

landfill permit for the landfill that indicates the project would not impact wetlands, threatened and endangered species, or cultural resources.

To address cumulative impacts, the existing affected environment surrounding the project area was considered in conjunction with the environmental impacts presented in Chapter 3 and the potential resource impacts from the past, present, and reasonably foreseeable future actions. Some of the proposed actions identified under the Proposed Action Alternative would occur in areas previously disturbed (e.g., the Ash Pond 4, the proposed laydown area). A large portion of the project area, however, remains a natural setting (e.g., where Cane Creek would be relocated), although the entire project area has been subject to environmental stressors that are associated with previous, long-term industrial operations and disturbances.

The cumulative impact analysis considers potential impacts that may result from the incremental impact of a project when added to other past, present, and reasonably foreseeable future actions. This cumulative impact analysis is limited to those resource issues affected by the proposed activities. As described above, the Proposed Action Alternative may result in only minor adverse impacts to terrestrial and aquatic ecology, floodplains, surface water quality, and transportation. Other cumulative activities would be expected to have similarly minor impacts to ecology, floodplains, and water quality that would occur outside of the project area. Only transportation impacts are expected to result in impacts outside of the project area. Impacts from the Proposed Action Alternative, in combination with the “other actions” described above, would not result in incrementally greater cumulative effects to terrestrial and aquatic ecology, floodplains or surface water quality.

Cumulative transportation impacts would be localized and short term. The potential for cumulative effects to transportation from the Proposed Action Alternative and other identified actions would primarily be related to the construction phases of these actions. Traffic generated by these actions would consist of construction workforce and goods and equipment transport to construction sites. The reasonably foreseeable future actions near Colbert including the demolition and deconstruction of the Colbert Fossil Plant, the construction of the combustion-turbine plant, and the expansion of the Cherokee Industrial Landfill would contribute to additional traffic volumes on the U.S. Highway 72 and Colbert Steam Plant Road, which could lead to congestion at intersections in the vicinity. While the Proposed Action Alternative would have a minor effect on transportation, cumulatively these activities have potential to result in moderate traffic impacts in the immediate vicinity of COF, with cumulatively minor effects occurring further away from COF.

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CHAPTER 5 - LIST OF PREPARERS

The following individuals contributed to the completion of the EA.

Name/Education	Experience	Project Role
Matthew Higdon *M.S., Planning* *B.A., History*	18 years in NEPA compliance and natural resources planning	Document Preparation, NEPA Compliance, Transportation
Steve Cole *Ph.D., Anthropology (Archaeology specialization)* *M.A., Anthropology*	18 years in Cultural Resources	Cultural Resources
Adam Dattilo *M.S., Forestry* *B.S., Natural Resource Conservation Management*	17 years of experience in ecological restoration and plant ecology and 10 years in botany	Terrestrial Ecology (Vegetation), Threatened and Endangered Species
Sara McLaughlin *B.S. Wildlife and Fisheries Science*	15 years in field biology, 8 years in ESA compliance	Terrestrial Ecology (Wildlife), Threatened and Endangered Species
Kim Pilarski-Hall *M.S., Geography*	26 years in wetlands assessment and delineation	Wetlands
Bill Roddy *B.S., Chemical Engineering*	10 years in NEPA and environmental compliance	Document preparation, Environmental Compliance
John Shelton *M.S., Environmental Science* *B.A., Biology*	7 years in field biology, 2 years in NEPA and ESA compliance	Terrestrial Ecology (Vegetation), Threatened and Endangered Species
Brandon Whitley *M.S., Wildlife and Fisheries Science*	3 years in field biology, 3 years in ESA compliance	Aquatic Ecology, Threatened and Endangered Species
A. Chevales Williams *B.S., Environmental/Chemical Engineering*	15 years of experience in water quality monitoring and compliance	Surface Water Quality
Carrie Williamson *M.S., Civil Engineering* *B.S., Civil Engineering, Professional Engineer, Certified Floodplain Manager*	7 years in floodplains and flood risk, 3 years in river forecasting, 11 years in compliance monitoring	Floodplains and flood risk

ATTACHMENT A - TVA BAT STRATEGY PROJECT REVIEW FORM

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

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

Project Name: Ash Pond 4 Seismic Project **Date:** 10/16/2020

Contact(s): Bill Roddy **CEC#:** 43881 **Project ID:** 427074

Project Location (City, County, State): Colbert County, Alabama

Project Description:

Between 2016 & 2018, Ash Pond 4 was capped/closed. In 2018 & 2019, TVA performed additional subsurface investigation to monitor the closed condition & to evaluate post-earthquake stability. To address the potential seismic vulnerability of a 500-foot portion of the east dike, TVA proposes to install a soil & rock buttress along this section of the dike & relocate/realign 1,700 linear feet of Cane Creek.

SECTION 1: PROJECT INFORMATION - ACTION AND ACTIVITIES

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

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

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

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

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

TABLE 2. Activities not likely to adversely affect bats with implementation of conservation measures. Conservation measures and completion of bat strategy project review form REQUIRED; review of bat records in proximity to project NOT required.

■ 18. Erosion control, minor	☐ 57. Water intake - non-industrial	☐ 79. Swimming pools/associated equipment
☐ 24. Tree planting	■ 58. Wastewater outfalls	☐ 81. Water intakes – industrial
☐ 30. Dredging and excavation; recessed harbor areas	☐ 59. Marine fueling facilities	☐ 84. On-site/off-site public utility relocation or construction or extension
■ 39. Berm development	☐ 60. Commercial water-use facilities (e.g., marinas)	☐ 85. Playground equipment - land-based
☐ 40. Closed loop heat exchangers (heat pumps)	☐ 61. Septic fields	☐ 87. Aboveground storage tanks
☐ 45. Stream monitoring equipment - placement and use	☐ 66. Private, residential docks, piers, boathouses	☐ 88. Underground storage tanks
☐ 46. Floating boat slips within approved harbor limits	■ 67. Siting of temporary office trailers	☐ 90. Pond closure
■ 48. Laydown areas	☐ 68. Financing for speculative building construction	☐ 93. Standard License
☐ 50. Minor land based structures	☐ 72. Ferry landings/service operations	☐ 94. Special Use License
☐ 51. Signage installation	☐ 74. Recreational vehicle campsites	☐ 95. Recreation License
☐ 53. Mooring buoys or posts	☐ 75. Utility lines/light poles	☐ 96. Land Use Permit
☐ 56. Culverts	☐ 76. Concrete sidewalks	

Table 3: Activities that may adversely affect federally listed bats. Conservation measures AND completion of bat strategy project review form REQUIRED; review of bat records in proximity of project REQUIRED by OSAR/Heritage eMap reviewer or Terrestrial Zoologist.

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

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

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

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

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

c) If conducting **prescribed burning** (**activity 23)**, estimated acreage**:** 7 and timeframe(s) below; ☐ **N/A**

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

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

e) If **tree removal (activity 33 or 34)**, estimated amount: 7 (•)**ac** ( )**trees** ( )**N/A**

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

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

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

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

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

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

Info below completed by:				
☐ **Heritage Reviewer**	(name)		Date	
☐ **OSAR Reviewer**	(name)		Date	
■ **Terrestrial Zoologist**	(name)	Sara McLaughlin-Johnson	Date	1/8/2021

Gray bat records: ☐ None ☐ Within 3 miles* ☐ Within a cave* ☒ Within the County

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

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

Virginia big-eared bat records: ☒ None ☐ Within 6 miles* ☐ Within the County

Caves: ☐ None within 3 mi ☐ Within 3 miles but > 0.5 mi ☐ Within 0.5 mi but > 0.25 mi* ☒ Within 0.25 mi but > 200 feet* ☐ Within 200 feet*

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

Amount of SUITABLE habitat to be removed/burned (may differ from STEP 4e): 7 **(**(•)**ac** ( )**trees)*** ( )**N/A**

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

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

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

STEP 7) Project will involve:

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

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

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

STEP 10) Project ◉ **WILL** ○ **WILL NOT** require use of Incidental Take in the amount of 7 ◉ **acres or** ○ **trees** proposed to be used during the ■ **WINTER** ○ **VOLANT SEASON** ○ **NON-VOLANT SEASON** ○ **N/A**

STEP 11) Available Incidental Take (prior to accounting for this project) as of 1/8/2021

TVA Action	Total 20-year	Winter	Volant Season	Non-Volant Season
5 Operate, Maintain, Retire, Expand, Construct Power Plants	1,701.65	1,320.45	276.47	104.73

STEP 12) Amount contributed to TVA's Bat Conservation Fund upon activity completion: $ 0 OR ◉ **N/A**

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

SECTION 3: REQUIRED CONSERVATION MEASURES

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

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

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

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

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

Manual Override

Name: Sara McLaughlin-Johnson

Check if Applies to Project	Activities Subject To Conservation Measure	Conservation Measure Description
		NV1 - Noise will be short-term, transient, and not significantly different from urban interface or natural events (i.e., thunderstorms) that bats are frequently exposed to when present on the landscape.
		SHF1 - Fire breaks will be used to define and limit burn scope.
		SHF2 - Site-specific conditions (e.g., acres burned, transport wind speed, mixing heights) will be considered to ensure smoke is limited and adequately dispersed away from caves so that smoke does not enter cave or cave-like structures.
		SHF3 - Acreage will be divided into smaller units to keep amount of smoke at any one time or location to a minimum and reduce risk for smoke to enter caves.
		SHF4 - If burns need to be conducted during April and May, when there is some potential for bats to present on the landscape and more likely to enter torpor due to colder temperatures, burns will only be conducted if the air temperature is 55° or greater, and preferably 60° or greater.
		SHF5 - Fire breaks will be plowed immediately prior to burning, will be plowed as shallow as possible, and will be kept to minimum to minimize sediment.
		SHF6 - Tractor-constructed fire lines will be established **greater than 200 feet from cave entrances**. Existing logging roads and skid trails will be used where feasible to minimize ground disturbance and generation of loose sediment.
		SHF7 - Burning will only occur if site specific conditions (e.g. acres burned, transport wind speed, mixing heights) can be modified to ensure that smoke is adequately dispersed away from caves or cave-like structures. This applies to prescribed burns and burn piles of woody vegetation.
		SHF8 - Brush piles will be burned a **minimum of 0.25 mile from documented, known, or obvious caves or cave entrances** and otherwise in the center of newly established ROW when proximity to caves on private land is unknown.
		SHF9 - A **0.25 mile buffer of undisturbed forest** will be maintained around documented or known gray bat maternity and hibernation colony sites, documented or known Virginia big-eared bat maternity, bachelor, or winter colony sites, Indiana bat hibernation sites, and northern long-eared bat hibernation sites. Prohibited activities within this buffer include cutting of overstory vegetation, construction of roads, trails or wildlife openings, and prescribed burning. Exceptions may be made for maintenance of existing roads and existing ROW, or where it is determined that the activity is compatible with species conservation and recovery (e.g., removal of invasive species).
		TR1* - Removal of potentially suitable summer roosting habitat during time of potential occupancy has been quantified and minimized programmatically. TVA will track and document alignment of activities that include tree removal (i.e., hazard trees, mechanical vegetation removal) with the programmatic quantitative cumulative estimate of seasonal removal of potential summer roost trees for Indiana bat and northern long-eared bat. Project will therefore communicate completion of tree removal to appropriate TVA staff.
		TR4* - Removal of suitable summer roosting habitat within potential habitat for Indiana bat or northern long-eared bat will be tracked, documented, and included in annual reporting. Project will therefore communicate completion of tree removal to appropriate TVA staff.

SSPC2 - Operations involving chemical/fuel storage or resupply and vehicle servicing will be handled outside of riparian zones (streamside management zones) in a manner to prevent these items from reaching a watercourse. Earthen berms or other effective means are installed to protect stream channel from direct surface runoff. Servicing will be done with care to avoid leakage, spillage, and subsequent stream, wetland, or ground water contamination. Oil waste, filters, other litter will be collected and disposed of properly. Equipment servicing and chemical/fuel storage will be limited to locations greater than 300-ft from sinkholes, fissures, or areas draining into known sinkholes, fissures, or other karst features.

SSPC3 (**Power Plants only**) - Power Plant actions and activities will continue to implement standard environmental practices. These include:

- Best Management Practices (BMPs) in accordance with regulations:
  - Ensure proper disposal of waste, ex: used rags, used oil, empty containers, general trash, dependent on plant policy
  - Maintain every site with well-equipped spill response kits, included in some heavy equipment
  - Conduct Quarterly Internal Environmental Field Assessments at each sight
  - Every project must have an approved work package that contains an environmental checklist that is approved by sight Environmental Health & Safety consultant.
  - When refueling, vehicle is positioned as close to pump as possible to prevent drips, and overfilling of tank. Hose and nozzle are held in a vertical position to prevent spillage
- Construction Site Protection Methods
  - Sediment basin for runoff - used to trap sediments and temporarily detain runoff on larger construction sites
  - Storm drain protection device
  - Check dam to help slow down silt flow
  - Silt fencing to reduce sediment movement
- Storm Water Pollution Prevention (SWPP) Pollution Control Strategies
  - Minimize storm water contact with disturbed soils at construction site
  - Protect disturbed soil areas from erosion
  - Minimize sediment in storm water before discharge
  - Prevent storm water contact with other pollutants
  - Construction sites also may be required to have a storm water permit, depending on size of land disturbance (>1ac)
- Every site has a Spill Prevention and Control Countermeasures (SPCC) Plan and requires training. Several hundred pieces of equipment often managed at the same time on power generation properties. Goal is to
  - Minimize fuel and chemical use Ensure proper disposal of waste, ex: used rags, used oil, empty containers, general trash, dependent on plant policy
  - Maintain every site with well-equipped spill response kits, included in some heavy equipment
  - Conduct Quarterly Internal Environmental Field Assessments at each sight
  - Every project must have an approved work package that contains an environmental checklist that is approved by sight Environmental Health & Safety consultant.
  - When refueling, vehicle is positioned as close to pump as possible to prevent drips, and overfilling of tank. Hose and nozzle are held in a vertical position to prevent spillage
- Construction Site Protection Methods
  - Sediment basin for runoff - used to trap sediments and temporarily detain runoff on larger construction sites
  - Storm drain protection device
  - Check dam to help slow down silt flow
  - Silt fencing to reduce sediment movement
- Storm Water Pollution Prevention (SWPP) Pollution Control Strategies
  - Minimize storm water contact with disturbed soils at construction site
  - Protect disturbed soil areas from erosion
  - Minimize sediment in storm water before discharge
  - Prevent storm water contact with other pollutants
  - Construction sites also may be required to have a storm water permit, depending on size of land disturbance (>1ac)
- Every site has a Spill Prevention and Control Countermeasures (SPCC) Plan and requires training. Several hundred pieces of equipment often managed at the same time on power generation properties. Goal is to minimize fuel and chemical use

L1 - Direct temporary lighting away from suitable habitat during the active season.

	L2 - Evaluate the use of outdoor lighting during the active season and seek to minimize light pollution when installing new or replacing existing permanent lights by angling lights downward or via other light minimization measures (e.g., dimming, directed lighting, motion-sensitive lighting).

[1]Bats addressed in consultation (02/2018), which includes gray bat (listed in 1976), Indiana bat (listed in 1967), northern long-eared bat (listed in 2015), and Virginia big-eared bat (listed in 1979).

Hide All Unchecked Conservation Measures

- (•) HIDE
- ( ) UNHIDE

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

- (•) HIDE
- ( ) UNHIDE

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

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

Bill Roddy (name) is (or will be made) aware of the requirements below.

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

For Use by Terrestrial Zoologist Only

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

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

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