Document Type: EA-Administrative Record
Index Field: Environmental Assessment
Project Name: East Region Consolidation
Project Number: 2017-12

PHASE 1 EAST REGION CONSOLIDATION – NORRIS PROPERTIES
FINAL ENVIRONMENTAL ASSESSMENT
Anderson County, Tennessee

Prepared by:
TENNESSEE VALLEY AUTHORITY
Knoxville, Tennessee

January 2019

To request further information, contact:
Travis Giles
NEPA Compliance
NEPA Program and Valley Projects
Tennessee Valley Authority
1101 Market Street - MR4G
Chattanooga, TN 37402
E-mail: tagiles@tva.gov

This page intentionally left blank

Table of Contents

List of Appendices

List of Tables

List of Figures

Symbols, Acronyms, and Abbreviations

APE	Area of Potential Effect
BMP	Best Management Practice
CFR	Code of Federal Regulations
dB	decibel
dBA	A-weighted decibel
DNL	Day-Night Sound Level
EA	Environmental Assessment
EO	Executive Order
EPA	United States Environmental Protection Agency
ITMA	Inspection, Testing, Monitoring, and Analysis
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
SHPO	State Historic Preservation Officer
SWPPP	Stormwater Pollution Prevention Plan
TDEC	Tennessee Department of Environment and Conservation
TVA	Tennessee Valley Authority
TVAR	Tennessee Valley Archaeological Research
U.S.	United States
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service

CHAPTER 1 - PURPOSE OF AND NEED FOR ACTION

1.1 Introduction and Background

In 2013, the Tennessee Valley Authority (TVA) developed an internal valley wide real estate strategy to effectively and efficiently manage the agency-wide real estate portfolio to reduce costs and maximize the financial return on TVA's real estate assets[1] including office space. At present, TVA occupies two properties in the City of Norris, Anderson County, Tennessee as shown in Figure 1-1. TVA could achieve work process efficiencies by consolidating similar functions in one physical location.

To meet office space requirements and consolidate the operations in a more efficient and economical manner, TVA is proposing to relocate the Inspection, Testing, Monitoring, and Analysis (ITMA) program from Summer Place Building, aquatic laboratory (lab) from Walnut Orchard, water quality lab from the Greenway Area Office building (Greenway), and associated equipment storage needs to the Norris Engineering Lab Complex (Engineering Lab). The consolidation effort would require interior renovations to some of the buildings within the Engineering Lab. Other buildings on the Engineering Lab property would be demolished to support the construction of new facilities. The consolidation effort would relocate approximately 20 TVA staff to the Engineering Lab.

As TVA continues to develop plans for consolidation, the consolidation would proceed in two phases. This EA evaluates the potential impacts associated with Phase 1 which would be focused on interior renovations of structures at the Engineering Lab, and exterior work focused primarily in the southern and eastern portions of the property. Phase 1 exterior actions include the demolition of two small boat sheds and Building I, clearing of trees, installation of lights and cameras for security, construction of a stormwater detention pond, trenching and groundwork in the vicinity of Buildings B and I, repaving/reconfiguring of parking areas, and construction of a new boat shed(s) in the vicinity of Building I. Phase 2 would be driven by security updates needed to bring the facility into compliance with current TVA security measures and protocols. Phase 2 would also address any additional consolidation related actions that may be necessary as a result of TVA's ongoing evaluation of the condition of the existing facilities and program needs.

1.2 Purpose and Need

The purpose of the proposed action is to relocate portions of TVA operations from Walnut Orchard and a portion of Greenway into one location at the Engineering Lab to improve space utilization and to reduce TVA cyclic operations and maintenance and capital project costs consistent with TVA's real estate strategy. The project would consolidate similar functions to achieve work process efficiencies while fostering greater synergies among employees. The

[1] Title to real property held by TVA is in the name of the United States of America.

purpose of dividing this project into phases is to minimize potential impacts to bat habitat associated with the clearing of trees and to meet project considerations.

1.3 Decision to be Made

TVA must determine whether to relocate portions of TVA operations from Walnut Orchard and a portion of Greenway into one location at the Engineering Lab to improve space utilization and to reduce TVA cyclic operations and maintenance and capital project costs consistent with TVA's real estate strategy. Additionally, TVA must decide whether the consolidation should include the proposed interior renovations of structures at the Engineering Lab, and exterior work (demolition, clearing, and construction activities) focused primarily in the southern and eastern portions of the property.

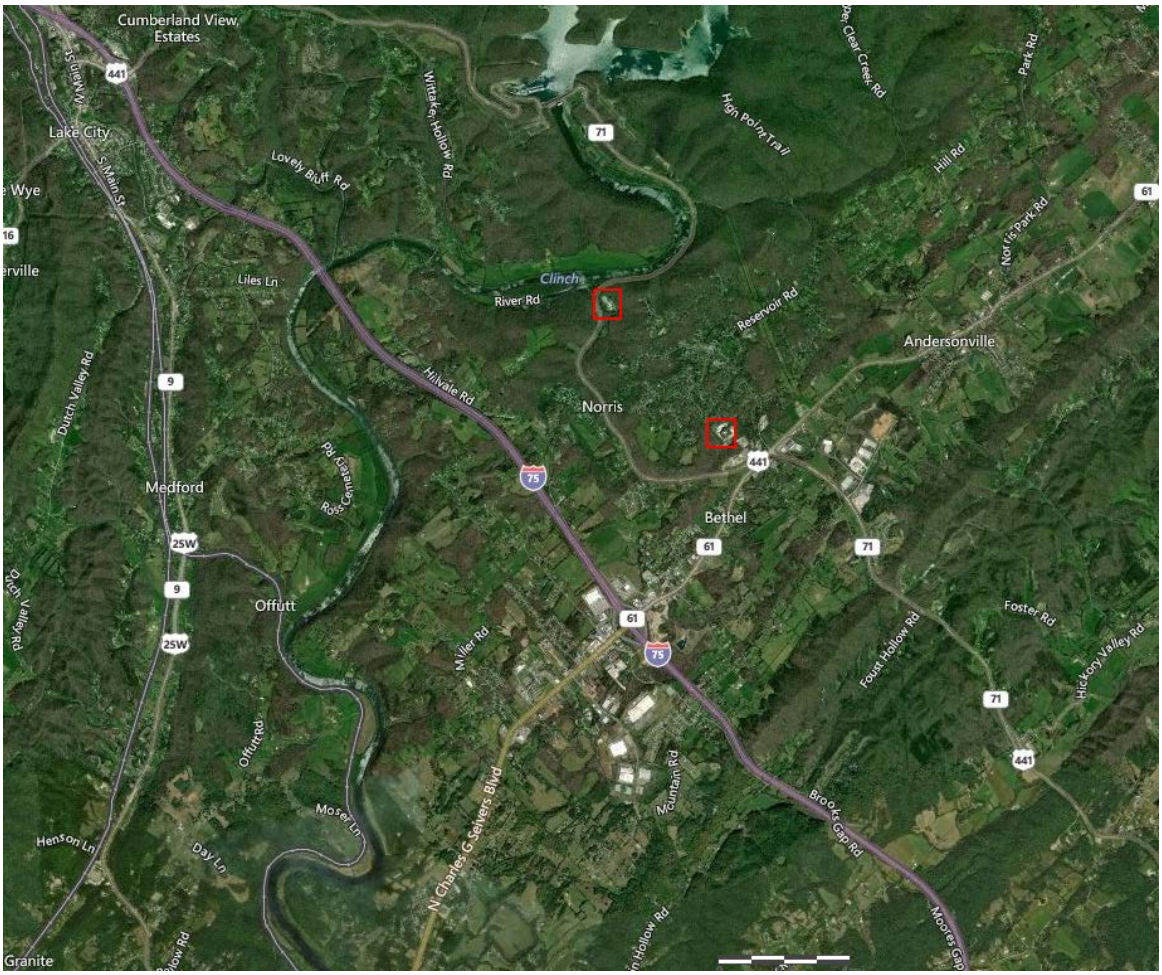

Figure 1-1. Norris Properties

1.4 Scope of the Environmental Assessment

TVA has prepared this environmental assessment (EA) to comply with the National Environmental Policy Act (NEPA) and associated implementing regulations. TVA considered the possible environmental effects of the proposed action and determined that potential effects to the environmental resources listed below were relevant to the decision to be made; thus, the following environmental resources are addressed in detail in this EA.

- Land Use
- Terrestrial Wildlife including Threatened and Endangered Species
- Vegetation
- Surface Water
- Cultural Resources
- Air Quality
- Noise
- Transportation
- Visual Resources
- Socioeconomics
- Environmental Justice
- Solid and Hazardous Waste

Additionally, TVA has determined that the following resources would not be affected by the proposed action:

- Floodplains – no floodplains are present within the proposed project area. Therefore, there would be no impacts to floodplains as a result of the proposed actions and this resources has not been carried forward for analysis in this EA.

- Wetlands – no wetlands are present within the proposed project area. Therefore, there would be no impacts to wetlands as a result of the proposed actions and this resources has not been carried forward for analysis in this EA.

- Aquatic Ecology – no streams or water bodies supporting aquatic ecology are present within the proposed project area, therefore, impacts to aquatic ecology associated with the proposed action would be negligible and this resource has not been carried forward for analysis in this EA.

- Prime Farmland – because both the Engineering Lab and Walnut Orchard properties are already developed federal properties, there would be no conversion of prime farmland. Therefore, this resource has not been carried forward for analysis in this EA.

- Recreation – because the proposed actions would be restricted to already developed federal property and because there are no recreational areas in the immediate vicinity of

the Engineering Lab and Walnut Orchard Complexes, there would be no impacts to recreation. Therefore, this resource has not been carried forward for analysis in this EA.

1.5 Necessary Permits or Licenses

In addition to the necessary approvals from TVA, the following permits would be required for implementation of the proposed action:

- Coverage under Tennessee General National Pollutant Discharge Elimination System [NPDES] Permit for Discharges of Stormwater Associated with Construction Activities.

- Asbestos Notification to the Tennessee Department of Environment and Conservation required 10 working days prior to renovation and demolition activities.

CHAPTER 2 - ALTERNATIVES

This chapter presents descriptions of the proposed action and its alternatives, a brief comparison of their environmental effects, and TVA's preferred alternative.

2.1 Description of Alternatives

The following are summaries for each alternative analyzed in this EA.

2.1.1 Alternative A – No Action Alternative

Under the No Action Alternative, TVA would not relocate and consolidate any operations activities. TVA would continue to operate the Walnut Orchard, Greenway Area Office, and Engineering Lab facilities with their current activities. No properties would be demolished.

2.1.2 Alternative B – Phase 1 Engineering Lab Consolidation

Under this alternative, TVA would consolidate portions of TVA operations to the Engineering Lab located in Norris, Tennessee. This alternative would include the following actions also shown on Figure 2-1:

- Maximize approximately 74,912 square feet at the Engineering Lab. Modifications at the Engineering Lab would include:
    - Interior renovations to the following buildings:
        - Minimum renovations to Buildings D, G, N, and T to address life safety and deferred maintenance (lighting and heating, ventilation, and cooling upgrades).
        - Moderate renovations to Buildings B, Q1, and Q2 would include interior wall modifications and potential replacement of stained wall/ceiling panels.
        - Major renovations to Building J would include construction of office and lab space.
        - Buildings A, H, and P would remain in their current state.
    - Installation of cameras and illuminators on the exteriors of Buildings B and D.
    - Demolition of two sheds and the necessary clearing for new construction of a new boat shed(s).
    - Demolition of Building I
    - Construction of a new boat shed or sheds in the vicinity of Building I.
    - Construction of a stormwater detention pond on the south side of the property near Buildings H and I.
    - Trenching and ground work on the south side of Building B up to the area of Building I.
    - Repaving/reconfiguring of existing parking lots.

- Tree clearing near the site entrance, between various structures, and around Building I.

- The relocation of the ITMA program, Walnut Orchard aquatic lab, the Greenway water quality lab, and associated storage space to the Engineering Lab.

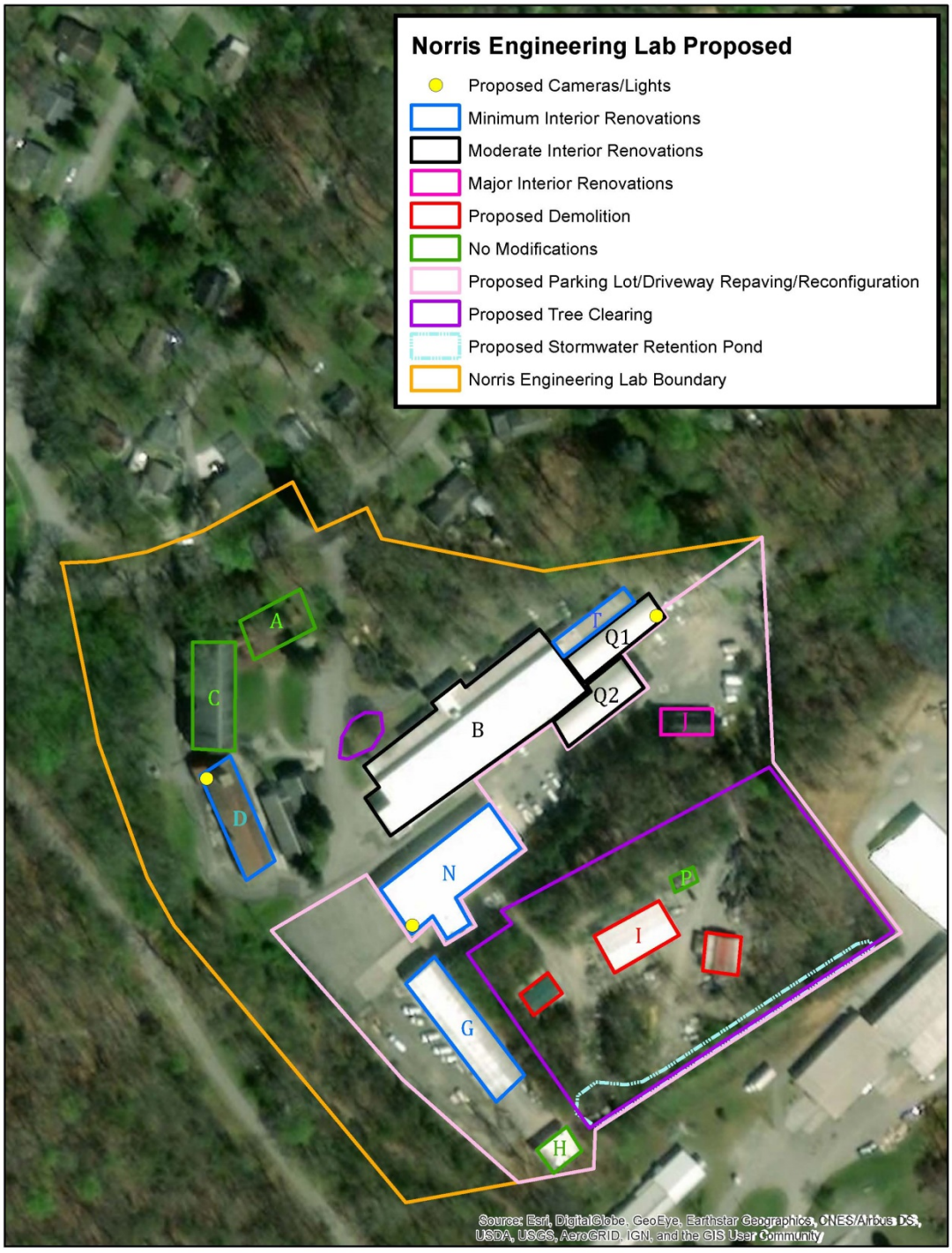

Figure 2-1. Engineering Lab Alternative B Proposed Modifications

2.1.3 Alternatives Considered and Eliminated

2.1.3.1 Alternative C – Greenway Warehouse Consolidation

TVA would consolidate at Greenway Warehouse 1) the water quality lab from Greenway; and 2) the aquatic lab from Walnut Orchard. Functions at the Engineering Lab would be dispersed to the West Tower of the TVA Knoxville Office Complex, Watts Bar Equipment Support Services, and Chickamauga Power Service Center.

After exploring the functions occurring at the Engineering Lab, this alternative was dismissed from detailed analysis. The work processes found at the Engineering Lab are not conducive to an office environment typically found in the West Tower of the Knoxville Office Complex. The expense of relocating highly specialized laboratory functions to Chickamauga Power Service Center outweighed the benefits of the move. Similarly, the potential expense of renovations to the Greenway Warehouse exceeded potential renovation expenses at the Engineering Lab.

2.1.3.2 Alternative D – New Operations Center

TVA would construct a new centralized operational center located near conjunction of Interstates 40 and 75. The Greenway Area Office, Walnut Orchard, and Engineering Lab would be vacated and functions relocated the new operational center. TVA typically experiences higher project costs associated with new construction versus renovating existing buildings and structures. In addition, TVA has a long-standing operational presence in the City of Norris, Tennessee, and this alternative would significantly reduce that presence. TVA typically favors utilization and refurbishment of existing buildings rather than new construction where cost-effective and practicable. Therefore, this alternative was also dismissed from further consideration.

2.1.4 Alternatives Summary

The alternatives identified above were evaluated based on a set of criteria including: cost, efficiency, workplace design, sustainability, environmental impacts, and meeting TVA's commitment to demonstrate financial and environmental stewardship. All of the alternatives, with the exception of the No Action Alternative, partially met the project purpose and need, Alternative B is the only alternative that has the potential to fully meet TVA's agency-wide real estate goals to reduce costs and maximize the financial return on TVA's real estate assets.

TVA has determined that from the standpoint of NEPA, there are two alternatives that will be carried forward in the EA: Alternative A – the No Action Alternative and Alternative B – Engineering Lab Consolidation, as described above. Alternatives C and D have been eliminated from further consideration for the reasons described above.

2.2 Comparison of Alternatives

The environmental impacts of the alternatives are summarized in Table 2-1. These summaries are derived from the information and analyses provided in Chapter 3.

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

Resource Area	Impacts from Alternatives*	
	A (No Action)	B (Proposed Action)
Land Use	None	None
Wildlife	None	None to Minor
Threatened and Endangered Species	None	Minor
Vegetation	None	Minor
Surface Water	None	None to Minor
Historic and Archaeological Resources	None	None
Aesthetics	None	Temporary and Minor
Air Quality	None	Temporary and Minor
Noise	None	Temporary and Minor
Transportation	None	Temporary and Minor
Socioeconomics	None	None
Environmental Justice	None	None
Solid and Hazardous Waste	None	Minor

* Impacts listed in this table are considered adverse unless otherwise noted.

2.3 Identification of Mitigation Measures

TVA would implement various best management practices (BMPs) to minimize potential environmental impacts resulting from renovation and construction activities. Additionally, tree removal would occur only between November 15 and March 31 and TVA would implement the identified conservation measures per Appendix A. TVA will track and document removal of potentially suitable summer roost trees and include in annual reporting in accordance with Section 7(a)(2) consultation.

2.4 Preferred Alternative

Alternative B, Phase 1 Engineering Lab Consolidation, has been identified as TVA's preferred alternative. A significant number of laboratory functions are already present at the Engineering Lab. The facilities at the Engineering Lab are more conducive to renovation and functional expansion than the facilities at Walnut Orchard. Additionally, operational and maintenance efforts could be reduced by consolidating functions into the Engineering Lab.

CHAPTER 3 - AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the affected environment (existing conditions of environmental resources in the project area) and the anticipated environmental consequences that would occur from adoption of the alternatives described in Chapter 2.

3.1 LAND USE

3.1.1 Affected Environment

The Engineering Lab facilities are located within City of Norris limits in Anderson County, Tennessee. The Engineering Lab is located in an area zoned for industrial uses; the parcel is owned by TVA. The site is an existing developed facility utilized for various purposes including laboratories, offices, and storage facilities. Land cover is predominantly developed with some vegetated and landscaped areas surrounding the structures.

3.1.2 Environmental Consequences

3.1.2.1 Alternative A – No Action

Under Alternative A, the No Action Alternative, TVA would not relocate any functions or people, and would not refurbish or demolish any structures. All buildings and vegetation would remain in place in their current state. Therefore, no direct or indirect impacts to land use would occur as a result of Alternative A.

3.1.2.2 Alternative B – Proposed Action

The relocation of the various programs and activities from the Walnut Orchard site would result in a change in use of the buildings, however, land use at Walnut Orchard would continue to be considered industrial as it would continue to be used for transmission work. Therefore, there would be no impact to land use at the Walnut Orchard site. At the Engineering Lab, land use would also remain unchanged. The site would continue to be used for industrial purposes. While there would be some modification at the site, the overall uses would remain unchanged, thus, there would be no impacts to land use at the Engineering Lab. Overall, there would be no impacts to land use.

3.2 WILDLIFE

3.2.1 Affected Environment

Habitat assessments for terrestrial animal species were conducted in the field on April 2, 2015, August 24, 2017, and April, 27, 2018 for the properties associated with the proposed East Region Consolidation – Norris Properties Project. Landscape features within the project action area consists of fragmented forest and disturbed areas (i.e. mowed lawn, office complex, storage facilities, and paved areas). Approximately 37 acres of forested habitat was identified and surveyed within the proposed project footprint. The entire parcel has been previously

heavily disturbed by tree removal at some point in time, mowing/bush hogging, and construction activities. Each of the varying vegetative community types offers suitable habitat for animal species common to the region, both seasonally and year-round.

Mixed deciduous-evergreen forest fragments occupy approximately 26.3 percent of the habitat within the project footprint. These forest types provide habitat for an array of common terrestrial animal species. Bird species typical of this habitat include Acadian flycatcher, chuck-will's-widow, downy and hairy woodpecker, eastern screech-owl, eastern wood-pewee, great horned owl, indigo bunting, 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. Bat species likely found within this habitat include eastern red bat, evening bat, and tricolored bat. Eastern chipmunk, gray fox, and woodland vole are other mammals likely to occur within this habitat (Kays and Wilson 2002, Whitaker 1996). Eastern black kingsnake, black ratsnake, eastern box turtle, and ring-necked snake are common reptiles of deciduous forests in this region (Conant and Collins 1998, Dorcas and Gibbons 2005, Scott and Redmond 2008).

Developed areas and areas otherwise previously disturbed by human activity (e.g. buildings, landscaping, and mowed grass) comprise the remaining 6.7 acres of the project footprint. This habitat type is home to a large number of common species. American robin, Carolina chickadee, blue jay, European starling, house sparrow, mourning dove, northern cardinal, northern mockingbird, and black and turkey vultures 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). Road-side ditches provide potential habitat for amphibians including American toad, upland chorus frog, and spring peeper. Reptiles potentially present include gray rat snake and mole kingsnake (Conant and Collins 1998, Dorcas and Gibbons 2005).

Review of the TVA Regional Natural Heritage database in August 2017 indicated five caves have been documented within three miles of the project area. No additional caves were identified during field review of the project footprints on April 2, 2015, August 24, 2017, and April, 27, 2018. No other unique or important terrestrial habitats were identified within the project area. In addition, proposed actions are approximately 1.07 miles away from Norris Dam State Park and 1.5 miles from Norris Dam Cave, a known gray bat maternity roost.

Migratory birds may utilize forests and landscaping within the project action area. According to the US Fish and Wildlife Information for Planning and Consultation (USFWS IPaC https://ecos.fws.gov/ipac/; September 2017) birds of conservation concern in found in this region include black-billed cuckoo (*Coccyzus erythropthalmus*), bobolink (*Dolichonyx oryzivorus*), cerulean warbler (*Dendroica cerulean*), eastern whip-poor-will (*Caprimulgus vociferus*), golden-winged warbler (*Vermivora chrysoptera*), Henslow's sparrow (*Ammodramus henslowii*), Kentucky warbler (*Oporornis formosus*), prairie warbler (*Dendroica discolor*), red crossbill (*Loxia curvirostra*), red-headed woodpecker (*Melanerpes erythrocephalus*), rusty

blackbird (*Euphagus carolinus*), wood thrush (*Hylocichla mustelina*), and yellow-bellied sapsucker (*Sphyrapicus varius*). Of these migratory birds of conservation concern, black-billed cuckoo, eastern whip-poor-will, golden-winged warbler, prairie warbler, red cross-bill, red-headed woodpecker, rusty blackbird, wood thrush, and yellow-bellied sapsucker may use these forested areas.

3.2.2 Environmental Consequences

3.2.2.1 Alternative A – No Action

Under Alternative A, the No Action Alternative, TVA would not relocate, refurbish, or demolish facilities, and forested areas would not be impacted. All buildings and vegetation would remain in place in their current state. No direct, indirect, or cumulative impacts to wildlife would occur as a result of Alternative A.

3.2.2.2 Alternative B – Proposed Action

Under Action Alternative B, TVA would demolish or refurbish buildings at the Engineering Lab and some or all of the 3.2 acres of fragmented forest and adjacent landscaping would be impacted. Both forested and herbaceous vegetation that may provide habitat for common wildlife species would be removed in association with the proposed actions.

Vegetation removal would occur on some or all of the early successional, herbaceous habitat (lawn) and planted trees. Any wildlife (primarily common, habituated species) currently using these heavily disturbed areas may be displaced by increased levels of disturbance during construction actions, but it is expected that they would return to the project area upon completion of actions and landscaping.

Clearing of approximately 2.8 acres of forested habitat would take place as part of the proposed actions. Building demolition would also occur. Wildlife may utilize these forested areas and buildings for nesting and foraging. Direct effects to some individuals that are immobile during the time of construction may occur, particularly if construction activities transpire during breeding/nesting seasons. However, the actions are not likely to affect populations of species common to the area, as proposed impacts occur over a relatively small area and similarly forested and building habitat exists in the surrounding landscape.

Demolition and renovation-associated disturbances and habitat removal would disperse wildlife into surrounding areas in an attempt to find new food and shelter sources and to reestablish territories, potentially resulting in added stress or energy use to these individuals. All of the forested area within the project footprint has been previously disturbed by human activity and the area is frequently impacted by loud machinery used on site, as was observed during field surveys. These previously disturbed areas likely provide corridors for animal dispersal to adjacent forested areas. Due to the high level of disturbance, the quality of nesting/denning habitat in these areas is low for any sensitive species.

Black-billed cuckoo, eastern whip-poor-will, golden-winged warbler, prairie warbler, red cross-bill, red-headed woodpecker, rusty blackbird, wood thrush, and yellow-bellied sapsucker may use the forested areas in the action area for foraging or nesting. Should vegetation removal occur during the nesting seasons of these birds, direct impacts to individuals may occur to some individuals that may be immobile at that time (i.e. nestlings or eggs). Removal of this vegetation also would remove foraging and future nesting sites for individuals utilizing the area. Similarly suitable habitat is prevalent across the landscape immediately surrounding the proposed action area. The small area of the proposed actions has lead TVA biologists to determine that the proposed actions would not impact populations of migratory birds of conservation concern.

3.3 VEGETATION

3.3.1 Affected Environment

Vegetation within the action area consists of heavily disturbed herbaceous habitats (lawns), isolated trees, and fragmented woodlots. The habitats within the action area are common throughout the region and possess no conservation value. Vegetated areas are surrounded by development and contain a large coverage of invasive plant species.

3.3.2 Environmental Consequences

3.3.2.1 Alternative A – No Action

Under Alternative A, the No Action Alternative, TVA would not relocate, sell, or demolish facilities, and forested areas would not be impacted. All buildings and vegetation would remain in place in their current state. No direct, indirect, or cumulative impacts to vegetation would occur as a result of adopting Alternative A.

3.3.2.2 Alternative B – Proposed Action

Under Action Alternative B, some or all of the 3.2 acres of fragmented forest and adjacent landscaping would be impacted. However all plants habitats present on-site are common and well represented throughout the region and possess no conservation value. Adoption of Alternative B would have no impact on the vegetation of the region.

3.4 THREATENED AND ENDANGERED SPECIES

3.4.1 Affected Environment

3.4.1.1 Threatened and Endangered Wildlife

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

and Wildlife Service (USFWS) when proposed actions may affect endangered or threatened species or Designated Critical Habitat.

A review of the terrestrial animal species in the TVA Regional Heritage database in August 2017 result in records for four state-listed (eastern small-footed bat, hellbender, smoky shrew, and southeastern shrew) and three federally listed species (gray bat, Indiana bat, and northern long-eared bat) within three miles of the project footprint (Table 3.4-1).

Table 3.4-1. Federally listed terrestrial animal species reported from Anderson County, Tennessee and other species of conservation concern documented within three miles of the project area[1]

Common Name	Scientific Name	Status[2]	
		Federal	State (Rank[3])
Amphibians			
Hellbender	*Cryptobranchus alleganiensis*	PS	D(S3)
Mammals			
Eastern small-footed bat	*Myotis leibii*	--	D(S2S3)
Gray bat	*Myotis grisescens*	LE	E(S2)
Indiana bat	*Myotis sodalis*	LE	E(S1)
Northern long-eared bat	*Myotis septentrionalis*	LT	-(S1S2)
Smoky shrew	*Sorex fumeus*	--	D(S4)
Southeastern shrew	*Sorex longirostris*	--	D(S4)

[1] Source: TVA Regional Natural Heritage Database, extracted 8/31/2017; USFWS Information for Planning and Conservation (IPaC) resource list (https://ecos.fws.gov/ipac/), accessed 8/31/2017.
[2] Status Codes: D = Deemed in Need of Management; E or LE = Endangered; T = Listed Threatened; PS = Partial Status.
[3] State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Rare; S4 = Apparently Secure.

Hellbender favor larger, fast-flowing, streams and rivers with large shelter rocks. Eggs are laid in depressions created beneath large rocks or submerged logs (Petranka 1998). The nearest known hellbender record occurs approximately 1.4 miles from the project footprint and is a historical record. There are no water bodies within the project footprint capable of supporting hellbenders.

Smoky shrews are found in a variety of forested habitats though they are most abundant in damp coniferous and deciduous forested habitat with suitable soil for borrowing, fallen trees, and standing hollow trees. They nest beneath stumps, rotted logs, and rocks (NatureServe 2017). The nearest known smoky shrew record is approximately 0.8 miles from the action area. Marginally suitable habitat exists in forested areas of the project action area for smoky shrew.

Southeastern shrews are found in a variety of habitats including bogs and wetlands, grasslands and old fields, and lowland and upland forest. This species prefers moist to wet areas bordering riparian zones with heavy ground cover (NatureServe 2017). The nearest southeastern shrew

record is a historic collection from approximately 0.8 miles outside of the action area. Marginally suitable habitat exists in forested areas of the project footprint for this species.

Eastern small-footed bats inhabit caves and mines during winter. In summer they migrate to roost in rocky outcrops, talus slopes, and beneath exfoliating tree bark, in hollow trees, and in buildings and bridges. This species forages over ponds and streams, as well as in riparian forests, uplands forests, clearings, and ridgetops (Harvey et al 2011, NatureServe 2017). The nearest eastern small-footed bat record was documented approximately 1.5 miles from the action area. Foraging habitat and summer roosting habitat for eastern small-footed bat exists throughout the project footprint in forest fragments at the Norris Engineering Lab. Suitable bat roosting habitat was not observed at buildings proposed for demolition (Building I and the two sheds the Engineering Lab).

Gray bats roost in caves year-round and migrate between summer and winter roosts during spring and fall (Brady et al. 1982, Tuttle 1976). Although they to prefer caves, gray bats have been documented roosting in large numbers in buildings (Gunier and Elder 1971). Bats disperse over bodies of water at dusk where they forage for insects emerging from the surface of the water (Harvey 1992). The closest gray bat record is known from a cave approximately 1.5 miles from the project footprint. This cave is a known maternity roost for this species and is listed as a Priority 2 Maternity Cave in the USFWS Gray Bat Recovery Plan. Four additional caves are known within three miles of the project footprint. No additional caves were observed during field reviews in April 2015, August 2017, and April 2018. Foraging habitat for gray bat is not present within the project footprint. Suitable bat roosting habitat was not observed at buildings proposed for demolition (Building I and the two sheds at the Engineering Lab).

Indiana bats hibernate in caves in winter and use areas around them in fall and spring (for swarming and staging), prior to migration back to summer habitat. During the summer, Indiana bats roost under the exfoliating bark of dead and living trees in mature forests with an open understory, often near sources of water. Indiana bats are known to change roost trees frequently throughout the season, yet still maintain site fidelity, returning to the same summer roosting areas in subsequent years. This species forages over forest canopies, along forest edges and tree lines, and occasionally over bodies of water (Pruitt and TeWinkel 2007, Kurta et al. 2002, USFWS 2017). Although less common, Indiana bats have also been documented roosting in buildings (Butchkoski and Hassinger 2002). The nearest known record of Indiana bat is a historical record from a hibernaculum approximately 1.5 miles from the action area. Indiana bats have not been reported from this cave since 1976 despite frequent surveys. As mentioned above, four additional caves have been documented within three miles of the project area. No additional caves were observed during field surveys in April 2015, August 2017, and April 2018. Foraging habitat for Indiana bat exists throughout the project footprint over forest fragments and fence rows at the Norris Engineering Lab. Suitable summer roosting habitat for Indiana bat exists throughout forested areas of the project footprint at the Norris Engineering Lab. Suitable bat roosting habitat was not observed at buildings proposed for demolition (Building I and the two sheds at the Engineering Lab).

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 that of Indiana bat, however northern long-eared bats are thought to be more opportunistic in roost site selection. This species also roosts in abandoned buildings and under bridges. Northern long-eared bats emerge at dusk to forage below the canopy of mature forests on hillsides and roads, and occasionally over forest clearings and along riparian areas (USFWS 2014). Northern long-eared bat records are known from a hibernaculum approximately 1.5 miles from the project footprint. Four additional caves have been documented within three miles of the project. Foraging habitat exists throughout the proposed project area in forest fragments and along fence rows at the Norris Engineering Lab. Suitable summer roosting habitat for northern long-eared bat exists throughout forested areas of the project footprint at the Norris Engineering Lab. Suitable bat roosting habitat was not observed at buildings proposed for demolition (Building I and the two sheds at the Engineering Lab).

Assessment of the project area for presence of Indiana bat and northern long-eared bat summer roosting habitat followed 2017 and 2018 federal guidance and resulted in the identification of suitable roost trees scattered throughout the action area at the Norris Engineering Lab (USFWS 2017). Habitat quality ranged from moderate to high based on the presence of trees with exfoliating bark open forest understory, solar exposure, and proximity to water. Suitable summer roosting areas were comprised of mixed age, mixed deciduous-evergreen stands dominated by boxelder, eastern red cedar, post oak, red maple, slippery elm, and Virginia pine. Approximately 2.8 acres of suitable summer roosting habitat is proposed for removal at this time.

3.4.1.2 Threatened and Endangered Vegetation

An October 2018 review of the TVA Natural Heritage Database indicated that nine state-listed and no federally listed plants have been documented from within a five mile vicinity of the project area (Table 3.4-2). No federally listed plants are known to occur in Anderson County, Tennessee. All areas within the project area are heavily disturbed and contain no habitats capable of supporting listed species.

Table 3.4-2. State and federally listed plant species previously documented from within a 5 mile vicinity of the East Region Consolidation – Norris Properties project area.[1]

Common Name	Scientific Name	Federal Status[2]	State Status[2]	State Rank[3]
Spreading False-foxglove	*Aureolaria patula*	-	S	S3
Tall Larkspur	*Delphinium exaltatum*	-	E	S2
Northern Bush-honeysuckle	*Diervilla lonicera*	-	T	S2
Butternut	*Juglans cinerea*	-	T	S3
Meehania Mint	*Meehania cordata*	-	T	S2
American ginseng	*Panax quinquefolius*	-	S-CE	S3S4
Large-leaved Grass-of-parnassus	*Parnassia grandifolia*	-	S	S3
Sullivantia	*Sullivantia sullivantii*	-	E	S1
Northern White Cedar	*Thuja occidentalis*	-	S	S3

[1] Source: TVA Natural Heritage Database, queried in October 2018.
[2] Status Codes: E = Listed Endangered; S = Listed Special Concern; S-CE = Listed Special Concern/ Commercially Exploited; T = Listed Threatened.
[3] State Ranks: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; S4 = Apparently secure S#S# = Denotes a range of ranks because the exact rarity of the element is uncertain (e.g., S1S2)

3.4.2 Environmental Consequences

3.4.2.1 Alternative A – No Action

Under Alternative A, the No Action Alternative, TVA would not relocate, refurbish, or demolish facilities, and forested areas would not be impacted. All buildings and vegetation would remain in place in their current state. No direct, indirect, or cumulative impacts to threatened or endangered terrestrial species would occur as a result of proposed actions. No direct, indirect, or cumulative impacts to state or federally plants would occur with adoption of Alternative A because no such species are present in the action area.

3.4.2.2 Alternative B – Proposed Action

Wildlife

Under Action Alternative B, TVA would demolish or refurbish buildings at the Engineering Lab and some or all of the 3.2 acres of fragmented forest and adjacent landscaping would be impacted. Forested and herbaceous vegetation and buildings that may provide habitat for threatened or endangered terrestrial animal species would be removed in association with the proposed actions.

Four state-listed (eastern small-footed bat, hellbender, smoky shrew, and southeastern shrew) and three federally listed species (gray bat, Indiana bat, and northern long-eared bat) have been documented within three miles of the project footprint. Of these, six species have the potential to

utilize the project area. Habitat for hellbender does not exist within the project footprint. Hellbenders would not be impacted by the proposed actions.

Moderately suitable habitat may exist in the 3.2 acres of forested habitat within the project footprint for smoky shrew and southeastern shrew. However, preferred habitat features (moist areas, heavy ground cover, fallen logs, and large rocks) were almost entirely absent in the action area. Therefore nesting is less likely to occur in the areas proposed to be impacted, though foraging in these areas is still possible. Direct effects to some individuals may occur, though those individuals foraging in the areas are expected to flee when disturbed. Proposed actions are not likely to affect populations of either shrew species. Populations of smoky shrew and southeastern shrew would not be impacted by the proposed project activities.

Suitable winter roosting habitat for eastern small-footed bat, gray bat, Indiana bat, and northern long-eared bat does not occur in the action area. Five caves are known within three miles of the project footprint, however, the nearest of these occurs approximately 1.5 miles outside of the project footprint and would not be impacted by the proposed activities.

Buildings slated for demolition were surveyed for evidence of suitable roosting characteristics or evidence of bat use. Building I and the two sheds at Norris Engineering Lab do not offer suitable roosting habitat for bats nor was any evidence of bat use observed.

Suitable forested foraging habitat exists along fence rows and within forests for eastern small-footed bat, Indiana bat, and northern long-eared bat within the action area. This habitat would be removed in association with the proposed actions, however, the forested acreage slated for removal is minimal (2.8 acres) and an abundance of similarly suitable foraging habitat exists on the landscape surrounding the project footprint. Suitable gray bat foraging habitat does not occur within the project footprint.

Approximately 2.8 acres were identified or assumed as suitable for summer roosting eastern small-footed bats, Indiana bats, and northern long-eared bats and may be removed for the proposed project. The area was determined to have low to moderate habitat suitability based on the number of trees with exfoliating bark (snags and live trees) their proximity to water sources and amount of solar exposure they receive. Large hollow trees, rock outcrops, and bridges suitable for maternity roosting eastern small-footed bats were not present in the project action area. Tree removal is proposed between November 15 and March 31 when these bat species are unlikely to be roosting in trees on the landscape. Therefore no direct effects to individuals of these bat species would occur. Proposed actions are not expected to impact populations of eastern small-footed bats.

The proposed action includes removal of approximately 2.8 acres of forest. As part of TVA's Endangered Species Act programmatic biological assessment for bats, TVA programmatically quantified and minimized removal of potentially suitable summer roosting habitat during time of potential occupancy by Indiana bat and northern long-eared bat. The project area occurs within 5 miles of a documented northern long-eared bat hibernacula and within 10 miles of a documented Indiana bat hibernacula. Accordingly, TVA will track and document removal of

potentially suitable summer roost trees and include in annual reporting in accordance with Section 7(a)(2) consultation. Additionally, if removal of suitable bat roost tree habitat needs to be removed when bats may be present on the landscape, TVA would set aside funding to be applied towards future bat-specific conservation projects. TVA currently plans to conduct tree removal between November 15 and March 31, when neither Indiana nor northern long-eared bats would be roosting on the landscape. Tree removal during this timeframe also ensures no tree removal would occur between June 1 and July 31 to avoid any potential direct impact to juvenile bats at a time when they are unable to fly.

A number of activities associated with the proposed action, including tree clearing, were addressed in TVA's programmatic biological assessment on routine actions and federally listed bats in accordance with Endangered Species Act Section 7(a)(2) (TVA 2017). For those activities with potential to affect bats, TVA committed to implementing specific conservation measures. No direct effects to federally listed bat species are anticipated and indirect effects to federally-listed bat species are expected to be minor. These activities and associated conservation measures are identified in TVA's Bat Strategy Project Screening Form (Appendix A).

Vegetation

Under Action Alternative B, some or all of the 2.4 acres of fragmented forest and adjacent landscaping would be impacted. No direct, indirect, or cumulative impacts to state or federally plants would occur with adoption of Alternative B because no such species are present in the action area.

3.5 SURFACE WATER

3.5.1 Affected Environment

This project area is located in Anderson County, Tennessee and drains to water ways within the (8-digit Hydrological Unit Code [HUC] 06010207) Lower Clinch River watershed. The surface water streams in the vicinity of this project are listed below in Table 3.5-1. No streams or other surface water bodies are present within the project boundary.

Precipitation in the general area of the proposed project averages about 54.12 inches per year. The wettest month is December with approximately 5.3 inches of precipitation, and the driest month is October with 2.91 inches. The average annual air temperature is 55.85 degrees Fahrenheit, ranging from a monthly average of 43.9 degrees Fahrenheit to 67.8 degrees Fahrenheit (U.S. Climate Data 2016). Stream flow varies with rainfall and averages about 24.75 inches of runoff per year, i.e., approximately 1.82 cubic feet per second, per square mile of drainage area (United States Geological Survey 2008).

The federal Clean Water Act requires all states to identify all waters where required pollution controls are not sufficient to attain or maintain applicable water quality standards and to establish priorities for the development of limits based on the severity of the pollution and the sensitivity of the established uses of those waters. States are required to submit reports to the

EPA. The term "303(d) list" refers to the list of impaired and threatened streams and water bodies identified by the state. The Clinch River in the vicinity of the project is currently listed on Tennessee's 303(d) list for temperature and flow alterations, due to upstream impoundment. (Tennessee Department of Environment and Conservation [TDEC] 2016). The Lower Clinch River in the vicinity of the project is also listed an Exceptional Waters of Tennessee. Buffalo Creek in the vicinity of the Engineering Lab Complex is also listed on the 303(d) list for Nitrate + Nitrite, Total Phosphorus and E coli impairment, due to municipal point source and pasture grazing. There is an EPA approved pathogen total maximum daily load (TMDL) that address the pathogen pollutant. Table 3.1 provides a listing of local streams with their state (TDEC 2013) designated uses.

Table 3.5-1. Designations for Streams in the Vicinity of the Proposed Project Area

Stream	Use Classification[1]							
	NAV	DOM	IWS	FAL	REC	LWW	IRR	TS
Clinch River[2]		X	X	X	X	X	X	X
Unnamed Tributary of Clinch River[2]			X	X	X	X		
Buffalo Creek[2]			X	X	X	X		

[1] Codes: DOM = Domestic Water Supply; IWS = Industrial Water Supply; FAL = Fish and Aquatic Life; REC = Recreation; LWW = Livestock Watering and Wildlife; IRR = Irrigation, NAV = Navigation, TS = Trout Stream
[2] Not in project area, shown for flow network.

3.5.2 Environmental Consequences

3.5.2.1 Alternative A – No Action

Under the No Action Alternative, no buildings would be demolished or built; therefore, no environmental impacts to surface water would occur. However, if the buildings should not be maintained then long term impact to surface water from solid waste and erosion of soils could occur should the buildings deteriorate over time.

3.5.2.2 Alternative B – Proposed Action

Construction/Demolition Impacts

Surface Runoff - Demolition and construction activities have the potential to temporarily affect surface water via storm water runoff. Soil erosion and sedimentation can clog small streams and threaten aquatic life. TVA would comply with all appropriate state and federal permit requirements. Appropriate BMPs would be followed, and all proposed project activities would be conducted in a manner to ensure that waste materials are contained, and the introduction of pollution materials to the receiving waters would be minimized. A general construction storm water permit would be needed because more than one acre is disturbed. This permit also requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). Because this project is in the vicinity of either impaired or exceptional waters, additional protective measures may be required, such as expanded buffer zones. Refer to the TDEC General Construction Storm Water permit (TDEC 2016b) for details. The SWPPP would identify specific BMPs to address construction-related activities that would be adopted to minimize storm water impacts. The Tennessee Erosion and Sediment Control Handbook

(TDEC 2012) would be used to avoid contamination of surface water in the project area. Proper implementation of these controls is expected to result in only minor temporary impacts to surface waters.

Additionally, impervious buildings and infrastructure prevent rain from percolating through the soil and result in additional runoff of water and pollutants into storm drains, ditches, and streams. The proposed development of the Engineering Lab site would appear to not change impervious surface area significantly. To help facilitate any concentrated storm water flows a storm water detention basin would be constructed south of Building I. This pond would be less than one-quarter of a surface acre in size. Storm water flows would continue to follow existing drainage for the site, however would have this added treatment to help prevent discharges of sediment. Any future development would need proper treatment with either implementation of the proper BMPs or to engineer a discharge drainage system that could handle any increased flows prior to discharge into the outfall(s).

Domestic Sewage - Portable toilets would be provided for the construction workforce as needed. These toilets would be pumped out regularly and the sewage would be transported by tanker truck to a publicly-owned wastewater treatment works that accepts pump out. However, the facility would be expected to have restroom facilities added to accommodate the staff of the finished facility. Depending on if public sewer services are available, this waste would either be handled by a septic tank and drainage field lines or would be discharged and handled by a local publicly owned treatment works. The type and size of the system implemented would determine the type of permits required for engineering, construction and maintenance of this septic system.

Equipment Washing and Dust Control – Equipment washing and dust control discharges would be handled in accordance with BMPs described in the Storm Water Pollution Prevention Plan for water-only cleaning.

Operational Impacts

Operational impacts to surface waters should be minor during operation of the proposed constructed/renovated Engineering Lab facility. More staff would be on-site which could increase septic output, solid wastes and even the potential for automobile leakage to be released to surface water stream. There would be a potential for contaminated runoff to reach storm drains and thus, nearby waterbodies, however, with good housekeeping practices and BMP placement, these potential releases should be negligible. This facility should also ensure that all chemicals handled are properly contained, covered and disposed of, so that they are not at risk of entering surface waters.

3.6 HISTORIC AND ARCHAEOLOGICAL RESOURCES

3.6.1 Affected Environment

Federal agencies are required by the National Historic Preservation Act (NHPA) and by the NEPA to consider the possible effects of their undertakings on historic properties. The term

"undertaking" means any project, activity, or program that is funded under the direct or indirect jurisdiction of a federal agency or is licensed, permitted, or assisted by a federal agency. An agency may fulfill its statutory obligations under NEPA by following the process outlined in the regulations implementing

Section 106 of NHPA, at 36 Code of Federal Regulations (CFR) Part 800. Under these regulations, considering an undertaking's possible effects on historic properties is accomplished through a four-step review process: (1) initiation (defining the undertaking and the area of potential effects (APE), and identifying the consulting parties); (2) identification (studies to determine whether cultural resources are present in the APE and whether they qualify as historic properties); (3) assessment of adverse effects (determining whether the undertaking would damage the qualities that make the property eligible for the National Register of Historic Places [NRHP]); and (4) resolution of adverse effects (by avoidance, minimization, or mitigation). Throughout the process the agency must consult with the appropriate State Historic Preservation Officer (SHPO), federally-recognized Indian tribes that have an interest in the undertaking, and any other party with a vested interest in the undertaking.

Cultural resources include prehistoric and historic archaeological sites, districts, buildings, structures, and objects, and locations of important historic events that lack material evidence of those events. Cultural resources that are included or considered eligible for inclusion in the NRHP maintained by the National Park Service are called historic properties. To be included or considered eligible for inclusion in the NRHP, a cultural resource must possess integrity of location, design, setting, materials, workmanship, feeling, and association. In addition, it must also meet one of four criteria: (a) association with important historical events; (b) association with the lives of significant historic persons; (c) having distinctive characteristics of a type, period, or method of construction, or representing the work of a master, or having high artistic value; or (d) having yielded or having the potential to yield information important in history or prehistory.

An undertaking may have effects on a historic property that are not adverse, if those effects do not diminish the qualities of the property that identify it as eligible for listing on the NRHP. However, if the agency determines (in consultation) that the undertaking's effect on a historic property within the APE would diminish any of the qualities that make the property eligible for the NRHP (based on the criteria for evaluation at 36 CFR 60.4), the effect is said to be adverse. Examples of adverse effects would be ground disturbing activity in an archaeological site, or erecting structures within the viewshed of a historic building in such a way as to diminish the structure's integrity of feeling or setting. Federal agencies are required to resolve the adverse effects of their undertakings on historic properties. Resolution may consist of avoidance (such as choosing a project alternative that does not result in adverse effects), minimization (such as redesign to lessen the effects), or mitigation. Adverse effects to archaeological sites are typically mitigated by means of excavation to recover the important scientific information contained within the site. Mitigation of adverse effects to historic structures sometimes involves thorough documentation of the structure by compiling historic records, studies, and photographs. Agencies are required to consult with SHPOs, tribes, and others throughout the Section 106 process and to document adverse effects to historic properties resulting from agency undertakings.

3.6.1.1 Area of Potential Effects

The APE is the geographic area or areas within which the proposed undertaking may directly or indirectly cause changes in the character or use of historic properties, if such properties exist. The APE for the East Region Consolidation undertaking includes 14 buildings and structures, designated as Buildings A, B, C, D, F, G, H, I, J, N, P, Q1, Q2, T, a modern boat shed, and the immediate vicinity surrounding the boat shed.

3.6.1.2 Historical Background

East Tennessee has been an area of human occupation for the last 12,000 years. This includes five broad cultural periods: Paleo-Indian (11,000-8,000 BC), Archaic (8000-1600 BC), Woodland (1600 BC-AD 1000), Mississippian (AD 1000-1700), and Historic (AD 1700- to present). Prehistoric land use and settlement patterns vary during each period, but short- and long-term habitation sites are generally located on flood plains and alluvial terraces along rivers and tributaries. Specialized campsites tend to be located on older alluvial terraces and in the uplands. In East Tennessee, during the 17th and 18th centuries, Europeans and Native Americans began interacting through the fur trading industry. Euro-American settlement increased in the early 19th century as the Cherokee were forced to give up their land. Anderson County was established in 1801 from parts of Knox and Grainger Counties. As with most of East Tennessee in the early 19th century, agriculture/subsistence farming was the primary way of life. The coal mining industry came to county by the 1830's and by the mid-19th century with the influx of the railroad system coal mining was the county's largest industry. In 1933, President Franklin Delano Roosevelt signed into law the TVA Act, and shortly afterwards construction began on the first hydro-electric dam, Norris Dam, and the planned community of Norris. The creation of TVA brought electricity, jobs, flood control, and recreation to the region (Mielnik 2017) and remains an integral part of the county today.

Construction of TVA's Norris Engineering Labs complex began in the early 1930's and was TVA's primary civil and mechanical engineering research programs facility from ca. 1935 to ca. 1968 (Karpynec et al 2015). The town of Norris was listed on the National Register of Historical Places (NRHP) as a historic district in 1975 (Harper) and according to the Tennessee Historical Commission Building A (formerly TVA ceramics lab) is listed on the NRHP as a contributing resource to the Norris Historic District (Harper 1975). According to the Tennessee Historical Commission, all buildings constructed within the town of Norris during the 1930s and 1940s and located within the NRHP boundary are considered contributing resources to the district.

3.6.1.3 Previous Surveys

Four previous cultural resources surveys have been conducted within the APE. In 2003 Sam Smith of the Tennessee Division of Archaeology recorded TVA's ceramic lab (Building A) as archaeological site 40AN218 during research on Tennessee Potters and Potteries (Smith and Rogers 2013). The site form does not list any determinations on the eligibility of the archaeology site.

In 2015, Tennessee Valley Archaeological Research (TVAR) conducted an architectural assessment of the Norris Engineering Labs complex (Karpynec et al 2015) and made recommendations that the TVA Norris Engineering Labs complex eligible for the NRHP under Criterion C as a historic district, with contributing resources to include Buildings A, B, C, D, G, I, Q1, Q2, and T. In addition, TVA recommended that Buildings A, B, and D were individually eligible for the NRHP under Criterion A. TVA recommended that Buildings F, H, J, N, P, and the modern boat shed were individually ineligible for listing on the NRHP.

In June 2018, TVA reassessed and reconsulted with the SHPO on Building I. It was previously recorded a steel-frame warehouse building constructed in approximately 1988; however, due to a typographical error, it was listed in a table as being a contributing resource in previous consultation. In addition to being constructed after the laboratory's period of significance, the building is not in its original location. According to laboratory staff, the building was originally constructed at one of TVA's hydroelectric plants, disassembled, and reassembled on site in the late 1980s. Each of the metal panels on the north, south, and east elevations feature numbers to indicate location for assembly after relocation. Given that a typographical error led to it being determined a contributing resource and that it was moved from another location and reassembled at the laboratory after the period of significance of the NRHP-eligible district, TVA finds Building I is not a contributing building and therefore, its demolition would not result in an adverse effect. Furthermore, TVA plans to reassess the entire district for NRHP eligibility and contributing status prior to any additional projects at the laboratory beyond this current scope. In December 2018, the SHPO concurred that Building I is a non-contributing structure.

In 2018, Thomason and Associates conducted a reassessment of the contributing status of Building B in the NRHP eligible Norris Engineering Labs historic district. Thomason recommended that Building B has a loss of overall integrity based on the considerable alterations to the interior and exterior. TVA requested that a reevaluation of Building B's contribution the Norris Engineering Labs complex be considered. The SHPO reviewer disagreed that the changes would impact eligibility of Building B; thus, it remains eligible for listing in the NRHP as a contributing element of the NRHP-eligible Norris Engineering Labs historic district.

In May of 2018, TVA Cultural Compliance staff conducted a reconnaissance survey of the proposed new boat shed and area designated as potential for demolition and ground disturbance and did not identify any archaeological resources within the APE.

3.6.2 Environmental Consequences

3.6.2.1 Alternative A – No Action

Under the No Action Alternative, no buildings would be demolished or built, therefore, there would be no effects to historic properties. However, if the buildings should not be maintained then long term they could deteriorate which could affect the integrity of the historic district as well as the individually eligible structures.

3.6.2.2 Alternative B – Proposed Action

The entire APE has been surveyed for both archaeological and architectural resources. Under the proposed action, the three structures individually eligible for the NRHP would experience no to moderate renovations. The proposed renovations would not affect the eligibility of the structures. There would be no changes to Building A, moderate renovations to the interior of Building B (including wall modifications and replacement of wall and/or ceiling panels), and minimum renovations to Building D (to address life safety and deferred maintenance to lighting, heating, ventilation, and cooling systems). With regard to the historic district, the proposed renovations are largely to the interiors of structures as described in Subsection 2.1.2. These renovations and the construction of a modern boat shed would not affect the integrity of the historic district. In November 2018, TVA consulted with the SHPO regarding the proposed actions including the demolition of the non-contributing structures Building I and the existing boat sheds and the construction of a new boat shed(s) in the same vicinity. In December 2018, the SHPO concurred that the proposed actions would not have a significant effect on historic properties. As described in Subsection 3.5.1, no archaeological resources have been identified in the areas where ground disturbance would occur. Therefore, TVA, in consultation with the Tennessee SHPO, has determined that the proposed Norris Consolidation would not affect any historic properties included in or eligible for inclusion in the NRHP.

3.7 AESTHETICS

3.7.1 Affected Environment

The Engineering Lab is located within the City of Norris, Tennessee approximately 1.5 miles from the intersection of U.S. Highways 61 and 441 (Figure 1). The Engineering Lab is located in a heavily wooded area adjacent to a residential area. Commercial properties are located to the south of the Engineering Lab closer to U.S. Highway 61. Screened by trees, the Engineering Lab is not highly visible to any structures in the surrounding vicinity. It is possible that one or two of the closest residential properties may have a partial view of the Engineering Lab.

3.7.2 Environmental Consequences

3.7.2.1 Alternative A – No Action

Under the No Action Alternative, no buildings would be demolished or built, therefore, there would be no changes to the existing viewshed. However, if the buildings should not be maintained then long term they could deteriorate which could affect the appearance of the structures. Because of the surrounding vegetation, the structures are not highly visible to the surrounding vicinity, therefore, any potential impacts to aesthetics would be minor and confined primarily to the site itself.

3.7.2.2 Alternative B – Proposed Action

Visual impacts associated with the proposed action would include minor, temporary impacts associated with the presence of construction equipment and vehicles during the construction period and long-term changes to the viewshed associated with the construction of the new boat

shed. Given the presence of screening vegetation, both construction impacts and the viewshed changes associated with the boat shed would be primarily limited to the site itself. The closest residential properties may notice construction equipment during the construction period. The other changes, including construction of the boat shed, would likely not be visible to these residential neighbors. Therefore, overall, impacts to aesthetics would be minor.

3.8 AIR QUALITY

3.8.1 Affected Environment

Ambient air quality is determined by the type and amount (concentration) of pollutants emitted into the atmosphere, the size and topography of the air basin in question, and the prevailing meteorological conditions in that air basin. Through its passage of the Clean Air Act of 1970 (CAA) and its amendments, Congress has mandated the protection and enhancement of our nation's air quality. The EPA has established the National Ambient Air Quality Standards (NAAQS) for the following criteria pollutants to protect the public health and welfare: sulfur dioxide (SO_2), ozone (O_3), nitrogen dioxide (NO_2), particulate matter whose particles are less than or equal to 10 micrometers (PM_{10}), particulate matter whose particles are less than or equal to 2.5 micrometers ($PM_{2.5}$), carbon monoxide (CO), and lead (Pb).

The primary NAAQS were promulgated to protect public health, and the secondary NAAQS were promulgated to protect public welfare (e.g., visibility, crops, forests, soils and materials) from any known or anticipated adverse effects of air pollutants. Areas in compliance with the NAAQS are designated "attainment" areas. Areas in violation of the NAAQS are designated as "nonattainment" areas, and new sources being located in or near these areas may be subject to more stringent air permitting requirements. Nonattainment areas are usually defined by county. National standards, other than annual standards, are not to be exceeded more than once per year (except where noted). Areas that cannot be classified on the basis of available information for a particular pollutant are designated as "unclassifiable" and are treated as attainment areas unless proven otherwise (USEPA 2016). Anderson County is in attainment with the National Ambient Air Quality Standards for criteria pollutants established under the Clean Air Act.

3.8.2 Environmental Consequences

3.8.2.1 Alternative A – No Action

Under the No Action Alternative, no buildings would be demolished or built, therefore, there would be no changes to the existing air quality. However, if the buildings should not be maintained then long term they could deteriorate which could mobilize dust and particulates. Such impacts to air quality would be negligible and therefore, no impacts would be anticipated as a result of the no action alternative.

3.8.2.2 Alternative B – Proposed Action

The primary mechanisms for causing potential effects to local air quality considered in this assessment are the construction activities associated with demolition and clearing of two sheds and vegetation, mobilization of dust associated with movement of vehicles and ground-

disturbing activities, and the interior construction activities within existing structures. All activities generate fugitive dust, which is commonly measured by the size of particulate matter. Likewise, exhaust from internal combustion engines used to power trucks and demolition equipment can affect local air quality, particularly if the engines are not properly maintained. Approximately 95 percent (by weight) of fugitive emissions from vehicular traffic over paved and unpaved roads would be comprised mainly of particles that would be deposited near the roadways along the routes the construction and contractors' vehicles would travel to reach the site.

As necessary, fugitive dust emissions from construction activities would be mitigated using BMPs including wet suppression, as needed. Therefore, direct impacts to air quality associated with construction activities would be expected to be temporary and minor.

No noticeable direct or indirect impacts to air quality or regional climate would be associated with the construction activities. The use of construction equipment would cause a minor temporary increase in greenhouse gas emissions during the construction activities. Combustion of gasoline and diesel fuels by internal combustion engines (haul trucks and off-road vehicles) would generate local emissions of PM, nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compounds (VOCs), and SO_2. These impacts would be minor and consistent with existing emissions from vehicular activity in the area. Consolidating operations to reduce building unit footprint and improve space utilization can have minor beneficial impacts to indirect greenhouse gas emissions such as building energy use and heating.

The operation of the Engineering Lab following completion of construction would not be anticipated to cause air quality impacts. While there would be a small increase in activity at the Engineering Lab, this activity would be correspondingly reduced at Walnut Orchard a few miles away. Therefore, overall, there would be no new emissions produced by the operation of the Engineering Lab that were not already present in the region as a result of the operational activities.

3.9 NOISE

3.9.1 Affected Environment

Noise is generally described as unwanted sound, which can be based either on objective effects (hearing loss, damage to structures, etc.) or subjective judgments (such as community annoyance). Sound is usually represented on a logarithmic scale with a unit called the decibel (dB). Sound on the decibel scale is referred to as sound level. The threshold of human hearing is approximately 0 dB, and the threshold of discomfort or pain is around 120 dB.

Noise levels are computed over a 24-hour period and adjusted for nighttime annoyances to produce the day-night average sound level (DNL). DNL is the community noise metric recommended by the EPA and has been adopted by most federal agencies (EPA 1974). A DNL of 65 A-weighted decibel (dBA) is the level most commonly used for noise planning purposes and represents a compromise between community impact and the need for activities like construction. (The A-weighted sound level, used extensively in the U.S. for the measurement of community and transportation noise, represents the approximate frequency response

characteristic of the average young human ear.) Areas exposed to a DNL above 65 dBA are generally not considered suitable for residential use. A DNL of 55 dBA was identified by EPA as a level below which there is no adverse impact. Additionally, to avoid potential long-term effects to hearing, EPA established a 24-hour exposure level of 70 dBA (EPA 1974).

Noise occurring at night generally results in a greater annoyance than do the same levels occurring during the day. It is generally agreed that people perceive intrusive noise at night as being 10 dBA louder than the same level of noise during the day. This perception is largely because background environmental sound levels at night in most areas are about 10 dBA lower than those during the day.

The Noise Control Act of 1972 directs federal agencies to comply with applicable federal, state, and local noise control regulations. The proposed project areas are located within Norris City Limits. The Norris Municipal Code prohibits construction noise during the hours of darkness[2] on week days and Saturdays except in the case of urgent necessity in the interest of public health and safety. Additionally, the City of Norris sets a limit of 65 dB at the common lot line for industrial areas excluding noise from cars, trucks, or motorcycles (Municipal Technical Advisory Service 1996). Sound limits for vehicles within the City of Norris are as shown in Table 3.9-1:

Table 3.9-1. Vehicle Sound Level Limits within Norris City Limits

Sound Level in Decibels (dB)	Type of Vehicle	Where Measured
87	Buses and trucks over 10,000 pounds	At 50 feet
93	Buses and trucks over 10,000 pounds	At 25 feet
80	Buses and trucks under 10,000 pounds	At 50 feet
86	Buses and trucks under 10,000 pounds	At 25 feet
78	Passenger cars	At 50 feet
84	Passenger cars	At 25 feet
87	Motorcycles (includes other vehicles)	At 50 feet
93	Motorcycles (includes other vehicles)	At 25 feet

Source: Municipal Technical Advisory Service 1996

3.9.2 Environmental Consequences

3.9.2.1 Alternative A – No Action

Under the No Action Alternative, noise receptors in the vicinity would continue to experience ambient noise from the environment, normal activities at the site, traffic, and recreational activities in the vicinity. No noise related impacts would be anticipated related to the existing ambient sounds.

[2] The hours of darkness are defined as one half hour after official sunset and one half hour before official sunrise.

3.9.2.2 Alternative B – Proposed Action

Construction activities at the sites, would result in short-term increases in noise levels in the project area. This increase would typically occur between the hours of 7 am and 5 pm on weekdays. Noise sources would include a variety of construction equipment and construction activities. Table 3.9-2 describes noise emission levels for construction equipment expected to be used during the proposed construction activities. As can be seen from this table, the anticipated noise levels at 50 feet from the noise source range from 75 dBA to 87 dBA based on data from the Federal Highway Administration (Federal Highway Administration 2006). As the majority of project actions would occur within the sites and not on the common lot boundary, and as noise attenuates over distance, TVA anticipates that noise generated as a result of construction activities at the sites would attenuate to below the 65 dB limit as decreed in the Norris city noise ordinance.

Table 3.9-2. Maximum noise levels at 50 feet for common construction equipment

Equipment Type	Maximum Noise Level (L_{max}) at 50 Feet (dBA, slow[1])
Backhoe	78
Clam Shovel (dropping)	87
Compactor (ground)	83
Concrete Truck	79
Crane	81
Dozer	82
Dump Truck	76
Excavator	81
Flat Bed Truck	74
Generator	81
Grader	Not applicable
Pickup Truck	75
Warning Horn	83

Source: Federal Highway Administration 2006

1 Slow response as measured on the A scale of a sound level meter or time-weighted average.

Construction personnel, especially equipment operators, would use appropriate personal hearing protection to limit exposure and ensure compliance with federal health and safety regulations.

Following completion of construction activities, the ambient sound environment would be expected to return to near ambient levels. The Engineering Lab is located within a zoned industrial area, the 65 dB industrial ordinance would apply at this location. Walnut Orchard is located within a zoned government area and there is not an established ordinance for this

zoning type. Existing activities at both sites are similar and, therefore, the ambient noise environments are also similar. Because both sites are currently utilized for industrial purposes, noise levels would return to equivalent levels experienced at this site at present. Noise would be anticipated to typically be below the 65 dbA and compliant with the Norris City noise ordinance. Overall, noise impacts under Alternative B are anticipated to be temporary and minor.

3.10 TRANSPORTATION

3.10.1 Affected Environment

The Engineering Labs is located off Sawmill and Pine Roads in Norris, Tennessee (Figure 3.10-1). Construction and operations related vehicles access the Engineering Labs would come from Highway 61 north along East Norris Road, and then onto Pine Road, some vehicles may travel further on Pine until reaching Sawmill Road. Pine Road is lined primarily by residential structures. Sawmill Road is an access road to the Engineering Labs. East Norris Road is partially residential (closest to Pine Road) and partially commercial (closest to Highway 61).

The average annual daily traffic on Highway 61 north of the Engineering Labs is 6,482 vehicles. East Norris Road, a few hundred feet north of the intersection with Pine Road, had an average annual daily traffic flow of 3,361 vehicles (Tennessee Department of Transportation 2018). Traffic data was not immediately available for Pine and Sawmill Roads, however, given the nature of each road, it is likely that both have less traffic than East Norris Road. Most traffic entering headed to the Engineering Lab is likely coming from Highway 61. Therefore, the majority of the Engineering Lab traffic likely does not pass through the East Norris Road data collection station which is located after the turnoff to Pine Road. It can then be assumed that traffic on East Norris Road is greater than 3,361 as it approaches Highway 61. Sawmill Road traffic is primarily restricted to vehicles entering the Engineering Lab.

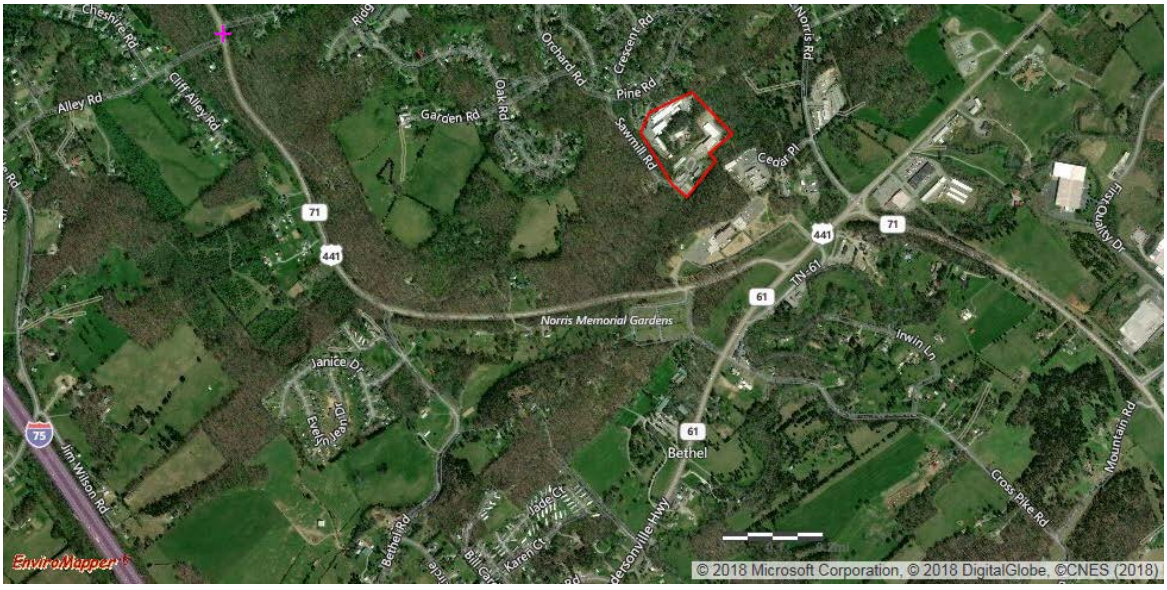

Figure 3.10-1. Roads in the vicinity of the Engineering Lab

3.10.2 Environmental Consequences

3.10.2.1 Alternative A – No Action

Under the No Action Alternative, normal activities at the site would continue, including operational and occasional maintenance traffic traveling to and from the Engineering Lab. No changes to transportation would be anticipated and therefore, there would be no transportation impacts.

3.10.2.2 Alternative B – Proposed Action

Under the Proposed Action, there would be a minor increase in the traffic accessing the Engineering Lab. The number of vehicles accessing the lab would increase during the construction period. It is anticipated that some construction equipment would come into the site and then remain on site until designated construction tasks are completed. Other construction vehicles, and construction workers personal vehicles would come into and out of the Engineering Lab on a daily basis. It is anticipated that the numbers of daily vehicles entering and exiting the site would not represent a significant increase above the current levels of operational traffic. Construction vehicle numbers could vary on a daily basis, however, the number of vehicles is not anticipated to create congestion along Pine and Sawmill Roads. Should congestion occur, TVA could implement mitigation measures such as staggered arrival and departure times to minimize potential impacts. Therefore, construction related impacts to transportation on Pine and Sawmill Roads are anticipated to be temporary and minor.

There would be an increase in operational vehicles entering and exiting the Engineering Labs. The number of operational vehicles would be higher than present usage, however, it would also be lower than the construction vehicle usage. Therefore, operational impacts to transportation would also be expected to be minor and no congestion would be anticipated.

There would be no impacts to traffic on East Norris Road and Highway 61. As those roads experience average annual daily traffic exceeding 3,000 and 6,000 vehicles, the number of construction and operations vehicles associated with the Proposed Action would be negligible.

3.11 SOCIOECONOMICS

3.11.1 Affected Environment

The Engineering Lab is located in the City of Norris, in Anderson County, Tennessee. The City of Norris is located approximately 21 miles northwest of Knoxville, Tennessee and 21 miles northeast of Oak Ridge, Tennessee.

Based on the U.S. Census Bureau American Community Survey 2012-2016 estimate, approximately 1,690 people live in the City of Norris. In contrast, approximately 75,545 people live in Anderson County, Tennessee (U.S. Census Bureau 2016a). Of the population residing in the City of Norris, approximately 700 individuals above the age of 16 are employed in a variety of fields, with the largest field constituting approximately 276 individuals working in the education, health care, and social services industry (U.S. Census Bureau 2016b).

Approximately 60% of those workers are employed at jobs within Anderson County (including within the City of Norris) (U.S. Census Bureau 2016c).

There are approximately 753 housing units available in the City of Norris, of which, approximately 71 are vacant. Out of the approximately 682 occupied housing units, approximately 490 are owner-occupied and 192 are renter-occupied (U.S. Census Bureau 2016d).

3.11.2 Environmental Consequences

3.11.2.1 Alternative A – No Action

Under the No Action Alternative, normal activities at the site would continue, the numbers employees working at the Engineering Lab would remain unchanged. As there would be no changes in the numbers of employees at the site, there would be no impacts to socioeconomics associated with the no action alternative.

3.11.2.2 Alternative B – Proposed Action

Under the proposed action, some employees would be relocated to the Engineering Labs. Given the scope and scale of the construction activities, no new construction jobs are anticipated. It is expected that the construction activities would be completed by companies in the area using their existing employees. There would be a few dozen additional staff at the Engineering Labs on a daily basis during the operational period. These employees would be relocated to the Engineering Labs from Walnut Orchard or other locations. Therefore, these employees would be transfers rather than new employees. As Walnut Orchard is approximately 3.75 miles by road from the Engineering Labs, it is assumed these employees already live in the immediate vicinity or in nearby Anderson County and therefore would not require new housing in the area. Therefore, there are no anticipated impacts to socioeconomics as a result of the proposed action.

3.12 ENVIRONMENTAL JUSTICE

3.12.1 Affected Environment

Executive Order (EO) 12898 directs federal agencies to identify and address, as appropriate, potential disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. While TVA is not subject to this EO, TVA typically assesses environmental justice impacts in its NEPA reviews. The Council on Environmental Quality has provided guidance for addressing environmental justice in *Environmental Justice: Guidance under the National Environmental Policy Act* (Council on Environmental Quality 1997).

In identifying minority and low-income populations, the following Council on Environmental Quality definitions of minority individuals and populations and low-income populations were used:

- *Minority individuals.* Individuals who identify themselves as members of the following population groups: American Indian or Alaskan Native, Asian, Native Hawaiian or Other Pacific Islander, Black, Hispanic, or two or more races.

- *Minority populations.* Minority populations are identified where (1) the minority population of an affected area exceeds 50 percent or (2) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis. For the purposes of this analysis, "meaningfully greater" is defined as greater than 20 percent of the minority population percentage in the general population of the county.

- *Low-income populations.* Low-income populations in an affected area are identified with the annual statistical poverty thresholds from the Census Bureau's Current Population Reports, Series P-60, on Income and Poverty. In this analysis, low-income populations are identified where (1) the population of an affected area exceeds 50 percent low-income based on the Census data or (2) the percentage of low-income population in the affected area is greater than 20 percent of the low-income population percentage in county.

According to Council on Environmental Quality guidance, U.S. Census data are typically used to determine minority and low-income population percentages in the affected area of a project in order to conduct a quantitative assessment of potential environmental justice impacts. For the purposes of this analysis, the City of Norris is the population geographic area and Anderson County as the comparison region as it is assumed the minority of workers at the Engineering Lab live within city limits or within Anderson County.

Table 3.12-1 shows the population demographics of the City of Norris and Anderson County, Tennessee. The total minority population of the City of Norris is approximately 4.1 percent as compared to the minority population of Anderson County of 10.2 percent. Therefore, the City of Norris does not constitute a minority population under the criteria described above.

In the City of Norris, an estimated 6.6 percent of the total population is low-income as compared to 17.2 percent of the population of Anderson County (U.S. Census Bureau 2016e). Therefore, the City of Norris does not constitute a low-income population as defined under the criteria above.

Table 3.12-1 City of Norris and Anderson County, Tennessee Population Demographics

	City of Norris, Tennessee		Anderson County, Tennessee	
	Estimate	**Percent**	**Estimate**	**Percent**
Total population	1,690	100.0%	75,545	100.0%
Hispanic or Latino (of any race)	22	1.3%	1,908	2.5%
Not Hispanic or Latino	1,668	98.7%	73,637	97.5%
White alone	1,621	95.9%	67,876	89.8%
Black or African American alone	9	0.5%	2,756	3.6%
American Indian and Alaska Native alone	0	0.0%	183	0.2%
Asian alone	3	0.2%	1,025	1.4%
Native Hawaiian and Other Pacific Islander alone	0	0.0%	36	0.0%
Some other race alone	0	0.0%	107	0.1%
Two or more races	35	2.1%	1,654	2.2%
Two races including Some other race	0	0.0%	27	0.0%
Total Minority Population	69	4.1%	7696	10.2%

Source: U.S. Census Bureau 2016a

3.12.2 Environmental Consequences

3.12.2.1 Alternative A – No Action

Under the No Action Alternative, normal activities at the site would continue, the numbers employees working at the Engineering Lab would remain unchanged. As there would be no changes in the numbers of employees at the site, there would be no impacts to environmental justice associated with the no action alternative.

3.12.2.2 Alternative B – Proposed Action

As the population of the City of Norris does not constitute either a minority or low-income population, it is not an environmental justice community. Therefore, there would be no impacts to environmental justice as a result of the proposed action.

3.13 SOLID AND HAZARDOUS WASTE

3.13.1 Affected Environment

Solid waste is more commonly referred to as trash or garbage and is generated by normal, day-to-day operations. It is generally managed in a variety of ways including reduction, recycling and disposal in landfills. Reduction considers the design, production, and use of materials to reduce the amount of waste; recyclables are those items diverted from the solid waste stream such as paper, glass, plastic, and metals; and disposal refers to the placement of solid waste in engineered areas designed to protect the environment from contaminants. Solid waste is generally considered low risk and may be disposed of in dumpsters pending removal from site

by the contracted municipal waste hauler for disposal in a licensed landfill. Most construction debris, such as cleared trees, packing materials, and scrap lumber and metals would also fall into this category.

Hazardous materials are solids, liquids, or gases that have properties that pose the potential to harm people, other living organisms, property, or the environment. Hazardous materials have the potential to become or to create hazardous waste. Hazardous materials include materials that are radioactive, flammable, explosive, corrosive, oxidizing, asphyxiating, biohazardous, toxic, pathogenic, or allergenic as defined by U.S. Department of Transportation regulations. These materials pose a risk to health, safety, and property when transported in commerce (49 CFR 172.101, Hazardous Materials Table). The National Fire Protection Association, in Section 704 of the National Fire Code, uses a different system for identifying the hazards associated with materials developed primarily with the needs of fire protection agencies in mind.

Hazardous waste refers to a class of wastes specifically defined in the Resource Conservation and Recovery Act (RCRA). These wastes contain certain toxic chemicals or have certain characteristics that cause them to be a significant risk to the environment and/or human health with respect to storage, transportation, or disposal. Hazardous waste may be classified as hazardous because of toxicity, reactivity, ignitability, or corrosivity. Certain types of wastes are “listed” or identified as hazardous by the EPA in 40 CFR 263.

Solid and or hazardous waste currently generated at the Engineering Lab are disposed in accordance with all appropriate local, state, and federal requirements.

3.13.2 Environmental Consequences

3.13.2.1 Alternative A – No Action

Under the No Action Alternative, normal activities at the site would continue and the amounts of solid and hazardous waste generated at the Engineering Lab would remain unchanged. Therefore, no impacts associated with solid and hazardous waste would be anticipated under the no action alternative.

3.13.2.2 Alternative B – Proposed Action

Under the proposed action, a number of construction activities would generate varying quantities of waste. Construction dumpsters would be staged onsite and emptied on a recurring schedule, likely several times a week. In other places within the project boundary, construction debris may be staged for later disposal. The majority of construction generated waste would consist of solid waste such as wood, metal, and plastic debris. Possible short-term impacts to the local environment through the release of fugitive dust during demolition and while removing material to the landfill would be minimized through mitigation measures, including dust suppression and environmental controls, if necessary. Due to the temporary nature of the construction activities and the use of permitted disposal facilities, along with trained and experienced contractors and personnel, environmental impacts from waste handling and disposal are not anticipated in association with construction activities.

During construction, a minor temporary increase in hazardous waste would occur due to the use of heavy equipment and other machinery. Potential hazardous waste items could include petroleum fuels, hydraulic fluids, testing supplies, car batteries and paints. This increase would be minor and temporary. Any spills would be immediately addressed and BMPs such as secondary containment and spill kits maintained onsite during construction would be used to assure that hazardous substances would not be released to the environment. Therefore, impacts associated with hazardous materials during construction would be minor.

Upon completion of the construction project, the amount of solid and hazardous materials at the Engineering Labs may be somewhat higher than at present given that more activities would be occurring at the site. However, the increase would result from a relocation of these activities from Walnut Orchard. Therefore, rather than an overall increase, this is more of a relocation in the source from which these wastes are generated. TVA's current procedures for handling of these wastes would be modified to account for the changed source location. Otherwise, there would be no anticipated new impacts in association with solid and hazardous waste in association with operations at the Engineering Lab.

3.14 CUMULATIVE IMPACTS

Cumulative impacts are defined in the Council on Environmental Quality's regulations at 40 C.F.R. § 1508.7 as follows:

> Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Past actions that have already occurred and present actions are integrated into the existing baseline conditions discussed above. TVA is currently unaware of any future projects in the immediate vicinity of the Engineering Lab. Therefore, no cumulative impacts would be anticipated.

3.15 Unavoidable Adverse Environmental Impacts

The selected alternative would not cause any unavoidable adverse environmental impacts.

3.16 Relationship of Short-Term Uses and Long-Term Productivity

Short-term uses are those that generally occur on a year-to-year basis. Examples are wildlife use of forage, timber management, recreation, and uses of water resources. Long-term productivity is the capability of the land to provide resources, both market and nonmarket, for future generations. Long-term impacts would be those that last beyond the life of the project.

The proposed action would remove some vegetation. Short-term impacts to productivity could include disruptions to wildlife in the vicinity of the project area (terrestrial) as a result of construction notice and temporary disturbances. Following construction, while there would be

more operational activity at the site, the majority of this activity would occur indoors. Therefore, it is anticipated that wildlife use of the site would return to previous levels. Therefore, only minor impacts would be anticipated to short-term uses of the project area.

Long-term impacts would continue to be associated with the operation of the Engineering Lab. While there would be a minor increase in activity around the site, the majority of the long-term productivity impacts would have been associated with the initial construction of the site. Therefore, no new impacts to long-term productivity would be anticipated.

3.17 Irreversible and Irretrievable Commitments of Resources

As used here, irreversible commitments of resources include the use or consumption of non-renewable resources because of a decision or implementing a proposed action. For example, extracting ore is an irreversible commitment. Irretrievable commitments involve the use or commitment of resources for a period of time, even a long period. An example of an irretrievable resource commitment is the loss of timber production on a newly cleared transmission line right-of-way through a previously forested area. In that case, removal of the transmission line and the right-of-way would eventually result in the restoration of forestland and timber productivity.

Implementation of the proposed action would result in the irreversible or irretrievable commitments of resources associated with the construction activities. Wood, metal, and plastic and other materials would be utilized for the renovations to various structures. While some of these materials could potentially be recycled in the future, many would be considered as an irreversible and irretrievable use. Oils, paints, gas, and various substances would also be used for the construction activities. These substances would be irretrievable.

CHAPTER 4 - LIST OF PREPARERS

4.1 NEPA Project Management

Lora C. Kilgore, LEED AP, MCR.w
Project Role: Sr. Program Manager – Strategic Real Estate
Education: Assoc. of Arts
Experience: 36 years in Facilities Management & Services

Travis Giles
Project Role: Program Manager, Environmental Support
Education: M.A. in Environmental Science; BS, Environmental Policy
Experience: 4 years in NEPA compliance

Carol Butler Freeman, PG
Project Role: NEPA Specialist
Education: MS, Geological Sciences; BS, Geology
Experience: 10 years in NEPA compliance

4.2 Other Contributors

Bradley A. Creswell
Project Role: Historic and Archaeological Resources
Education: B.A., Anthropology
Experience: 24 years of experience in archaeology and cultural resource management (CRM); 4 years in Cultural Compliance (Section 106/110 of the NHPA)

Elizabeth Hamrick
Project Role: Wildlife and Threatened and Endangered Species
Education: MS, Wildlife; BS, Biology
Experience: 18 years conducting field biology, 13 years technical writing, 11 years compliance with NEPA and ESA

Hallie A. Hearnes
Project Role: Historic Structures, Architectural Historian
Education: M.A. in Public History, B.S. in Historic Preservation
Experience: 7 years of experience in cultural resource management (CRM) as an architectural historian; 1 year in Cultural Compliance (Section 106/110 of the NHPA); 4 years as research assistant

Sara McLaughlin
Project Role: Terrestrial Wildlife and Threatened and Endangered Species
Education: BS Major: Wildlife and Fisheries Science Management, Minor: Forestry
Experience: 10 years conducting field biology, 6 years technical writing, compliance with NEPA, and ESA, 2 years animal husbandry, public education, and outreach

Marianne Shuler

Project Role: Archaeologist
Education: B.A. in Religion, emphasis in Middle Eastern Archaeology
Experience: 15 years of experience in cultural resource management, Section 106/110, including experience in ARPA, 3 years in Tribal Liaison duties.

A. Chevales Williams

Project Role: Surface Water
Education: B.S., Environmental Engineering
Experience: 13 years of experience in water quality monitoring and compliance; 12 years in NEPA planning and environmental services.

CHAPTER 5 - LITERATURE CITED

Brady, J., T.H. Kunz, M.D. Tuttle and D. Wilson, 1982. Gray bat recovery plan. U.S. Fish and Wildlife Service, Denver, Colorado 80205. 143 pp.

Butchkoski, C. M., and J. D. Hassinger. 2002. Ecology of a maternity colony roosting in a building. *In* Kurta, A. and J. Kennedy, eds. *The Indiana Bat: Biology and Management of an Endangered Species.* Bat Conservation International, Austin, Texas.

Conant, R., and J. T. Collins*. A Field Guide to Reptiles and Amphibians: Eastern and Central North America*. 3rd ed. Boston: Houghton Mifflin, 1998. 616 pp.

Council on Environmental Quality (CEQ) 1997. Environmental Justice: Guidance Under the National Environmental Policy Act. Accessed at https://www.epa.gov/sites/production/files/2015-02/documents/ej_guidance_nepa_ceq1297.pdf. December 10, 1997.

Dorcas, L. and W. Gibbons. 2005. *Snakes of the Southeast*. The University of Georgia Press, Athens. 253 pp.

Gunier, W. J., and W. H. Elder. 1971. Experimental homing of gray bats to a maternity colony in a Missouri barn. *American Midland Naturalist 86(2): 502-506.*

Harper, Herbert L. 1975. Norris District. National Register of Historic Places nomination form.

Harvey, M. J. 1992. Bats of the eastern United States. Arkansas Game and Fish Commission, Little Rock, Arkansas. 46 pp.

Karpynec, Ted, Meghan Weaver, and David Sprouse. 2015. NRHP Assessment of TVA's Norris Engineering Labs Complex, Anderson County, Tennessee. Report Submitted to Tennessee Valley Authority, Knoxville, Tennessee.

Kays, R, and D E. Wilson. 2002. Mammals of North America. Princeton University Press, Princeton, NJ. 240pp.

Kurta, A., S. W. Murray, and D. H. Miller. 2002. Roost selection and movements across the summer landscape. Pages 118-129 in A. Kurta and J. Kennedy, editors. The Indiana Bat: Biology and Management of an Endangered Species. Bat Conservation International, Austin, Texas.

Mielnik, Tara Mitchell. 2017. "Anderson County" in the Tennessee Encyclopedia website, http://tennesseeencyclopedia.net/entries/anderson-county/ (Accessed 30 July, 2018).

National Geographic. 2002. A Field Guide to the Birds of North America. 4th ed. National Geographic Society Washington, D.C. 480pp.

NatureServe. 2017. NatureServe Web Service. Arlington, VA. U.S.A. Available online: http://services.natureserve.org. (Accessed 7 September 2017).

Petranka, J. W. 1998. Salamanders of the United States and Canada. Smithsonian Institution Press, Washington D.C. 587pp.

Pruitt, L., and L. TeWinkel, editors. 2007. Indiana Bat (Myotis sodalis) Draft Recovery Plan:

First Revision. U.S. Fish and Wildlife Service, Fort Snelling, Minnesota. 260 pgs. Available online: http://www.fws.gov/midwest/endangered/mammals/inba/pdf/inba_fnldrftrecpln_apr07.pdf (Accessed 6 December 2016).

Scott, A. F. and W. H. Redmond. 2008. Atlas of Reptiles in Tennessee. The Center for Field Biology, Austin Peay University. Available online: http://apbrwww5.apsu.edu/reptatlas/frames_file.htm (Accessed 6 December 2016).

Smith, Samuel D. 2003.Tennessee Department of Environment and Conservation, Division of Archaeology. Archaeological Site Survey Record. State Site No. 40AN218. On file at the Tennessee Division of Archaeology, Nashville, Tennessee.

Smith, Samuel D. and Stephen T. Rogers. 2011.Tennessee Potteries, Pots, and Potters - 1790s to 1950. Research Series No. 18. Tennessee Department of Environment and Conservation, Division of Archaeology. Nashville, Tennessee.

Tennessee Department of Transportation. 2018. Average Annual Daily Traffic Application. https://www.tdot.tn.gov/APPLICATIONS/traffichistory (Accessed 29 August 2018).

Thomason and Associates. 2018. *Reassessment of Contributing Status, Building B, Norris Engineering Laboratory, Norris, Tennessee*. Submitted to Tennessee Valley Authority, Knoxville, Tennessee.

Tuttle, M. D. 1976. Population ecology of the gray bat (Myotis grisescens): philopatry, timing, and patterns of movement, weight loss during migration, and seasonal adaptive strategies. Occasional Papers of the Museum of Natural History, University of Kansas, 54:1-38.

U.S. Census Bureau. 2016a. ACS Demographic and Housing Estimates for the City of Norris and Anderson County, Tennessee. 2012-2016 American Community Survey 5-year Estimates. Available online: https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml (Accessed 4 September 2018).

U.S. Census Bureau. 2016b. Industry by Sex for the Civilian Employed Population 16 years and over for the City of Norris, Tennessee. 2012-2016 American Community Survey 5-year Estimates. Available online: https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml (Accessed 4 September 2018).

U.S. Census Bureau. 2016c. Commuting Characteristics by Sex for the City of Norris, Tennessee. 2012-2016 American Community Survey 5-year Estimates. Available online: https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml (Accessed 4 September 2018).

U.S. Census Bureau. 2016d. Selected Housing Characteristics for the City of Norris, Tennessee. 2012-2016 American Community Survey 5-year Estimates. Available online: https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml (Accessed 4 September 2018).

U.S. Census Bureau. 2016e. Selected Economic Characteristics for the City of Norris and Anderson County, Tennessee. 2012-2016 American Community Survey 5-year Estimates. Available online: https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml (Accessed 4 September 2018).

U.S. Fish and Wildlife Service (USFWS). 2014. Northern Long-eared Bat Interim Conference and Planning. Available online: http://www.fws.gov/northeast/virginiafield/pdf/NLEBinterimGuidance6Jan2014.pdf (Accessed 6 December 2016).

U.S. Fish and Wildlife Service (USFWS). 2017. 2017 Range-Wide Indiana Bat Summer Survey Guidelines. Available online: http://www.fws.gov/midwest/endangered/mammals/inba/surveys/pdf/2015IndianaBatSummerSurveyGuidelines01April2015.pdf (Accessed 13 July 2017).

Whitaker, J.O. 1996. *National Audubon Society: Field Guide to North American Mammals*. Alfred A. Knopf, Inc., New York.

APPENDIX A

Agency Consultation

From:	Hamrick, Elizabeth Burton
To:	"Robbie Sykes (robbie_sykes@fws.gov)"; "Ross Shaw"
Subject:	Revised project scope- Notification in accordance with TVA Programmatic Consultation for Routine Actions and Federally listed bats
Date:	Wednesday, October 24, 2018 2:13:22 PM
Attachments:	image001.png image002.png image003.png image004.png image005.png image006.png image007.png image008.png Completed_416446_NorrisProperties_LandDisposal_TVA-Bat-Strategy_2018-10-....pdf

---

Good afternoon,

TVA's programmatic ESA consultation on routine actions and bats was completed in April 2018.

For projects with NLAA or LAA determinations, TVA will be providing project-specific notification to relevant Ecological Service Field Offices. This notification also will be stored in the project administrative record. For projects that utilize Take issued through the Biological Opinion, that Take will be tracked and reported in TVA's annual report to the USFWS in March of the following year.

The attached form is serving at TVA's mechanism to determine if project-specific activities are within the scope of TVA's bat programmatic consultation and if there is project-specific potential for impact to covered bat species, necessitating conservation measures, which are identified for the project on pages 6-11. The form also is serving as the primary means of notification to the USFWS and others as needed.

The following project had a change in project scope to include 0.8 additional acres of forest to be removed. The additional trees are assumed suitable roosting habitat for Indiana bat and NLEB:

Norris Properties Consolidation Environmental Assessment - consolidate operations to Norris Engineering Lab Complex and construct a boat shed. Two sheds may be demolished or renovated and parking/paved areas will be resurfaced. 2.8 acres of forest may be removed between November 15 and March 31. Anderson County, TN

The original TVA Bat Strategy Form for this project was submitted to your office by Holly LeGrand on May 25, 2018.

Thank you,

Liz Hamrick
Terrestrial Zoologist
Biological Compliance

400 W Summit Hill Dr. WT 11C-K
Knoxville, TN 37902

865-632-4011 (w)
ecburton@tva.gov

Project Screening Form - TVA Bat Strategy *(04/19/2018)*

This form is to assist in determining alignment of proposed projects and any required measures to comply with TVA's ESA Section 7 programmatic consultation for routine actions and federally-listed bats[1]

Project Name: Norris Properties Consolidation EA **Date**: 10/24/2018

Contact(s): Carol Freeman or Dana Vaughn **CEC#**: n/a **RLR#**: n/a **Project ID**: 2017-12

Project Description: SREG proposes to consolidate operations to Norris Engineering Lab Complex and to construct a boatshed. Two sheds may be demolished or renovated and parking/paved areas will be resurfaced. Anderson County, TN

STEP 1) Select Appropriate TVA Action (or check here □ if none of the Actions below are applicable):

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

STEP 2) Select **all** activities from **Tables 1 and 2** (Column 1 only) included in proposed project. If you have an activity that is not listed below, describe here): _____

Table 1. Activities (CHECK ALL THAT APPLY) with No Effect on Federally Listed Bats. If none, check here: □

	#	ACTIVITY		#	ACTIVITY
□	**1**	Loans and/or grant awards	□	**12**	Sufferance agreement
□	**2**	Purchase of property	□	**13**	Engineering or environmental planning or studies
□	**3**	Purchase of equipment for industrial facilities	□	**14**	Harbor limits
□	**4**	Environmental education	□	**19**	Site-specific enhancements in streams and reservoirs for aquatic animals
□	**5**	Transfer of ROW easement or ROW equipment	□	**20**	Nesting platforms
□	**6**	Property and/or equipment transfer	□	**41**	Minor water-based structures
□	**7**	Easement on TVA property	■	**42**	Internal renovation or internal expansion of existing facility
□	**8**	Sale of TVA property	□	**43**	Replacement or removal of TL poles, or cutting of poles to 4-6 ft above ground
□	**9**	Lease of TVA property	□	**44**	Conductor and OHGW installation and replacement
□	**10**	Deed modification of TVA rights or TVA property	□	**49**	Non-navigable houseboats
□	**11**	Abandonment of TVA retained rights			

Table 2. Activities (CHECK ALL THAT APPLY) and Associated Conservation Measures. If none, check here: □

	#	ACTIVITY	CONSERVATION MEASURES	TZ SME Review Needed
■	**15**	Windshield or ground surveys for archaeological resources	■ a. NV1 □ b. HP2	□ b. HP1
□	**16**	Drilling	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3 □ g. L1, L2	□ a NV3, NV4 / □ a1. NV2
□	**17**	Mechanical vegetation removal; does not include removal of trees or tree branches ≥ 3" in diameter.	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3, SSPC5	□ f. SSPC4, SSPC7
■	**18**	Erosion control – minor	■ a. NV1 ■ f. SPCC1, SSPC2, SSPC3, SSPC5	None
□	**21**	Herbicide use	□ d. SSPC1, SSPC2, SSPC3, SSPC5	□ d. SSPC6, SSPC7
□	**22**	Grubbing	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3, SSPC5	□ f. SSPC4
■	**23**	Prescribed burns, burn piles, or	■ c. SHF1, SHF4, SHF5	□ c. SHF2, SHF3, SHF6, SHF7,

	#	ACTIVITY	CONSERVATION MEASURES	TZ SME Review Needed
		brush piles		SHF8, SHF9
□	**24**	Tree planting	□ a. NV1 □ f. SSCP1, SSPC2, SSPC3, SSPC5	None
□	**25**	Maintenance, improvement or construction of pedestrian or vehicular access corridors	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3, SSPC5	□ a1. NV2 □ f. SSPC7
□	**26**	Maintenance or construction of access control measures	□ a. NV1 □ b. HP2 □ f. SSPC1, SSPC2, SSPC3,SSPC5 □ g. L1, L2	□ a NV3, NV4 / □ a1. NV2 □ b. HP1 □ f. SSPC7
□	**27**	Restoration of sites following human use and abuse	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3	□ f. SSPC7
□	**28**	Removal of debris (e.g., dump sites, hazardous material, unauthorized structures)	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3	□ f. SSPC7
□	**29**	Acquisition and use of fill/borrow material	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3	□ f. SSPC7
□	**30**	Dredging and excavation; recessed harbor areas	□ a. NV1 □ f. SSPC2, SSPC3, SSPC5	None
□	**31**	Stream/wetland crossings	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3, SSPC5	□ f. SSPC7
□	**32**	Clean-up following storm damage	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3	□ f. SSPC4, SSPC7
□	**33**	Removal of hazardous trees or tree branches	□ a. NV1 □ d. TR7, TR8 □ f. SSPC1, SSPC2, SSPC3, SSPC5	□ d. TR1, TR2, TR3, TR4, TR5, TR6, TR9, □ f. SSPC4, SSPC7
■	**34**	Mechanical vegetation removal, includes trees or tree branches three inches or greater in diameter	■ a. NV1 ■ d. TR7, TR8 ■ f. SSPC1, SSPC2, SSPC3, SSPC5	■ d. TR1, TR2, TR3, TR4, TR5, TR6, TR9, □ f. SSPC4, SSPC7
□	**35**	Stabilization (major erosion control)	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3, SSPC5	□ f. SSPC4, SSPC7
■	**36**	Grading	■ a. NV1 ■ f. SSPC1, SSPC2, SSPC3, SSPC5 □ g. L1, L2	□ f. SSPC4, SSPC7
□	**37**	Installation of soil improvements	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3 □ g. L1, L2	□ a1. NV2 □ f. SSPC7
□	**38**	Drainage installations (including for ponds)	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3 □ g. L1, L2	□ f. SSPC7
□	**39**	Berm development	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3, □ g. L1, L2	None
□	**40**	Closed loop heat exchangers (heat pumps)	□ f. SSPC5	None
□	**45**	Stream monitoring equipment-placement, use	□ a. NV1	None
□	**46**	Floating boat slips within approved harbor limits	□ f. SSPC5	None
■	**47**	Conduit installation	■ a. NV1	□ a1. NV2
■	**48**	Laydown areas	■ a. NV1 ■ f. SSPC1, SSPC2, SSPC3, □ g. L1, L2	None
□	**50**	Minor land-based structures	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3, SSPC5 □ g. L1, L2	None
□	**51**	Signage installation	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3, SSPC5	None
□	**52**	Floating buildings	□ a. NV1 □ f. SSPC2, SSPC3,SSPC5 □ g. L1, L2	□ a1. NV2
□	**53**	Mooring buoys or posts	□ a. NV1	

	#	ACTIVITY	CONSERVATION MEASURES	TZ SME Review Needed
			□ f. SSPC2, SSPC3, SSPC5	None
□	54	Maintenance of water control structures (dewatering units, spillways, levees)	□ a. NV1 □ f. SSPC2, SSPC3, SSPC5	□ f. SSPC6, SSPC7
□	55	Solar panels	□ a. NV1 □ f. SSPC2, SSPC3, SSPC5	□ f. SSPC7
□	56	Culverts	□ a. NV1 □ f. SSPC1, SSPC3, SSPC5	None
□	57	Water intake - non-industrial	□ a. NV1 □ f. SSPC3, SSPC5	None
□	58	Wastewater outfalls	□ a. NV1 □ f. SSPC2, SSPC3, SSPC5	None
□	59	Marine fueling facilities	□ a. NV1 □ f. SSPC2, SSPC3, SSPC5 □ g. L1, L2	None
□	60	Commercial water-use facilities (e.g., marinas)	□ a. NV1 □ f. SSPC2, SSPC5 □ g. L1, L2	None
□	61	Septic fields	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3, SSPC5	None
□	62	Blasting	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3, □ g. L1, L2	□ a NV3, NV4 / □ a1. NV2
□	63	Foundation installation	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3	□ a1. NV2
□	64	Installation of steel structure, overhead bus, equipment, etc.	□ a. NV1 □ g. SSPC1, SSPC2, SSPC3	□ a1. NV2
□	65	Pole and/or tower installation and/or extension	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3	□ a1. NV2
□	66	Private, residential docks, piers, boathouses	□ a. NV1 □ f. SPCC5 □ g. L1, L2	None
□	67	Siting of temporary office trailers	□ a. NV1 □ f. SSPC1, SSPC2, SSPC3, SSPC5 □ g. L1, L2	None
□	68	Financing for speculative building construction	□ a. NV1 □ f. SSPC5	None
■	69	Renovation of existing structures	■ a. NV1 ■ f. SSPC1, SSPC3, SSPC5 □ g. L1, L2	■ e. AR1, AR2, AR4, AR5
□	70	Lock maintenance and construction	□ a. NV1 □ f. SSPC2, SSPC3, SSPC5	□ a1. NV2
□	71	Concrete dam modification	□ a. NV1 □ f. SSPC2, SSPC3	□ a1. NV2
□	72	Ferry landings/service operations	□ a. NV1 □ f. SSPC5 □ g. L1, L2	None
□	73	Boat launching ramps	□ a. NV1 □ f. SSPC2, SSPC5	□ a1. NV2
□	74	Recreational vehicle campsites	□ a. NV1 □ g. SPCC5	None
□	75	Utility lines/light poles	□ a. NV1 □ f. SPCC5 □ g. L1, L2	None
□	76	Concrete sidewalk	□ a. NV1 □ f. SSPC2, SSPC3, SSPC5	None
■	77	Construction or expansion of land-based buildings	■ a. NV1 ■ f. SSPC2, SSPC3, SSPC5 □ g. L1, L2	■ e. AR1, AR2, AR5
□	78	Wastewater treatment plants	□ a. NV1 □ f. SSPC2, SSPC5 □ g. L1, L2	□ a1. NV2
□	79	Swimming pools and associated	□ a. NV1	

	#	ACTIVITY	CONSERVATION MEASURES	TZ SME Review Needed
		equipment	□ f. SSPC5 □ g. L1, L2	None
□	80	Barge fleeting areas	□ a. NV1 □ f. SSPC2, SSPC3, SSPC5	□ a1. NV2
□	81	Water intakes - Industrial	□ a. NV1 □ f. SSPC2, SSPC3, SSPC5	None
□	82	Construction of dam/weirs/ Levees	□ a. NV1 □ f. SPCC2, SPCC3, SPCC5	□ a1. NV2
□	83	Submarine pipeline, directional boring operations	□ a. NV1 □ f. SSPC2, SSPC3, SSPC5	□ a1. NV2
□	84	On-site/off-site public utility relocation or construction or extension	□ a. NV1 □ f. SSPC1, SSPC3, SSPC5	None
□	85	Playground equipment - land-based	□ a. NV1 □ f. SSPC5	None
□	86	Landfill construction	□ a. NV1 □ f. SSPC2, SSPC3 □ g. L1, L2	□ a1. NV2
□	87	Aboveground storage tanks	□ a. NNV1 □ f. SSPC2, SSPC3, SSPC5	None
□	88	Underground storage tanks (USTs)	□ a. NV1 □ g. SSPC2, SSPC3, SSPC5	None
■	89	Structure demolition	■ f. SSPC1, SSPC2, SSPC3	■ e. AR1, AR2, AR4, AR5
□	90	Pond closure	□ a. NV1 □ f. SSPC2, SSPC3	None
□	91	Bridge replacement	□ a. NV1 □ f. SSPC3, SSPC5	□ a1. NV2 □ e. AR1, AR2, AR3, AR5,
□	92	Return of remains to former burial sites	□ a. NV1 □ b. HP2	□ b. HP1
□	93	Standard license	□ a. NV1 □ f. SSPC5	None
□	94	Special use license	□ a. NV1	None
□	95	Recreation license	□ a. NV1 □ f. SSPC5	None
□	96	Land use permit	□ a. NV1 □ f. SSPC5	None

STEP 3) Are all project activities limited to Table 1? If **YES**, **STOP HERE**. No Bat Strategy Conservation Measures required. Include this form in environmental documentation (e.g., attach to CEC) and send to batstrategy@tva.gov. If **NO**, proceed to Step 4.....□ **YES** ■ **NO**

STEP 4) Check ALL relevant characteristics below. If **none** apply, **STOP HERE** and check ☐. No Bat Strategy Conservation Measures required. Include form in environmental documentation and send to batstrategy@tva.gov

■ **a**. Project may occur outside, involves human presence, or use of equipment that **generates noise or vibration** (e.g., drilling, blasting, loud machinery).
□ **a1.** Project involves continuous noise (i.e., ≥ 24 hrs) that is >75 decibels measured on A scale (e.g., loud machinery).

□ **b**. Project may involve **human entry into/survey of a potential bat roost** (cave, bridge, other structure).

■ **c**. Project may involve **fire (e.g., prescribed fire, burn piles) or preparation of fire breaks** within 0.25 mi of trees, caves, or water sources. **If prescribed burn**, estimated acreage: _____

■ **d**. Project may involve **tree removal**. Tree removal may need to occur **outside of winter:**.....■ **YES** □ **NO**
Estimated number of trees or acres to be removed: 2.80 ■ acres □ trees
If warranted, project has flexibility for bat surveys (May 15-Aug 15):.....□ **MAYBE** □ **YES** ■ **NO**

■ **e**. Project may involve **alteration or removal of bridges or other human structures**.

■ **f**. Project may involve land use activities involving **ground disturbance or use of chemicals or fuels** near water sources, wetlands, sinkholes, caves, or exposed limestone/karst.

□ **g**. Project may involve use of **artificial lighting** at night.

STEP 5) *Please contact Holly LeGrand or other Bat Strategy support staff for assistance if needed*. For those Activities selected in Table 2: select all Conservation Measures with letters (e.g., a-g) that correspond to characteristics selected in Step 4. If this results in selection of Conservation Measures in the last column of Table 2, a review by a terrestrial zoologist is required.

Based on selection of Conservation Measures, does project require review by a terrestrial zoologist? If **YES**, **STOP HERE** and submit form as part of environmental review request; if **NO**, skip to STEP 16.....■ **YES** □ **NO**

Terrestrial Zoologist SME Verification (Steps 6-11 will be completed by a terrestrial zoologist if warranted):

STEP 6) Project includes the following:

- □ Removal/burning of suitable trees within 0.5 mile (0.8 km) of P1-P2 Indiana bat hibernacula or 0.25 mile (0.4 km) of P3-P4 Indiana bat hibernacula or any northern long-eared bat hibernacula.
- ■ Removal/burning of suitable trees within 10 miles of documented Indiana bat hibernacula or within 5 miles of northern long-eared bat hibernacula.
- □ Removal/burning of suitable trees greater than 10 miles from documented Indiana bat hibernacula or greater than 5 miles from documented northern long-eared bat hibernacula.
- □ Removal/burning of trees within 150 feet of a documented Indiana bat or northern long-eared bat maternity roost tree.
- □ Removal/burning of suitable trees within 2.5 miles of Indiana bat roost trees or within 5 miles of Indiana bat capture sites.
- □ Removal/burning of suitable trees greater than 2.5 miles from Indiana bat roost trees or greater than 5 miles from Indiana bat capture sites.
- □ Removal/burning of documented Indiana bat or northern long-eared bat roost tree, if still suitable.

STEP 7) Amount of SUITABLE tree/acreage removal or burned (may be different than total amount of removal): 2.80 ■ acres □ trees

STEP 8) Select anticipated date range of burning/tree removal in table below:

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 - Sep 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 - Sep 30	□ Jun 1 - Jul 31

STEP 9) Presence/absence surveys (visual, mist net, acoustic) were/will be conducted: □ **YES** ■ **NO** □ **TBD**

STEP 10) Result of presence/absence surveys (if conducted), on _____ (date): □ **NEGATIVE** □ **POSITIVE** ■ **N/A** *NOTES*: _____

STEP 11) ■ Conservation measures have been verified (and modified, if necessary) in Table 2. *NOTES*:

Bat Strategy Compliance Verification (Steps 12-15 will be completed by SME/Bat Strategy Support staff):

STEP 12) Project ■ **WILL** □ **WILL NOT** require use of Incidental Take in the amount of 2.80 ■ acres or □ trees, proposed to be used during the ■ **VOLANT** □ **NON-VOLANT** bat season (or □ **N/A**).

STEP 13) Available Incidental Take as of 5/11/18 for Manage, Land Use, Disposal (Action):

TVA Action	Total 20-year acreage	Winter Burning/Removal	Volant Season Burning/Removal	Non-Volant Season Burning/Removal
3	12600	6263	3780	2520

STEP 14) Amount contributed to TVA's Bat Conservation Fund upon activity completion: $0.00 or □ **N/A**

STEP 15) Project Effects Determinations: ***Gray Bat***:■ NE □ NLAA □ N/A;***Virginia Big-eared Bat***:□ NE □ NLAA ■ N/A ***Northern Long-eared Bat***: □ NE □ NLAA ■ LAA □ N/A; ***Indiana Bat***: □ NE □ NLAA ■ LAA □ N/A

NOTES: 2.8 acres of suitable habitat removed in known habitat (swarming habitat) during winter (outside of swarming season).. No bodies of water impacted. No bats or evidence of bat use found in buildings for demolition.

TVA's ESA Section 7 Bat Strategy Conservation Measures Required for:

STEP 16) Based on completion of Step 5, select the appropriate Conservation Measures listed in the table below (this will be completed/verified by a Terrestrial Zoologist if a Terrestrial Zoologist review is required) and review the following bullets. Save this form in project environmental documentation AND send a copy of form to batstrategy@tva.gov. Submission of this form is an indication that the Project Lead Kevin Hayes (name) is (or will be made) aware of the requirements below.

- Implementation of conservation measures identified below is required to comply with TVA's programmatic Endangered Species Act bat consultation.
- Confirmation of completion (e.g., report from contractor, time stamped photos pre and post completion) for Conservation Measures below with an * (as well as any additional confirmation noted here by Terrestrial Zoologist: Elizabeth Hamrick) will be provided to TVA's Bat Strategy Compliance Officer (batstrategy@tva.gov) following completion of activit (ies).
- TVA may conduct post-project monitoring to determine if conservation measures were effective in minimizing or avoiding impacts to federally listed bats.

STEP 17) For projects that require use of Take and/or contribution to TVA's Bat Conservation Fund, please acknowledge the following statement:

■ Project Lead/Contact acknowledges that proposed project will result in use of 2.80 ■ acres/□ trees in Incidental Take and will require $0 contribution to TVA's Conservation Fund upon completion of activity.

	Conservation Measure Acronym	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.
☐	NV2	Drilling, blasting, or any other activity that involves continuous noise (i.e., longer than 24 hours) disturbances greater than 75 decibels measured on the A scale (e.g., loud machinery) within a 0.5 mile radius of documented winter and/or summer roosts (caves, trees, unconventional roosts) will be conducted when bats are absent from roost sites.
☐	NV3	Drilling or blasting within a 0.5 mile radius of documented cave (or unconventional) roosts will be conducted in a manner that will not compromise the structural integrity or alter the karst hydrology of the roost site.
☐	NV4	Drilling or blasting within 0.5 miles of a documented roost site (cave, tree, unconventional roost) that needs to occur when bats are present will first involve development of project-specific avoidance or minimization measures in coordination with the USFWS.
☐	HP1	Site-specific cases in which potential impact of human presence is heightened (e.g., conducting environmental or cultural surveys within a roost site) will be closely coordinated with staff bat biologists to avoid or minimize impacts below any potential adverse effect. Any take from these activities would be covered by TVA's Section 10 permit.
☐	HP2	Entry into roosts known to be occupied by federally listed bats will be communicated to the USFWS when impacts to bats may occur if not otherwise communicated (i.e., via annual monitoring reports per TVA's Section 10 permit). Any take from these activities would be covered by TVA's section 10 permit.
☐	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.
☐	TR2	Removal of suitable summer roosting habitat within 0.5 mile of Priority 1/Priority 2 Indiana bat hibernacula, or 0.25 mile of Priority 3/Priority 4 Indiana bat hibernacula or any northern long-eared bat hibernacula will be prohibited, regardless of season, with very few exceptions (e.g., vegetation maintenance of TL ROW immediately adjacent to a known cave).
☑	TR3*	Removal of suitable summer roosting habitat within documented bat habitat (i.e., within 10 miles of documented Indiana bat hibernacula, within five miles of documented northern long-eared bat hibernacula, within 2.5 miles of documented Indiana bat summer roost trees, within five miles of Indiana bat capture sites, within one mile of documented northern long-eared bat summer roost trees, within three miles of northern long-eared bat capture sites) will be tracked, documented, and included in annual reporting. 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.
☐	TR5	Removal of any trees within 150 feet of a documented Indiana bat or northern long-eared bat maternity summer roost tree during non-winter season, range-wide pup season or swarming season (if site is within known swarming habitat), will first require a site-specific review and assessment. If pups are present in trees to be removed (determined either by mist netting and assessment of adult females, or by visual assessment of trees following evening emergence counts),

		TVA will coordinate with the USFWS to determine how to minimize impacts to pups to the extent possible. May include establishment of artificial roosts before removal of roost tree(s).
☐	TR6	Removal of a documented Indiana bat or northern long-eared bat roost tree that is still suitable and that needs to occur during non-winter season, range-wide pup season, or swarming season (if site is within known swarming habitat) will first require a site-specific review and assessment. If pups are present in trees to be removed (determined either by mist netting and assessment of adult females, or by visual assessment of trees following evening emergence counts), TVA will coordinate with USFWS to determine how to minimize impacts to pups to the extent possible. This may include establishment of artificial roosts before removal of roost tree(s).
☐	TR7	Tree removal within 100 feet of **existing transmission ROWs** will be limited to hazard trees. On or adjacent to TLs, a hazard tree is a tree that is tall enough to fall within an unsafe distance of TLs under maximum sag and blowout conditions and/or are also dead, diseased, dying, and/or leaning. Hazard tree removal includes removal of trees that 1) currently are tall enough to threaten the integrity of operation and maintenance of a TL or 2) have the ability in the future to threaten the integrity of operation and maintenance of a TL.
☐	TR8	Requests for removal of hazard trees on or adjacent to **TVA reservoir land** will be inspected by staff knowledgeable in identifying hazard trees per International Society of Arboriculture and TVA's checklist for hazard trees. Approval will be limited to trees with a defined target.
☐	TR9	If removal of suitable summer roosting habitat occurs when bats are present on the landscape, a funding contribution (based on amount of habitat removed) towards future conservation and recovery efforts for federally listed bats would be carried out. Project can consider seasonal bat presence/absence surveys (mist netting or emergence counts) that allow for positive detections without resulting in increased constraints in cost and project schedule. This will enable TVA to contribute to increased knowledge of bat presence on the landscape while continuing to carry out TVA's broad mission and responsibilities.
☑	AR1	Projects that involve structural modification or demolition of buildings, bridges, and potentially suitable box culverts, will require assessment to determine if structure has characteristics that make it a potentially suitable unconventional bat roost. If so a survey to determine if bats may be present will be conducted. Structural assessment will include: o Visual check that includes an exhaustive internal/external inspection of building to look for evidence of bats (e.g., bat droppings, roost entrance/exit holes); this can be done at any time of year, preferably when bats are active. o Where accessible and health and safety considerations allow, a survey of roof space for evidence of bats (e.g., droppings, scratch marks, staining, sightings), noting relevant characteristics of internal features that provide potential access points and roosting opportunities. Suitable characteristic may include: gaps between tiles and roof lining, access points via eaves, gaps between timbers or around mortise joints, gaps around top and gable end walls, gaps within roof walling or around tops of chimney breasts, and clean ridge beams. o Features with high-medium likelihood of harboring bats but cannot be checked visually include soffits, cavity walls, space between roof covering and roof lining. o Applies to box culverts that are at least 5 feet (1.5 meters) tall and with one or more of the following characteristics. Suitable culverts for bat day roosts have the following characteristics: ▪ Location in relatively warm areas

		▪ Between 5-10 feet (1.5-3 meters) tall and 300 ft (100 m) or more long ▪ Openings protected from high winds ▪ Not susceptible to flooding ▪ Inner areas relatively dark with roughened walls or ceilings ▪ Crevices, imperfections, or swallow nests o Bridge survey protocols will be adapted from the Programmatic Biological Opinion for the Federal Highway Administration (Appendix D of USFWS 2016c, which includes a Bridge Structure Assessment Guidance and a Bridge Structure Assessment Form). o Bat surveys usually are NOT needed in the following circumstances: ▪ Domestic garages /sheds with no enclosed roof space (with no ceiling) ▪ Modern flat-roofed buildings ▪ Metal framed and roofed buildings ▪ Buildings where roof space is regularly used (e.g., attic space converted to living space, living space open to rafters) or where all roof space is lit from skylights or windows. Large/tall roof spaces may be dark enough at apex to provide roost space.
☐	AR2	Additional bat P/A surveys (e.g., emergence counts) conducted if warranted (i.e., when AR1 indicates that bats may be present).
☐	AR3	Bridge survey protocols will be implemented, either by permittee (e.g., state DOT biologists) or qualified personnel. If a bridge is determined to be in use as an unconventional roost, subsequent protocols will be implemented.
☐	AR4	Removal of buildings with suitable roost characteristics within six miles of known or presumed occupied roosts for Virginia big-eared bat would occur between Nov 16 and Mar 31. Buildings may be removed other times of the year once a bat biologist evaluates a buildings' potential to serve as roosting habitat and determines that this species is not present and/or is not using structure(s).
☐	AR5	If evidence of bat use warrants seasonal modification or removal, TVA will carry out or recommend (i.e., to applicants) seasonal modification or removal. Risk to human safety, however, should take priority. For project-specific cases in which project is unable to accommodate seasonal modification or removal, and federally listed bat species are present, TVA will carry out or recommend consultation with the USFWS to determine the best approach in the context of the project-specific circumstance. This may include establishment of artificial roosts before demolition of structures with bats present.
☐	SSPC1	**Transmission actions and activities** will continue to Implement A Guide for Environmental Protection and Best Management Practices for Tennessee Valley Authority Construction and Maintenance Activities. This focuses on control of sediment and pollutants, including herbicides. Following are key measures: o BMPs to minimize erosion and prevent/control water pollution in accordance with state-specific construction storm water permits. BMPS are designed to keep soil in place and aid in reducing risk of other pollutants reaching surface waters, wetlands and ground water. BMPs will undertake the following principles: ▪ Plan clearing, grading, and construction to minimize area and duration of soil exposure. ▪ Maintain existing vegetation wherever and whenever possible. ▪ Minimize disturbance of natural contours and drains. ▪ As much as practicable, operate on dry soils when they are least susceptible to structural damage and erosion. ▪ Limit vehicular and equipment traffic in disturbed areas. ▪ Keep equipment paths dispersed or designate single traffic flow

		paths with appropriate road BMPs to manage runoff. ▪ Divert runoff away from disturbed areas. ▪ Provide for dispersal of surface flow that carries sediment into undisturbed surface zones with high infiltration capacity and ground cover conditions. ▪ Prepare drainage ways and outlets to handle concentrated/increased runoff. ▪ Minimize length and steepness of slopes. Interrupt long slopes frequently. ▪ Keep runoff velocities low and/or check flows. ▪ Trap sediment on-site. ▪ Inspect/maintain control measures regularly and after significant rain. ▪ Re-vegetate and mulch disturbed areas as soon as practical. o Application of herbicide is in compliance with USEPA, state water quality standards, and state permits. Areas in which covered species are known to occur on existing transmission line ROW are depicted on referenced, applicable spreadsheets and include guidelines to follow for impact minimization or avoidance. During pre-job briefings, the ROW Forester will review location of resources with contractors and provide guidelines and expectations from TVA's BMP Manual (Appendix O). Herbicides labeled for aquatic use are utilized in and around wetlands, streams, and SMZs. Unless specifically labeled for aquatic use, measures are taken to keep herbicides from reaching streams whether by direct application or through runoff or flooding by surface water. Hand application of certain herbicides labeled for use within SMZs is used only selectively. o Specific guidelines regarding sensitive resources and buffer zones: ▪ Extra precaution (wider buffers) within SMZs is taken to protect stream banks and water quality for streams, springs, sinkholes, and surrounding habitat. ▪ BMPs are implemented to protect and enhance wetlands. Select use of equipment and seasonal clearing is conducted when needed for rare plants; construction activities are restricted in areas with identified rare plants. ▪ Standard requirements exist to avoid adverse impacts to caves, protected animals, and unique and important habitat (e.g., protective buffers around caves, restricted herbicide use, seasonal clearing of suitable habitat).
☐	SSPC2	Operations involving chemical/fuel storage or resupply and vehicle servicing will be handled outside of riparian zones (streamside management zones) in a manner to prevent these items from reaching a watercourse. Earthen berms or other effective means are installed to protect stream channel from direct surface runoff. Servicing will be done with care to avoid leakage, spillage, and subsequent stream, wetland, or ground water contamination. Oil waste, filters, other litter will be collected and disposed of properly. Equipment servicing and chemical/fuel storage will be limited to locations greater than 300-ft from sinkholes, fissures, or areas draining into known sinkholes, fissures, or other karst features.
☐	SSPC3	**Power Plant actions and activities** will continue to implement standard environmental practices. These include: o 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 o 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 o Storm Water Pollution Prevention (SWPP) Pollution Control Strategies ▪ Minimize storm water contact with disturbed soils at the 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 (>1 acre) o 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
☐	SSPC4	Woody vegetation burn piles associated with **transmission construction** will be placed in the center of newly established ROWs to minimize wash into any nearby undocumented caves that might be on adjacent private property and thus outside the scope of field survey for confirmation. Brush piles will be burned a minimum of 0.25 miles from documented caves and otherwise in the center of newly established ROW when proximity to caves on private land is unknown.
☑	SSPC5	**Section** 26a permits and contracts associated with **solar projects**, **economic development projects** or land use projects include standards and conditions that include standard BMPs for sediment and contaminants as well as measures to avoid or minimize impacts to sensitive species or other resources consistent with applicable laws and Executive Orders.
☐	SSPC6	Herbicide use will be avoided within 200 ft of portals associated with caves, cave collapse areas, mines and sinkholes that are capable of supporting cave-associated species. Herbicides are not applied to surface water or wetlands unless specifically labeled for aquatic use. Filter and buffer strips will conform at least to federal and state regulations and any label requirements.
☐	SSPC7	Clearing of vegetation within a 200-ft radius of documented caves will be limited to that conducted by hand or small machinery clearing only (e.g., chainsaws, bush-hog, mowers). This will protect potential recharge areas of cave streams and other karst features that are connected hydrologically to caves.
☐	L1	Direct temporary lighting away from suitable habitat during the active season.
☐	L2	Evaluate the use of outdoor lighting during the active season and seek to minimize light pollution when installing new or replacing existing permanent lights by angling lights downward or via other light minimization measures (e.g., dimming, directed lighting, motion-sensitive lighting).

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

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

June 7, 2018

Mr. E Patrick McIntyre, Jr.
Executive Director
Tennessee Historical Commission
2941 Lebanon Road
Nashville, Tennessee 37243-0442

Dear Mr. McIntyre:

TENNESSEE VALLEY AUTHORITY (TVA), NORRIS ENGINEERING LABS COMPLEX PROPOSED RENOVATION, ANDERSON COUNTY, TENNESSEE

TVA has previously consulted with your office regarding the Norris Engineering Labs Complex (Figure 1), located in Norris, Tennessee (36.18844º, - 84.07048º). In consultation with your office, TVA recommended the Norris Engineering Labs Complex as eligible as a district for the National Register of Historic Places (NRHP) and that Buildings A, B, C, D, G, I, Q1, Q2, and T, which were constructed during the laboratory's period of significance are contributing resources to the district. Buildings A, C, and D were also recommended eligible for the NRHP under Criterion A for their association with the early development of TVA and the agency's ceramics research laboratory during the period between 1935 and 1938. The remaining buildings and sheds were all recommended non-contributing to the district.

Since this consultation, TVA has contracted with Thomason & Associates to reassess the eligibility of Building B. See attached, *Reassessment of Contributing Status Building B, Norris Engineering Laboratory, Norris Tennessee (Thomason).* Building B is a one-story rectangular building that was constructed ca. 1934. Building B underwent major renovation in 1988 which led to significant exterior and interior alterations. Alterations included the removal of original windows from each bay along the north and south elevations. At the same time, interior spaces were enclosed with concrete blocks to create new offices. TVA now recommends that Building B is no longer contributing to the district due to alterations and loss of integrity.

In addition, an error was identified in the original report concerning Building I. Building I is recorded as a steel-frame warehouse/storage building constructed ca. 1988. Building I was inadvertently listed as a contributing building in the final summary of the report. Since the building was not constructed during the laboratory's period of significance, TVA now recommends Building I as non-contributing to the district.

TVA is currently proposing the following:

1. Lighting upgrades and a new HVAC system to Buildings D, N, T, I & G;

2. Interior wall modifications and replacement of stained wall/ceiling panels in Buildings B, Q1 and Q2;
3. Office and laboratory space construction within Building J;
4. Demolition of two boat sheds; and
5. Construction of a 17 feet (ft) high by 63ft long by 45ft wide new boat shed.

TVA has identified the area of potential effects (APE) for historic architectural resources to be the Norris Engineering Lab Complex. For archaeological resources, the APE has been identified as any area proposed for ground disturbance associated with the demolition of sheds and construction of new boat shed on the property. TVA Cultural Compliance staff (Creswell) conducted a field review on May 2, 2018 at the location of the sheds proposed for demo and the proposed new boat shed. The field review consisted of a pedestrian survey of the entire archaeological APE and the excavation of six shovel test pits (STPs) (Figure 2). The STPs data revealed a shallow (0 – 3 cm thick) humus layer underlain by a shallow (3 – 16 cm thick) brown silt loam plow zone, underlain by a yellowish yellowish-red – red clay loam subsoil (Figure x). All STPs were negative for cultural deposits and/or artifacts. The pedestrian survey verified that most of the interior of the APE had been previous disturbed through construction of buildings and/or roadways.

The field review also included a visual assessment of the proposed new boat shed. Currently the line of sight to the new boat shed would not be visible to other buildings due to vegetation. However, if the area slated for ground disturbance in Figure 2 (area in red) has all of the trees removed the proposed new boat shed would be visible to contributing Buildings G, T and Q2. The viewshed of these structures have already been compromised by the 1988 construction of non-contributing buildings and pole sheds. The location for the proposed new boat shed would not have a visual affect on contributing Buildings A, C, D, and Q1 as the viewshed is obscured and there would be no line of sight even if the vegetation is cleared within the archaeological APE.

Pursuant to 36 CFR § 800 (4)(d)(1), we are seeking your concurrence with TVA's findings that:

- Buildings B and I are non-contributing buildings to the NRHP eligible Norris Engineering Labs Complex;
- the proposed modifications and work to non-contributing Buildings N, I, G, and J would not affect the district as work would be interior and not visible to any contributing buildings;
- the proposed interior wall modifications and ceiling panel replacement would not adversely effect contributing Buildings Q1 and Q2; and
- the proposed construction of the new boat shed would not have an adverse visual effect on the district.

Pursuant to 36 CFR Part 800.3(f)(2), TVA is consulting with federally recognized Indian tribes regarding our findings and recommendations.

If you have any questions or comments, please contact Marianne Shuler by telephone, (865) 632-2464 or by email, mmshuler@tva.gov.

Sincerely,

Clinton E. Jones
Manager
Cultural Compliance

MMS:ABM
Enclosures
cc (Enclosures):
Ms. Jennifer Barnett
Tennessee Division of Archaeology
1216 Foster Avenue, Cole Bldg. #3
Nashville, Tennessee 37210

INTERNAL COPIES ONLY, NOT TO BE INCLUDED WITH OUTGOING LETTER:

A. Michelle Cagley, KFP 1T-KST
U. Matthew Clemmer, LP 3P-C
Michael J. Dobrogosz, WT 11A-K
Susan R. Jacks, WT 11C-K
Lora C. Kilgore, BR 4B-C
Cindy K. Light, WT 11A-K
Marianne M. Shuler, WT 11D-K
M. Susan Smelley, BR 4A-C
William C. Threlkeld, WT 3B-K
Dana M. Vaughn, WT 11D-K
ECM, WT CA-K

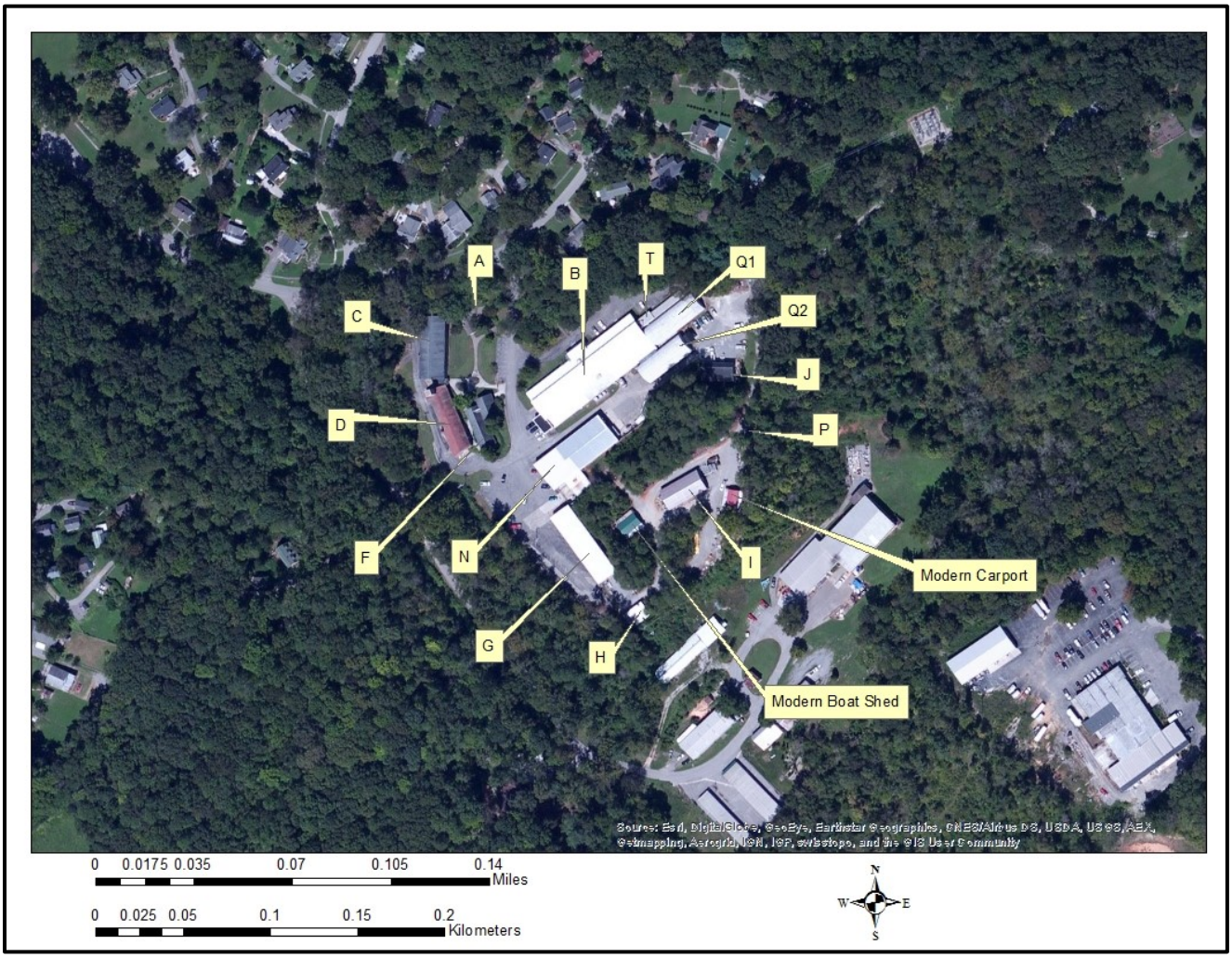

Figure 1. Aerial view of the Norris Labs Complex showing the locations of the buildings.

Figure 2. Norris Engineering Labs Complex with proposed work and STP locations.

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

June 20, 2018

Mr. Clinton E. Jones
Tennessee Valley Authority
Biological and Cultural Compliance
400 West Summit Hill Drive
Knoxville, TN 37902

RE: TVA / Tennessee Valley Authority, Norris Engineering Labs Proposed Renovations, Norris, Anderson County, TN

Dear Mr. Jones:

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

Based on the information provided, we find that the proposed construction of the new boat shed; proposed modifications and work to Buildings N, I, G, and J; and proposed interior wall modifications and ceiling panel replacement in Buildings Q1 and Q2 will not adversely affect the National Register of Historic Places-eligible Norris Engineering Labs Complex.

Regarding Building B at Norris Engineering Labs, the request contains no new information that would justify reassessing our 2015 concurrence with the determination that Norris Engineering Labs is an eligible district and that Building B is a contributing resource. Although Building B was altered in the 1980s, these alterations were present in 2015 when SHPO determined it contributing. Furthermore, Building B is a major resource in the district, so reassessment of Building B would require reassessment of the district as a whole and presentation of new information that we did not have in 2015.

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

further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act. Questions and comments may be directed to Justin Heskew (615) 770-1092. We appreciate your cooperation.

Sincerely,

E. Patrick McIntyre, Jr.

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

EPM/jsh

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

November 16, 2018

Mr. E. Patrick McIntyre, Jr.
Executive Director
Tennessee Historical Commission
2941 Lebanon Road
Nashville, Tennessee 37243-0442

Dear Mr. McIntyre:

TENNESSEE VALLEY AUTHORITY (TVA), NORRIS ENGINEERING LABS COMPLEX PROPOSED RENOVATION, ANDERSON COUNTY, TENNESSEE

TVA has previously consulted with your office, first in 2015 and again in 2018 regarding proposed renovation projects at the Norris Engineering Labs in Norris, Anderson County, Tennessee (36.18844, -84.07048) (Figure 1). In 2015, your office concurred that the Norris Engineering Labs Complex was eligible for listing in the National Register of Historic Places (NRHP) as a district, and that buildings A, B, C, D, G, I, Q1, Q2, and T are contributing resources. Buildings A, C, and D were also recommended eligible for listing in the NRHP under Criterion A for their association with the early development of TVA and the agency's ceramics research laboratory. The remaining buildings and sheds were all recommended as non-contributing to the district.

Your response dated June 20, 2018 concurred that based on the information provided, the proposed actions (construction of the new boat shed; proposed modifications and work to Buildings N, I, G, and J; and proposed interior wall modifications and ceiling panel replacement in Buildings Q1 and Q2) would not adversely affect the NRHP-eligible Norris Engineering Labs Complex.

Since previous consultation in June 2018, TVA has modified plans for the site. In addition to the previously-reviewed work, TVA proposes the following as a part of the current phase of work:

1. Installation of cameras and illuminators on Buildings B and D for security requiring the removal of two trees on northwest corner of Building B (Figures 2 and 3);
2. Groundwork on the south side of Building B and north side of current boat area;
3. Trenching to Building I;
4. Tree removal near boat sheds;
5. Repaving/reconfiguring parking lots that are currently surfaced and with no additional ground disturbance;

6. Construction of groundwater pond on the south side of the complex near Buildings H and I;
7. Demolition of two boat "sheds" (Connex A and Connex B) (Figures 4 and 5);
8. Construction of new boat sheds (Figures 6-7); and
9. Demolition of Building I.

Previous consultation indicated that a single boat shed was planned for construction near Building I. Project design has advanced and is currently focused on two options:

A. Demolition of Building I and the construction of three long self-supporting boat sheds and a combined shop and shed in place of Building I (see Figure 6); or
B. Demolition of Building I and the construction of a large curved/L-shaped shed to the northwest and southwest of the Building I and a combined shop and shed in place of Building I (see Figure 7).

TVA identified the area of potential effects (APE) for indirect/visual effects to be the extent of the Norris Engineering Lab Complex, as it is an NRHP-eligible district (see Figure 1). For archaeological resources and direct effects, the APE has been identified as any area proposed for ground disturbance associated with the demolition of sheds, construction of new boat sheds on the property, groundwork, trenching, and tree removal (as described in actions #2-4 and 6-9 above) (Figure 8).

TVA Cultural Compliance staff conducted a field review on May 2 and October 5, 2018 at the location of the connex boat "sheds" proposed for demo and the proposed new boat shed(s) (see Figure 8). The field review consisted of a pedestrian survey of the entire archaeological APE and the excavation of nine shovel test pits (STPs). The STPs data revealed a shallow (0 – 3 cm thick) humus layer underlain by a shallow (3 – 16 cm thick) brown silt loam plow zone, underlain by a yellowish yellowish-red – red clay loam subsoil (Figure 9). All STPs were negative for cultural deposits and/or artifacts. The pedestrian survey verified that most of the interior of the APE had been previous disturbed through construction of buildings and/or roadways. Additionally, the two trees to be removed at the northwest corner of Building B for security camera installation (action #1) will not require removal of stumps or any additional ground disturbance (see Figure 2). Thus, TVA finds the proposed actions (#1-9) will have no effect on archaeological resources.

An additional field review was completed by TVA's Architectural Historian on October 16, 2018 to assess potential direct and indirect/visual effects of each of the proposed actions on historic architectural resources and the NRHP-eligible district. Action #1, the removal of two trees and the addition of new cameras and illuminators on the exterior of Buildings B, D, and I for security, will not adversely affect the historic character of the buildings or create an intrusion into the district beyond existing intrusions for safety and security.

The field review also included a visual assessment of the effects of actions focused near the boat storage area and Building I (actions #2-9 as described above). Currently, the line of sight to the proposed locations of boatshed structures is obscured by vegetation (Figures 10 and 11). Removal of vegetation and groundwork associated with actions #2-9 will be visible within the southeastern section of the complex; however, the proposed boat sheds will not be within direct line of sight of Buildings B, G, T, and Q2, which are contributing to the district. Given that a thin vegetative buffer will remain around the perimeter of the area and the newly-constructed boat sheds will only exceed the current height of Building I by five feet, the proposed actions #2-9 will only have a direct or indirect/visual effect on Building I, which is currently recommended as non-contributing to the NRHP-eligible district.

In our previous consultation, we provided a correction regarding the contributing status of Building I. It was previously recorded a steel-frame warehouse building constructed ca. 1988; however, due to a typographical error, it was listed in a table as being a contributing resource in previous consultation. In addition to being constructed after the laboratory's period of significance, the building is not in its original location. According to laboratory staff, the building was originally constructed at one of TVA's hydroelectric plants, disassembled, and reassembled on site in the late 1980s. Each of the metal panels on the north, south, and east elevations feature numbers to indicate location for assembly after relocation (Figures 12-14). Given that a typographical error led to it being determined a contributing resource and that it was moved from another location and reassembled at the laboratory after the period of significance of the NRHP-eligible district, TVA finds Building I is not a contributing building and therefore, its demolition would not result in an adverse effect. Furthermore, TVA plans to reassess the entire district for NRHP eligibility and contributing status prior to any additional projects at the laboratory beyond this current scope.

Pursuant to 36 CFR Part 800.3(f)(2), TVA is consulting with federally recognized Indian tribes regarding our findings and recommendations.

Pursuant to 36 CFR 800.5(b), we are seeking your concurrence with TVA's findings that:

- Building I is a non-contributing building to the NRHP-eligible Norris Engineering Labs Complex;
- The proposed actions (#1-9) will have no effect on archaeological resources;
- The addition of security cameras and illuminators (action #1) will have no adverse effect to historic properties; and
- The remaining actions (#2-9) will have minimal effect because a vegetative buffer will remain between Buildings B, G, T, and Q2 and the proposed boatshed to minimize the effect of new construction, thus the proposed undertaking will have no adverse effect to historic properties.

Should you have any questions or comments, please contact Hallie Hearnes in Knoxville by email, hahearnes@tva.gov or by phone, (865) 632-3463.

Sincerely,

Edward W. Wells

Edward W. Wells on Behalf of Clinton E. Jones
Manager
Cultural Compliance

HAH:ABM
Enclosures
cc (Enclosures):
Ms. Jennifer Barnett
Tennessee Division of Archaeology
1216 Foster Avenue, Cole Bldg. #3
Nashville, Tennessee 37210

INTERNAL COPIES NOT TO BE INCLUDED WITH OUTGOING LETTER:

Lana D. Bean, WT 10C-K
Michael J. Dobrogosz, WT 11A-K
Patricia B. Ezzell, WT 7C-K
Travis A. Giles, MR 4G-C
Hallie A. Hearnes, WT 11B-K
Susan R. Jacks, WT 11C-K
Lora C. Kilgore, BR 4B-C
Cindy K. Light, WT 11A-K
Paul J. Pearman, BR 4A-C
Marianne M. Shuler, WT 11D-K
M. Susan Smelley, BR 4A-C
William C. Threlkeld, WT 11-A-K
Dana M. Vaughn, WT 11B-K
ECM, WT CA-K

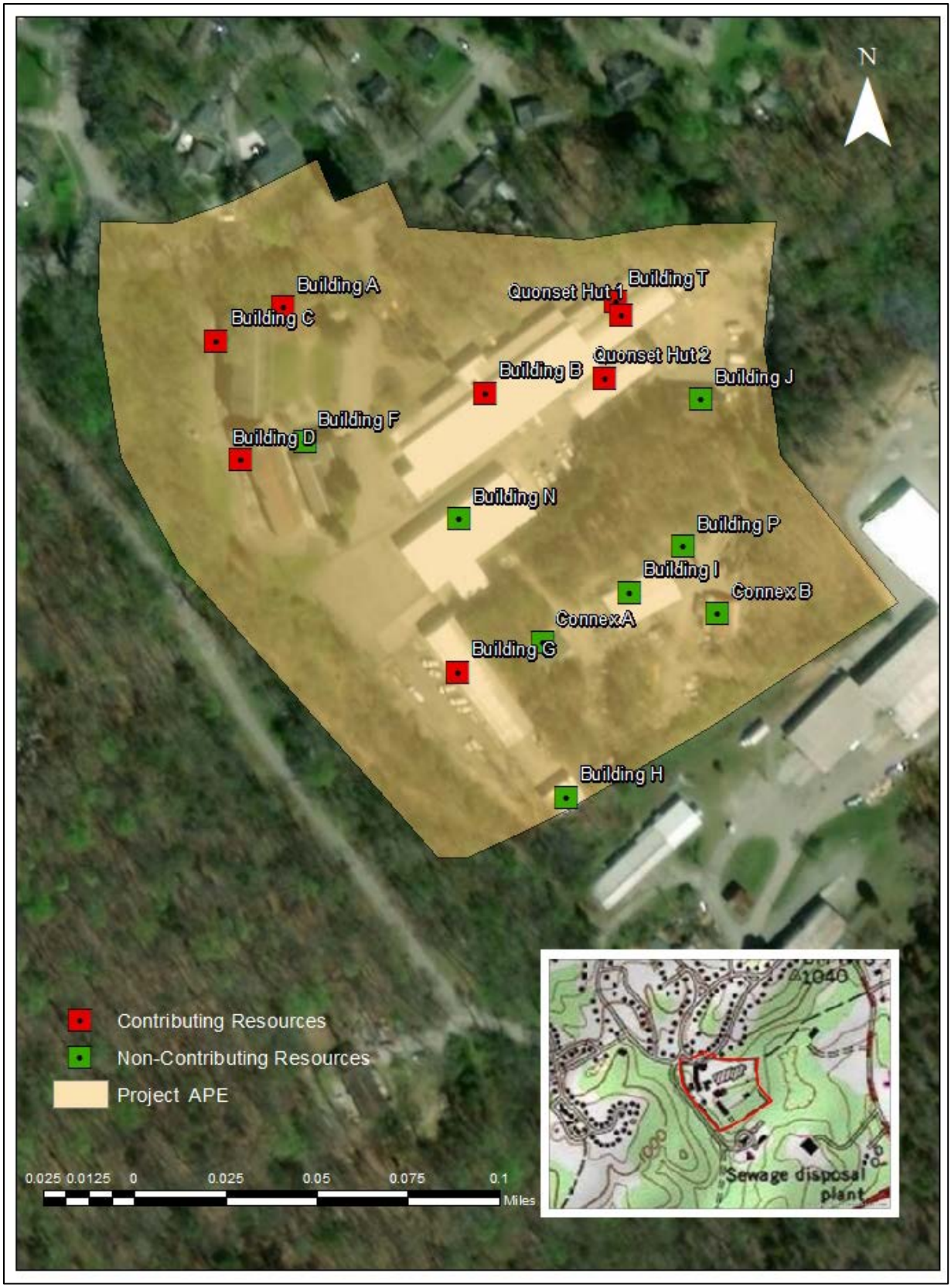

Figure 1. Aerial photograph and topographic map depicting the NRHP-eligible Norris Engineering Labs district and APE for indirect/visual effects.

Figure 2. Aerial photograph showing location of two trees to be removed as a part of action #1.

Figure 3. Two trees to be removed as a part of action #1.

Figure 4. Connex A to be removed.

Figure 5. Connex B to be removed.

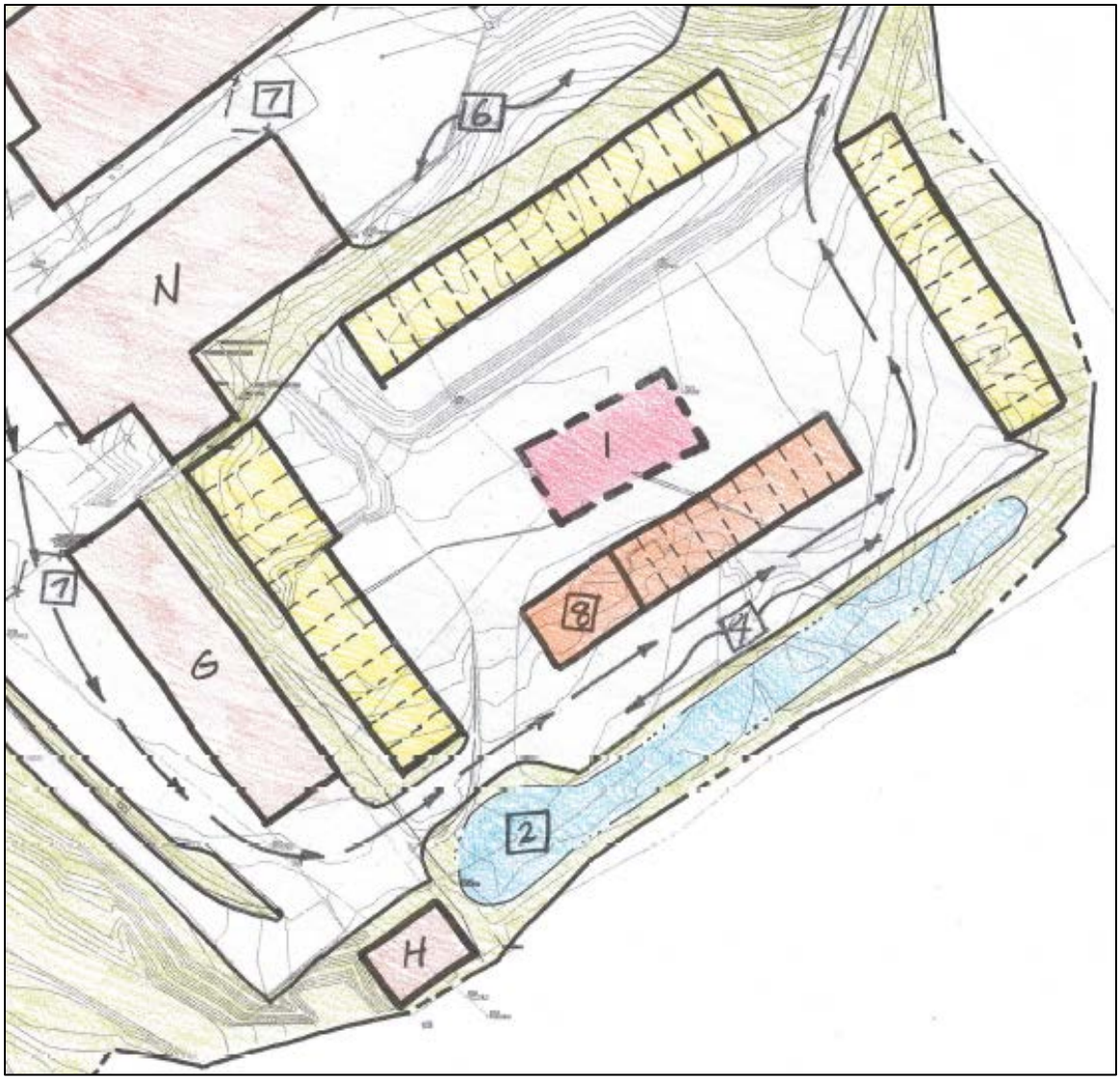

Figure 6. Proposed boat shed configuration (Option A) showing the demolition of Building I and the construction of three long boat sheds and a combined shop and shed in place of Building I.

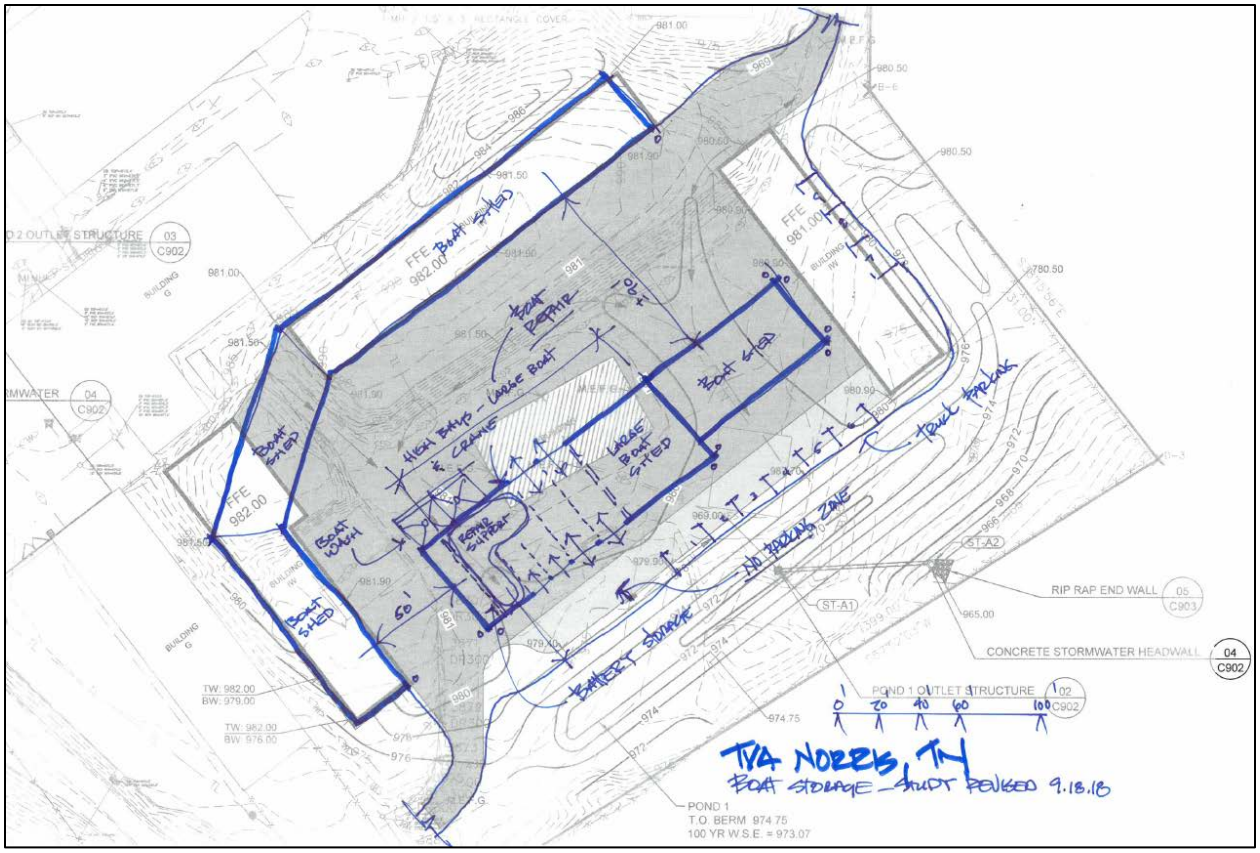

Figure 7. Proposed boat shed configuration (Option B) showing the demolition of Building I and the construction of a large curved/L-shaped shed to the northwest and southwest of Building I and a combined shop and shed in place of Building I.

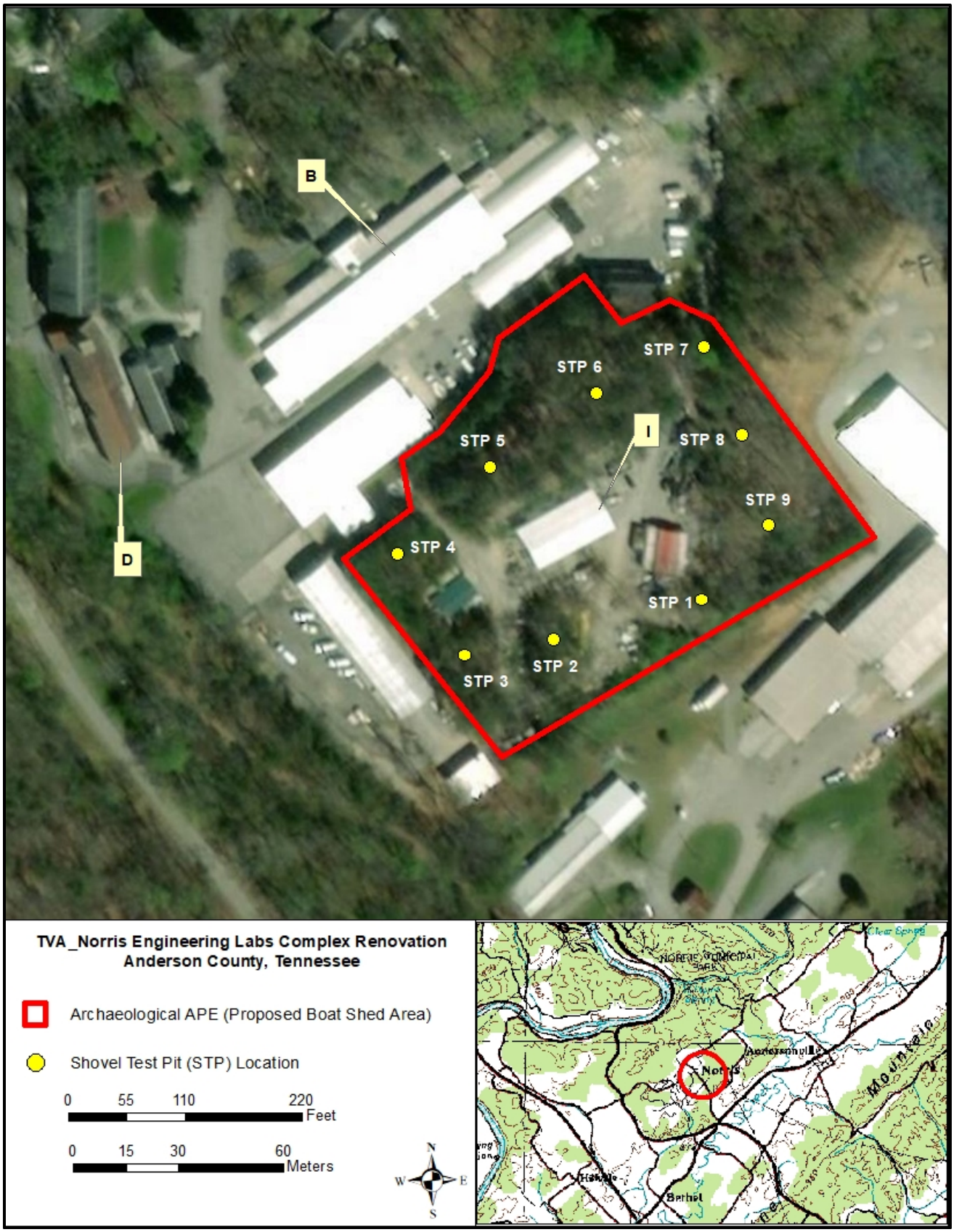

Figure 8. Aerial view of archaeological APE for direct effects.

Figure 9. Typical profile of soils within the archaeological APE. View of STP 6.

Figure 10. Northerly view of the existing vegetation to the north of Building I (right). Building N (non-contributing) is visible on the left.

Figure 11. Existing vegetation to the south of Buildings B and Q2 and north of Building I.

Figure 12. Numbers on east elevation of Building I.

Figure 13. Numbers on the north elevation of Building I.

Figure 14. Detail of numbers on the south elevation of Building I.

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

December 5, 2018

Mr. Clinton E. Jones
Tennessee Valley Authority
Biological and Cultural Compliance
400 West Summit Hill Drive
Knoxville, TN 37902

RE: TVA / Tennessee Valley Authority, Norris Engineering Labs Complex Proposed Renovation, Norris, Anderson County, TN

Dear Mr. Jones:

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

Based on the information provided, we find that: 1) Building I is a Non-Contributing building to the NRHP-eligible Norris Engineering Labs Complex; 2) the demolition of Building I, Connex A, and Connex B will not have an adverse effect on the district; 3) the construction of new boat sheds and a groundwater pond on the south side of the complex near Buildings H and I, as proposed, will not have an adverse effect on the district due to the vegetative buffer that will remain in place between Buildings B, G, T, and Q2; 4) the addition of security cameras and illuminators will have no adverse effect; 5) all remaining tree removals and other activities proposed will not have an adverse effect.

This office has no objection to the implementation of this project as currently planned. If project plans are changed or previously unevaluated archaeological resources are discovered during project construction, please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act. Questions and comments may be directed to Justin Heskew at (615) 770-1092. We appreciate your cooperation.

Sincerely,

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

EPM/jsh