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ECONOMIC DEVELOPMENT GRANT PROPOSAL FOR PROPOSED INDUSTRIAL SITE PURCHASE AND TREE CLEARING ENVIRONMENTAL ASSESSMENT

Smith County, Tennessee

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1.0 PROPOSED ACTION AND NEED

An integral part of Tennessee Valley Authority's (TVA) mission is to promote economic development within the TVA service area. TVA provides financial assistance to help bring to market new improved sites and facilities within the TVA service area and position communities to compete successfully for new jobs. The Proposed Action is comprised of TVA providing an economic development grant through TVA InvestPrep™ funds to Smith County, Tennessee to assist in the purchase of an approximately 119-acre tract of land for use as a proposed industrial site and for associated tree clearing within the tract of land. The site of the Proposed Action is located adjacent to Highway 53 (Gordonsville Highway) in Gordonsville, Smith County, Tennessee (see Figure 1 below and Attachment 1, Figure 1-A) and is comprised of one approximately 102-acre parcel (Baker Parcel) and an approximately 17-acre portion of an adjacent parcel (Gordonsville Development Parcel). The Baker Parcel and the portion of the Gordonsville Development Parcel are collectively referred to as the Project Site.

The primary purpose of the Proposed Action is to enable Smith County to purchase the Project Site for future use as an industrial park and to clear designated trees to provide improved visibility of the Project Site from adjacent roads. Smith County has committed to allocate approximately 75 percent of the total cost of the Project Site, but does not have sufficient funds for the remainder of the cost or for the associated tree clearing. TVA is proposing to fund approximately 25 percent of the cost of the property purchase and tree clearing and would, therefore, partially facilitate the purchase of the Project Site under the Proposed Action.

2.0 OTHER ENVIRONMENTAL REVIEWS AND DOCUMENTATION

Phase I Environmental Site Assessments of the two parcels that make up the Project Site were performed consistent with the procedures included in ASTM E 1527-05 (Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process) by ECS Southeast, LLP in December 2017 (ECS Southeast, LLP 2017a and 2017b). The primary purpose of the Phase I Environmental Site Assessments was to identify the presence of recognized environmental concerns or other environmental liabilities within the Project Site. These Phase I Environmental Site Assessments were used in the preparation of this Environmental Assessment.

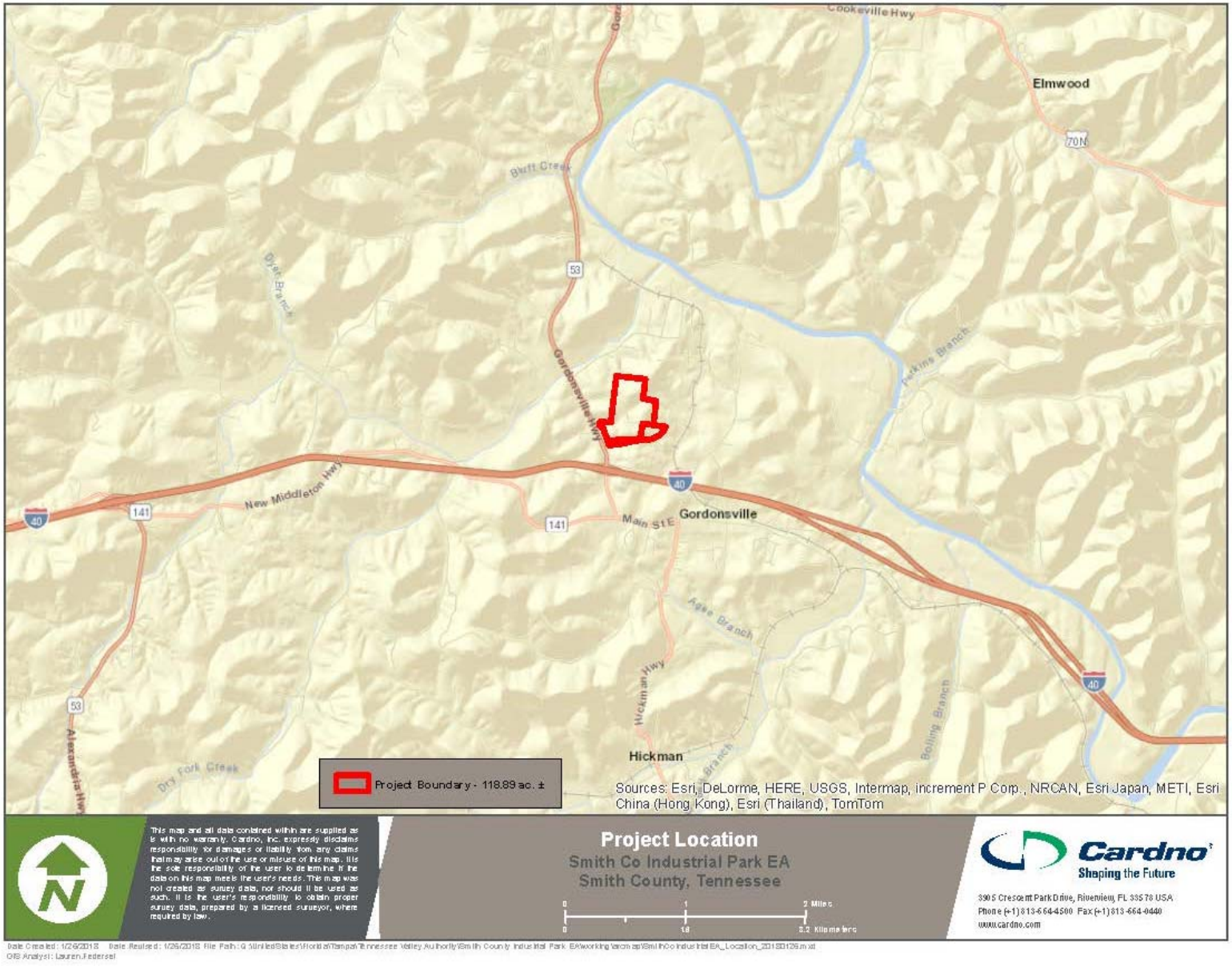


Figure 1: Project Location

3.0 ALTERNATIVES

Preliminary internal scoping by TVA has determined that from the standpoint of National Environmental Policy Act (NEPA), there are two alternatives available to TVA, the No Action Alternative and the Action Alternative, which are described below.

No Action Alternative

Under the No Action Alternative, TVA would not provide TVA InvestPrep™ funds to Smith County. TVA would not satisfy its mission of promoting economic development within the TVA service area at this specific site and would not position this specific community to compete successfully for new jobs through the Proposed Action. Smith County would presumably seek alternate funding (if available) to complete the purchase of the Project Site and associated tree clearing, which would result in similar impacts and benefits of the Action Alternative.

If Smith County were not able to secure the remaining funding for the purchase of the tract of land and associated tree clearing, the land use at the site would likely remain unchanged, no direct environmental impacts would be anticipated, and the economic benefits associated with the Action Alternative would not be realized.

Action Alternative

Under the Action Alternative, TVA would provide TVA InvestPrep™ funds to Smith County to support the purchase of the Project Site for future use as an industrial park. Trees would be removed within three separate designated areas of the Project Site (Attachment 1, Figure 1-B). Designated tree clearing areas total 18.32 acres. Within the tree clearing areas, approximately 8.25 acres of mixed-deciduous forest would be removed. Tree clearing would occur over an approximately two week period and would involve operation of an excavator and bulldozer. TVA's preferred alternative is the Action Alternative.

Smith County or its contractors would take appropriate feasible measures, such as implementing best management practices (BMPs) and best construction practices, to minimize or reduce negative potential environmental impacts of the Action Alternative to insignificant levels. These practices would include but are not limited to installation of sediment and erosion controls (silt fences, sediment traps, etc.); management of fugitive dust; and day time work hours. The one onsite residence, outbuildings, barns, sheds, utilities, and cell tower would be left in place and would not be impacted under the Action Alternative.

The Action Alternative does not include activities directly associated with the eventual build-out, occupation, and future use of the industrial park. The future industrial park would accommodate at least three distinct sites, and would target automotive suppliers and light manufacturers. While it is unlikely that future industrial development would disturb (grading, vegetation removal, etc.) the entire site, TVA assumed future disturbance of the entire Project Site, including removal of the onsite residence, outbuildings, barns, and sheds as a conservative approach for purposes of assessing cumulative impacts in this environmental assessment. Cumulative Impacts are discussed in Section 5 of this Environmental Assessment.

4.0 AFFECTED ENVIRONMENT AND ANTICIPATED IMPACTS

Site Description

The Project Site is located on approximately 119-acres adjacent to Highway 53 (Gordonsville Highway) in Gordonsville, Smith County, Tennessee. The current land use within the Project Site consists of agricultural farmland (pasture) and woods (mixed-deciduous forest) and is currently being used for cattle management. One residence and several outbuildings, barns and sheds are located within the Baker Parcel. Underground water and natural gas lines are located along the western property line of the Baker Parcel, and a cell tower exists on the eastern portion of the Baker Parcel. The properties adjacent to the Project Site consist of undeveloped land to the north; the Nyrstar zinc mine to the northeast; undeveloped land and the Rogers Group Gordonsville Quarry to the east; Rogers Road, woods (mixed-deciduous forest), agricultural farmland (pasture and cultivated crops), and residential areas to the south; several restaurants to the southeast; and apartment buildings and Graphics Packaging International (manufacturer of packaging for commercial products) to the west.

The Project Site was previously zoned for agricultural use; however, the City of Gordonsville re-zoned the parcels for industrial use in late 2017.

The Project Site generally consists of rolling topography, with the highest elevation surfaces located in the northeastern and eastern portions and the lower elevation surfaces located toward the western and southern portions (Attachment 1, Figure 1-C). Surface water features are located throughout the Project Site (Attachment 1, Figure 1-D). Mulherrin Creek is the nearest named stream, located approximately 0.25 miles from the northwestern portion of the Project Site.

Impacts Evaluated

TVA has determined that the Proposed Action, subsequent to TVA's selection of the Action Alternative, would have no impact on floodplains, prime farmland, natural areas, public recreation opportunities, managed areas, solid and hazardous wastes, Nationwide Rivers Inventory streams or Wild and Scenic Rivers, as discussed below. Therefore, potential impacts to these resources are not described in further detail in this Environmental Assessment.

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps, 47159C0204D and 47159C0215D, the Project Site is located in Zone X, defined as areas outside the 500-year floodplain (FEMA 2010) (Attachment 1, Figure 1-E).

Information from the Natural Resources Conservation Service (NRCS) Web Soil Survey (NRCS 2018) was examined to determine if prime farmland soils, defined as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is also available for these uses, are present in the Project Site. Eleven soil map units are present within the Project Site and all are rated as Not Prime Farmland (Attachment 1, Figure 1-F). Because prime farmland is not present with the Project Site, the Action Alternative would have no impact on prime farmland soils.

A review of data from the TVA Natural Heritage Database indicated that there are no Natural Areas (defined as places dominated by native vegetation that have various levels of

potential for harboring high quality natural resources and unique features) within the Project Site. Two Natural Areas, Dripping Rock Bluff and Caney Fork, are located 1.9 and 0.9 miles from the Project Site, respectively. These areas are of sufficient distance such that there would be no impacts associated with the Action Alternative.

There are no developed public recreation areas or managed areas in the vicinity of the Project Site. Turney Ford Field is a small sports field located approximately 1.0 mile from the Project Site and is the nearest developed public outdoor recreation area. This area is of sufficient distance such that there would be no impacts associated with the Action Alternative.

No observations or evidence of hazardous materials were observed on the Project Site during the December 2017 Phase 1 Environmental Site Assessments. No demolition or waste disposal activities are associated with the Action Alternative.

No United States National Park Service, Nationwide Rivers Inventory river segments (USNPS 2018) or Wild and Scenic River segments (WSR 2018) are located within the Project Site.

Resources that could potentially be impacted (negatively or positively) directly, indirectly or cumulatively by implementing the Action Alternative include air quality and climate change, biological resources (vegetation, wetlands, water resources and water quality, wildlife and threatened and endangered species), land use, cultural resources, visual resources, noise, socioeconomics and environmental justice, transportation, and safety. Potential impacts to these resources resulting from implementation of the Action Alternative are discussed in detail below.

Air Quality and Climate Change

Air quality is defined by ambient air concentrations of specific pollutants (referred to as criteria pollutants) determined by the United States Environmental Protection Agency (USEPA) to be of concern related to the health and welfare of the public and the environment. These criteria pollutants include ozone, sulfur dioxide, carbon monoxide, particulate matter, lead and nitrogen dioxide. Under the Clean Air Act (CAA), the USEPA has established National Ambient Air Quality Standards (NAAQS) (40 Code of Federal Regulations part 50) for criteria pollutants. These standards represent the maximum allowable atmospheric concentrations that may occur while promoting protection of public health and welfare, with a reasonable margin of safety. Air quality in Smith County, Tennessee meets national standards and the County is designated attainment with respect to those criteria pollutants (USEPA 2017).

Fugitive dust would be generated under the Action Alternative during land disturbance activities associated with tree clearing and removal. Emissions from the tree clearing equipment exhaust would include diesel particulate matter, carbon monoxide, sulfur dioxide and the ozone precursors, nitrogen oxides, and volatile organic compounds. Marketable timber would be removed from the Project Site and the remaining woody debris would be burned on-site in accordance with a local burn permit to be obtained by Smith County or its contractors. Smoke from burning the woody debris could contribute carbon monoxide and particulate matter to the ambient air.

Climate change results from the incremental addition of greenhouse gas emissions from millions of individual sources, which collectively have a large impact on a global scale. The

operation of equipment burning fossil fuels as part of tree clearing activities would generate minor greenhouse gas emissions which would not differ significantly from greenhouse gas emissions from equipment currently used to maintain and manage the Project Site for agricultural purposes.

Tree clearing would also eliminate a greenhouse gas sink, as trees serve as a form of long-term carbon dioxide storage. Implementation of the Action Alternative would result in clearing of 8.25 acres of trees (25.41 acres of mixed-deciduous forest would remain within the Project Site), which would have a negligible impact on greenhouse gas storage.

Because of the limited duration of equipment operation associated with tree clearing and woody debris burning and negligible reduction in greenhouse gas storage, negative impacts to local air quality would be temporary, localized, and negligible.

Under the No Action Alternative, tree clearing and associated burning would not occur and there would be no impact to air quality and climate change.

Biological Resources

Vegetation

Aerial photographs, site photographs, and topographic maps, were reviewed to preliminarily identify the vegetative communities present within the Project Site. Following review of available data, a field survey was conducted to verify these vegetative communities. The site consists of two vegetation communities: pasture (85.23 acres) and mixed-deciduous forest (33.66 acres). The proposed tree clearing areas are located within the mixed-deciduous forest vegetative community type.

Vegetation within the improved pasture areas consisted primarily of grasses that were maintained either by cattle grazing or were mowed/tilled, presumably for hay production.

The understory within the areas of mixed-deciduous forest was sparse and much was covered by leaf litter. Some catbrier (*Smilax* spp.) and poison ivy (*Toxicodendron radicans*) was present. The dominant canopy species observed in the mixed-deciduous forest areas included tulip popular (*Liriodendron tulipifera),* American basswood *(Tilia americana),* bitternut hickory *(Carya cordiformis),* shagbark hickory *(Carya ovata),* chinkapin *oak (Quercus muehlenbergii),* black cherry *(Prunus serotina),* common hackberry *(Celtis occidentalis),* sugar maple *(Acer saccharum),* black locust *(Robinia pseudoacacia)*, American sycamore (*Platanus occidentalis),* and red cedar *(Juniperus virginiana)*.

Implementation of the Action Alternative would remove canopy species within the three tree clearing areas for a total of 8.25 acres of tree removal. Following implementation of the Action Alternative, 25.41 acres of mixed-deciduous forest would remain within the Project Site. Review of aerial imagery shows that the mixed-deciduous forest habitat is common and well represented throughout the region and in the immediate vicinity of the Project Site. Implementation of the Action Alternative would have a negligible impact on the vegetation of the region.

Under the No Action Alternative tree clearing would not occur and it is anticipated that the existing site conditions would be maintained resulting in no impact to vegetation.

Wetlands

Aerial photographs, site photographs, topographic maps, the United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI), the United States Geological Survey (USGS) National Hydrography Dataset (NHD), and the NRCS Soils and Soil Survey Geographic (SSURGO)/State Soil Geographic (STATSGO) databases were reviewed to determine if wetlands were potentially present within the Project Site. Attachment 1, Figure 1-G depicts NWI data for the Project Site. Following review of available data, a field survey was conducted to delineate wetlands within the Project Site. The wetland delineation was performed using the routine on-site determination methods described in the Corps of Engineers Wetlands Delineation Manual (United States Army Corps of Engineers [USACE], Environmental Laboratory 1987) and is consistent with the methods, guidelines, and indicators present in the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region ([Regional Supplement] USACE 2012). No wetlands were identified within the Project Site, therefore implementation of the Action Alternative would not impact wetlands.

Similar to the Action Alternative the No Action Alternative would result in no impact to wetlands.

Water Resources and Water Quality

Aerial photographs, site photographs, topographic maps, the USFWS NWI, the USGS NHD, and the NRCS SSURGO/STATSGO databases were reviewed to determine the water resources potentially present within the Project Site. Following review of available data, a field survey was conducted to delineate water resources present within the Project Site. Waterbodies within the Project Site were identified by the presence of an Ordinary High Water Mark (OHWM). The top of bank or the centerline of the channels or edge of ponds was geographically located by using global positioning systems (GPS) capable of sub-meter accuracy. Information was collected on each waterbody including flow type (e.g., perennial, intermittent, or ephemeral), substrate type (mud/silt, sand, gravel, large rock, boulder, and/or bedrock), and channel width and depth. During the field survey, the following categories of waterbodies were evaluated for the Project:

- Traditional Navigable Water (TNW) – All those waters that are subject to the ebb and flow of the tide, and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. For the purposes of this Project, TNWs are those identified in List of Navigable Waters of the United States (WOTUS) within the Nashville District;

- Perennial Stream – A waterbody expected to have continuous year-round flow, with a well-defined OHWM, and sometimes (but not always) indicated on the USGS Quadrangle as a solid blue line;

- Intermittent Stream – A waterbody expected to have seasonal flow with seasonal flow defined as continuous flow for a consecutive period of at least three months, with a defined OHWM, and sometimes (but not always) indicated on the USGS Quadrangle as a dashed blue line;

- Wet Weather Conveyance / Ephemeral Stream – A watercourse expected to only have flow of short duration after a rainfall event, often with an ill-defined OHWM and channel, usually not indicated on the USGS Quadrangles; and

- Pond – A basin or area of non-flowing water where water is expected to pool on at least a seasonal basis defined as pooling for a consecutive period of at least three months, with a well-defined OHWM, hydrophyte vegetation may be present, in some cases man-made or altered, and may be indicated on the USGS Quadrangles.

Waterbodies were examined to determine if they were Jurisdictional waters of the United States (WOTUS) regulated by the USACE under Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act (RHA). Waterbodies were also investigated to determine if they were Jurisdictional Waters of the State of Tennessee (WOST) regulated by the Tennessee Department of Environment and Conservation (TDEC) under the Tennessee Water Quality Control Act of 1977. A Tennessee Qualified Hydrologic Professional (TN-QHP) conducted a hydrologic determination of each linear watercourse in accordance with the Tennessee Department of Environment and Conservation Division of Water Pollution Control *Guidance for Making Hydrologic Determinations* (TDEC 2011).

Water resources identified within the Project Site and within the tree clearing areas consisted of eight intermittent stream channels, thirteen wet weather conveyances or ephemeral streams, and four open water ponds (Attachment 1, Figure 1-D). These areas comprised 4,337 linear feet of intermittent stream, 2,007 linear feet of wet weather conveyances or ephemeral streams, and 0.9 acre of open water pond. The eight intermittent streams were considered relatively permanent waters and would be Jurisdictional WOTUS and WOST. Given the proximity of the four open water ponds to the intermittent streams, these waterbodies would also be potentially Jurisdictional WOTUS and WOST. The thirteen ephemeral streams were considered non-relatively permanent waters, but all have a direct connection to relatively permanent waters and would be potentially Jurisdictional WOTUS. Ephemeral waterbodies were also classified as wet weather conveyances and would not be Jurisdictional WOST.

All water features identified were within the Caney Watershed defined by the 8-digit Hydrologic Unit Code (HUC) 05130108 (EPA 2018). The Project is mostly located within the Mulherrin Creek defined by the 12-digit HUC 051301080907, and partially located in the Caney Fork River Outlet defined by the 12-digit HUC 051301080908. All water features identified were within the Mulherrin Creek 12-digit HUC. None of the features or the named receiving water (Mulherrin Creek) are included on the Draft 2018 List of Impaired and Threatened Waters in Tennessee, required by Section 303(d) of the Clean Water Act (TDEC 2018).

Implementation of the Action Alternative would remove the riparian canopy along approximately 374 linear feet of intermittent stream (134 linear feet in Tree Clearing Area 1 and 240 linear feet in Tree Clearing Area 3) and 503 linear feet of wet weather conveyances or ephemeral streams (216 linear feet in Tree Clearing Area 2 and 287 linear feet in Tree Clearing Area 3). If impacts to waterbodies located within the tree clearing areas cannot be avoided, consultation and permitting with the USACE Nashville District and TDEC would be required. Impacts to Jurisdictional WOTUS would require a Section 404 Clean Water Act authorization. Impacts to Jurisdictional WOST would require an Aquatic Resource Alteration Permit (ARAP) from the TDEC which would also serve as the Section 401 Water Quality Certification. During tree clearing, applicable BMPs such as installation of sediment and erosion controls (silt fences, sediment traps, etc.) would be employed and activities would be accomplished in compliance with applicable storm water permitting requirements. Therefore, direct, indirect or cumulative impacts to local surface water

quality or groundwater supplies or quality from the proposed tree clearing are anticipated to be temporary and minor. In the longer term, removal of the livestock and implementation of BMPs would likely result in beneficial impacts from reduced nutrient loading and increased bank stabilization.

Under the No Action Alternative tree clearing associated disturbances would not occur and it is anticipated that the existing site conditions would be maintained resulting in no impact to water resources and water quality.

Wildlife

Aerial photographs, site photographs, and topographic maps were reviewed to determine the habitat types potentially present within the Project Site. Following review of available data, a field survey was conducted to verify habitat types present within the Project Site. Habitat types present within the Project Site consist of pasture (85.23 acres) and mixed-deciduous forest (33.66 acres).

Common inhabitants of pasture, a type of early successional habitat, include brown-headed cowbird, brown thrasher, common yellowthroat, dickcissel, eastern bluebird, eastern kingbird, eastern meadowlark, field sparrow, and grasshopper sparrow (National Geographic 2002). Bobcat, coyote, eastern cottontail, hispid cotton rat and red fox are mammals typical of fields and cultivated land (Kays and Wilson 2002). Reptiles including northern copperhead and southern black racer are also known to occur in this habitat type (Dorcas and Gibbons 2005). Species observed within the pasture areas during the field survey of the Project Site included great blue heron, mourning dove, and various sparrows.

Mixed-deciduous forests provide habitat for an array of terrestrial animal species. Birds typical of this habitat include Acadian fly-catcher, chuck-will's-widow, downy and hairy woodpecker, eastern screech-owl, eastern wood-pewee, great horned-owl, indigo bunting, red-breasted nuthatch, red-headed woodpecker, red-tailed hawk, summer tanager, wood thrush, wild turkey, and yellow-billed cuckoo (National Geographic, 2002). This area also provides foraging and roosting habitat for several species of bat, particularly in areas where the forest understory is partially open. Common bat species likely found within this habitat include big brown bat, eastern red bat, evening bat, silver-haired bat, and tricolored bat. Eastern chipmunk, gray fox, and woodland vole are other mammals likely to occur within this habitat (Kays and Wilson 2002). Eastern black kingsnake, black rat snake, and northern ring-necked snake are common reptiles of deciduous forests in this region (Conant and Collins 1998, Dorcas and Gibbons 2005, Scott and Redmond 2017). Species observed within the mixed-deciduous forests areas during the field survey of the Project Site included grey squirrel, blue jay, tufted titmouse, and northern cardinal.

Review of the TVA Regional Natural Heritage database in January 2018 indicated that no caves have been documented within three miles of the Project Site and no caves were identified during the field survey on January 9, 2018. In addition, no aggregations of migratory birds or wading bird colonies have been documented within three miles of the Project Site and none were observed during the field survey.

Under the Action Alternative, 8.25 acres of mixed-deciduous forest habitat would be cleared from the three proposed tree clearing areas. Wildlife (primarily common species) currently using these forested habitats would be displaced by habitat removal. Direct impacts to some individuals that may be immobile during the time of construction may occur, particularly if clearing activities take place during breeding/nesting seasons. However, the

actions are not likely to impact populations of species common to the area, as similarly forested habitat exists in abundance in the surrounding landscape.

Tree clearing-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. In the event that surrounding areas are already overpopulated, further stress to wildlife populations could occur to those individuals presently utilizing these areas, as well as those attempting to relocate. The landscape on which the Project Site occurs is already highly fragmented and impacted by human activity (e.g., maintained cattle pastures, residences, and roads). Thus, it is unlikely that surrounding landscapes are already overpopulated with wildlife and that species currently occupying these adjacent habitats would be negatively impacted by the influx of new residents.

Under the No Action Alternative tree clearing associated disturbances and habitat removal would not occur and it is anticipated that the existing site conditions would be maintained resulting in no impact to wildlife resources.

Threatened and Endangered Species

The Endangered Species Act (ESA) provides broad protection for species of fish, wildlife, and plants that are listed as threatened or endangered in the United States or elsewhere. The ESA outlines procedures for federal agencies to follow when taking actions that may jeopardize federally listed species or their designated critical habitat. The policy directs federal agencies to conserve endangered and threatened species and use their authorities in furtherance of the ESA's purposes. The State of Tennessee provides protection for species considered threatened, endangered, or deemed in need of management within the state in addition to those federally listed under the ESA.

Plant Species – A January 2018 review of the TVA Natural Heritage Database indicated that three state-listed plant species have been previously documented within a five-mile vicinity of the Project Site (Table 5-1). The Project Site is not likely to support these or other state-listed plants because of the on-going disturbance of cattle grazing, and no occurrences of the species were identified during field surveys. Three federally listed plants occur in Smith County, but the very specific habitats required by these plant species do not occur within the Project Site. No designated critical habitat for plant species occurs within or adjacent to the Project Site.

Table 5-1: TVA Natural Heritage Database Plant Species of Conservation Concern Known within Five Miles and Federally Listed Plant Species Previously Reported from Smith County, Tennessee

Common Name	Scientific Name	Federal Status	State Status (Rank)
Velvety Cerastium	*Cerastium arvense ssp. velutinum*	None	END(S1)
Water Stitchwort	*Stellaria fontinalis*	None	SPCO(S3)
Herb-robert	*Geranium robertianum*	None	SPCO(S1)
Braun's Rock-cress[1]	*Arabis perstellata*	END	END(S1)
Lesquereux's Mustard[1]	*Physaria globosa*	END	END(S2)

Table 5-1: TVA Natural Heritage Database Plant Species of Conservation Concern Known within Five Miles and Federally Listed Plant Species Previously Reported from Smith County, Tennessee

Common Name	Scientific Name	Federal Status	State Status (Rank)
Western Wallflower[1]	*Erysimum capitatum*	PS	END(S1/S2)

Status codes: END = Endangered; SPCO =Special Concern; PS = Potential Listing.

Rank Codes:

S1 = Extremely rare and critically imperiled in the state with 5 or fewer occurrences, or very few remaining individuals, or because of some special condition where the species is particularly vulnerable to extirpation; S2 = Very rare and imperiled within the state, 6 to 20 occurrences;

S3 = Rare or uncommon with 21 to 100 occurrences; and

SH = Historical in Tennessee; S#S# = Denotes a range of ranks because the exact rarity of the element is uncertain (e.g., S1S2).

[1]Federally listed species occurring within the county where work would occur, but not within five miles of the Project Site.

An official species list was generated by the USFWS Information for Planning and Consultation (IPaC) Environmental Conservation Online System on January 3, 2018 (USFWS, 2018a). The only potential plant species identified by the IPaC was the Short's Bladderpod (also known as Lesquereux's mustard). The habitat required for this species does not occur within the Project Site.

A project review was also conducted by the TDEC, Division of Natural Areas, Natural Heritage Program. Although the project review identified the herb-robert (*Geranium robertianum*), velvety cerastium (*Cerastium velutinum var. velutinum*), and water stitchwort (*Stellaria fontinalis*) as occurring within four miles of the Project Site, the TDEC did not anticipate "any impacts to rare, threatened, or endangered plant species from this project; provided that best management practices to address erosion and sediment are implemented and maintained during construction activities." (TDEC, 2018)

Based on the lack of suitable habitat at the Project Site, implementation of the Action Alternative is not anticipated to impact federal or state-listed plants species.

Similar to the Action Alternative the No Action Alternative would result in no impact to federal or state-listed plants species.

Wildlife and Aquatic Species – A January 2018 review of the TVA Natural Heritage Database indicated that 18 federally listed endangered and six additional state-listed animals are currently known to be present in Smith County, Tennessee and/or within the HUC of the Project Site (Table 5-2). The review also indicated that no state-listed or federally listed terrestrial animal records are within three miles of the Project Site. One federally endangered species (gray bat; *Myotis grisescens*) is known from Smith County. In addition, the USFWS has determined that the federally threatened northern long-eared bat and the federally endangered Indiana bat have the potential to occur throughout the state of Tennessee and therefore these species are also included in Table 5-2.

Table 5-2: Records of Federal and State-Listed Animal Species from Smith County, Tennessee and/or within the HUC of the Project Site[1]

Common Name	Scientific Name	Element Rank[2]	Status[3]	
			Federal	State (Rank)[4]
Fishes				
Bedrock Shiner	*Notropis rupestris*	E	None	NMGT (S2)
Sooty Darter	*Etheostoma olivaceum*	H	None	NMGT (S3)
Mussels				
Clubshell	*Pleurobema clava*	H	END	END (SH)
Cumberland Bean	*Villosa trabalis*	H	END	END (S1)
Cumberlandian Combshell	*Epioblasma brevidens*	H	END	END (S1)
Dromedary Pearlymussel	*Dromus dromas*	E	END	END (S1)
Fanshell	*Cyprogenia stegaria*	H	END	END (S1)
Forkshell	*Epioblasma lewisii*	EXTI	None	TRKD (SX)
Orange-foot Pimpleback	*Plethobasus cooperianus*	H	END	END (S1)
Oyster Mussel	*Epioblasma capsaeformis*	H	END	END (S1)
Pink Mucket	*Lampsilis abrupta*	E	END	END (S2)
Purple Catspaw	*Epioblasma obliquata obliquata*	H	END	END (S1)
Rough Pigtoe	*Pleurobema plenum*	H	END	END (S1)
Round Hickorynut	*Obovaria subrotunda*	H	None	TRKD (S2/S3)
Sheepnose	*Plethobasus cyphyus*	H	END	TRKD (S2/S3)
Slabside Pearlymussel	*Pleuronaia dolabelloides*	H	END	TRKD (S2)
Smooth Rabbitsfoot	*Quadrula cylindrica cylindrica*	H	THR	TRKD (S3)
Snuffbox	*Epioblasma triquetra*	H	END	TRKD (S3)
Spectaclecase	*Cumberlandia monodonta*	H	END	TRKD (S2/S3)
Tuberculed Blossom Pearlymussel	*Epioblasma torulosa torulosa*	EXTI	END	END (SX)
White Wartyback	*Plethobasus cicatricosus*	EXTI	END	END (S1)
Yellow-blossom Pearlymussel	*Epioblasma florentina florentina*	EXTI	END	END (SX)
Snails				
Ornate Rocksnail	*Lithasia geniculata*	H	None	TRKD (S2)
Rugose Rocksnail	*Lithasia jayana*	H	None	TRKD (SX)
Mammals				
Gray Bat*	*Myotis grisescens*	None	LE	END (S2)

Table 5-2: Records of Federal and State-Listed Animal Species from Smith County, Tennessee and/or within the HUC of the Project Site[1]

Common Name	Scientific Name	Element Rank[2]	Status[3]	
			Federal	State (Rank)[4]
Indiana bat[5]	*Myotis sodalis*	None	LE	E(S1)
Northern long-eared bat[5]	*Myotis septentrionalis*	None	LT	-(S1S2)

[1]Source: TVA Regional Natural Heritage Database, extracted December 2017; USFWS Ecological Conservation OnlineSystem (http://ecos.fws.gov/ecos/home.action) and Tennessee Bat Working Group species occurrence maps (http://www.tnbwg.org/), accessed 5/11/2015.

[2]Element Rank: E = Extant; H = Historical; Element occurrence is greater than 25 years old.

[3]Status Codes: END = Listed Endangered; THR = Threatened; NMGT = In Need of Management; EXTI = Extirpated or Presumed Extinct; TRKD = Tracked by State Natural Heritage program

[4]State Rank: S1 = Critically Imperiled; S2 = Imperiled; S3 = Vulnerable; SH = Historic SX = Presumed Extirpated

* Federally listed species know from Smith County, TN but not within three miles of the Project Site.

[5] Federally threatened species thought to occur statewide though no records are known from Smith County, Tennessee.

An official species list was generated by the USFWS IPaC Environmental Conservation Online System on January 3, 2018 (USFWS, 2018a). The USFWS identified three mammals (all bats) and eleven clams as potentially occurring within the Project Site (Table 5-3).

Table 5-3: USFWS IPaC List of Federally Listed Terrestrial and Aquatic Species Potentially within the Project Site

Common Name	Scientific Name	Federal Status
Clams		
Clubshell	*Pleurobema clava*	Endangered
Cumberland Bean (pearlymussel)	*Villosa trabalis*	Endangered
Cumberlandian Combshell	*Epioblasma brevidens*	Endangered
Dromedary Pearlymussel	*Dromus dromas*	Endangered
Fanshell	*Cyprogenia stegaria*	Endangered
Oyster Mussel	*Epioblasma capsaeformis*	Endangered
Pink Mucket (pearlymussel)	*Lampsilis abrupta*	Endangered
Sheepnose Mussel	*Plethobasus cyphyus*	Endangered
Slabside Pearlymussel	*Pleuronaia dolabelloides*	Endangered
Spectaclecase (mussel)	*Cumberlandia monodonta*	Endangered
White Wartyback (pearlymussel)	*Plethobasus cicatricosus*	Endangered
Mammals		
Gray Bat	*Myotis grisescens*	Endangered
Indiana Bat	*Myotis sodalis*	Endangered
Northern long-eared bat	*Myotis septentrionalis*	Endangered

A project review was also conducted by the TDEC, Division of Natural Areas, Natural Heritage Program. The project review identified the sooty darter (*Etheostoma olivaceum*) and bedrock shiner (*Notropis rupestris)* as occurring within one mile of the Project Site. The project review also identified the spectaclecase (*Cumberlandia monodonta*) as occurring within four miles of the Project Site.

The water resources delineated within the Project Site do not provide the required habitat(s) for the federal and/or state protected aquatic species identified by the USFWS, TDEC Division of Natural Areas, Natural Heritage Program or TVA Regional Natural Heritage Database queries. Therefore, implementation of the Action Alternative is not anticipated to impact federal or state-listed aquatic species (e.g., fish, mussels/clams, and snails).

Implementation of the Action Alternative would remove canopy species (trees) within the tree clearing areas for a total of 8.25 acres of tree removal. Tree removal in these areas would also include clearing 42 potential roost trees for Indiana bat and northern long-eared bat (Attachment 1, Figure 1-H representing 3.78 acres of potential summer roosting habitat or 20.63 percent of the cleared areas (Jackson Group, 2018)). Following implementation of the Action Alternative, 25.41 acres of mixed-deciduous forest would remain within the Project Site and it is assumed that a similar percentage of potential roost trees or 5.24 acres would occur within the areas not cleared. Review of aerial imagery shows that the mixed-deciduous forest habitat is common and well represented throughout the region and immediately adjacent to the Project Site.

Several activities (vegetation removal, grubbing, grading, and burn piles) associated with the Action Alternative have potential to affect federally listed gray bat, Indiana bat and/or northern long-eared bat. Exposure of Indiana bat or northern long-eared bat to noise has potential to occur when machinery or heavy equipment is in use and is taking place near a roost occupied by a bat during the day. Noise may occur during vegetation removal, grubbing, and grading. Noise from these activities is expected to be short-term, transient, and not significantly different from urban interface or natural events that bats are frequently exposed to when present on the landscape; bats thus are unlikely to be disturbed. Exposure of Indiana bats or northern long-eared bats to smoke inhalation, heat, or fire while roosting in trees has potential to occur when burn piles are conducted in close proximity to roost trees. Bats may respond to smoke by having difficulty breathing or flushing from roost sites. To avoid or minimize impacts, burns would only be conducted if the air temperature is 55° Fahrenheit or greater, and preferably 60° Fahrenheit or greater, if burn piles need to be conducted during April and May, when there is some potential for bats to be present on the landscape and more likely to enter torpor due to colder temperatures. As well, any burning of woody debris between April 1 and November 14 would 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 any nearby suitable roost trees.

Exposure of Indiana bat and northern long-eared bat to the effects of tree removal has the potential to occur when bats are roosting in trees during time of removal, or when bats return to a previously occupied tree to find that the tree is no longer present. Bats may respond to the stress of roost tree removal by flushing during tree removal, falling out of the tree during tree removal, being crushed during tree removal, or selecting a different tree if a previously used tree is no longer present. To avoid or minimize impacts to bats, tree removal of potentially suitable summer roosting habitat will occur in the winter months (between November 15 and March 30).

All three bat species rely on water sources for drinking water and prey availability. Several water sources are present within the Project Site. Inputs of sediment or other pollutants into water sources resulting from vegetation removal, grubbing, grading, and burn piles has potential to alter water quality, which may in turn degrade drinking water and available prey sources. Bats may be exposed to the adverse impacts of sedimentation and pollutants when activities with ground disturbance or use of chemicals (or fuels) are conducted near or adjacent to water sources that these bats use for foraging and drinking. Bats may respond to these stressors by experiencing reduced health, reduced feeding success, death, or by seeking alternate sources for drinking, foraging and roosting, which may result in increased energy expenditures.

All activities discussed above (vegetation removal, grubbing, grading, and burn piles, as well as conservation measures to avoid and minimize impacts, are covered in TVA's programmatic ESA Section 7 consultation on federally listed bats and routine actions carried out or permitted by TVA (USFWS, 2018b). As determined by this programmatic consultation, none of these activities are likely to adversely affect gray bat. Grubbing, grading, burning of woody debris, and future structure demolition are not likely to adversely affect Indiana bat or northern long-eared bat. Vegetation removal (i.e., removal of suitable summer roost trees) may directly and adversely affect these two species if removal occurs when bats are present on the landscape. Tree removal of potentially suitable summer roosting habitat will occur in winter months (between November 15 and March 30) and will be tracked, documented and reported to the USFWS. Given the amount of suitable roost habitat (3.78 acres) proposed for removal, and the abundance of available habitat within the TVA region (TVA, 2017) implementation of the Action Alternative is anticipated to have a negligible impact on available bat habitat within the region.

Under the No Action Alternative tree clearing associated disturbances and habitat removal would not occur and it is anticipated that the existing site conditions would be maintained resulting in no impact to federal or state-listed plants species wildlife and aquatic species.

Land Use

Aerial photographs, site photographs, topographic maps, the USFWS NWI, the USGS NHD, the NRCS SSURGO/STATSGO databases were reviewed to preliminarily identify the land use types present within the Project Site. Following review of available data, a field survey was conducted to confirm land use. The Project Site consists of two land use types: agricultural farmland (85.23 acres) and woods (33.66 acres). Within the agricultural farmland area, the immediate area of the cell tower (0.08 acres) could be considered commercial/industrial land use, and the immediate area of the residence (0.40 acres) could be considered residential land use; however, these areas represent less than one percent of the overall land use within the Project Site.

Implementation of the Action Alternative would remove canopy species within the three tree clearing areas totaling 8.25 acres of tree removal. These areas would ultimately be converted from woods to industrial and/or commercial land use categories. Following implementation of the Action Alternative, 25.41 acres of woods would remain within the Project Site. Review of aerial imagery shows that woods are common and well represented throughout the region. The implementation of the Action Alternative is anticipated to have a negligible impact on the land use of the region.

Under the No Action Alternative tree clearing related land use changes would not occur and it is anticipated that the existing site conditions would be maintained resulting in no impact to land use.

Archaeological and Historical Resources

Historic and cultural resources, including archaeological resources, are protected under various federal laws, including: the Archaeological Resources Protection Act, the Native American Graves Protection and Repatriation Act, and the National Historic Preservation Act (NHPA). Section 106 of the NHPA requires federal agencies to consult with the respective State Historic Preservation Officer (SHPO) when proposed federal actions could impact these resources.

TVA determined the Area of Potential Effect (APE) to be the entire Project Site and an unobstructed half-mile viewshed of the project. No previously recorded archaeological sites were identified within the APE. The previously recorded Baker farmstead (SH-796) is contained within the Project Site, and the previously recorded Elizabeth Gibb Moss house (SH-1421) is located within the viewshed developed for the APE. An additional four previously recorded historic structures (SH-373, SH-795, SH-1437, and SH-1438) are within one-half mile of the Project Site but are not within the viewshed.

A Phase I cultural resources investigation was performed that included both an assessment of standing structures as well as an archaeological survey of the APE (Simpson et al., 2018). As a result of the archaeological survey, one isolated find, and two archaeological sites (40SM239 and 40SM240) were identified within the APE. 40SM239 is a small ephemeral prehistoric lithic scatter concentrated within disturbed surface soils. 40SM240 is a small ephemeral historic debris scatter with no directly associated historic structure or farmstead. Neither archaeological site is recommended for listing in the National Register of Historic Places (NRHP). The architectural survey resulted in the identification of four previously undocumented structures (IS-1, IS-2, IS-3, and IS-4) more than 50 years in age and two previously identified structures (SH-796 and SH-1421) with unimpeded views of the Project Site. None of these six architectural resources are recommended for listing in the NRHP.

Based on the finding of the Phase I cultural resources investigation and archaeological survey, TVA determined that no historic properties would be impacted by the Action Alternative. TVA consulted with the Tennessee SHPO in a letter dated February 13, 2018 regarding TVA's findings of no effect. In a letter dated February 26, 2018 the Tennessee SHPO concurred with TVA's finding of no effect. Pursuant to 36 CFR Part 800.3(f) (2), TVA also consulted with federally recognized Indian tribes regarding properties that may have religious and cultural significance to their tribe and eligible for the NRHP. TVA received concurrence with its finding of no effect from the Shawnee Tribe and the Absentee-Shawnee Tribe of Oklahoma on February 22, 2018 and February 26, 2018, respectively.

Similar to the Action Alternative the No Action Alternative would result in no impact to historic properties.

Visual Resources

The visual landscape surrounding the Project Site includes rolling hills, cleared farm land and pastures, forested land, and various developments and industry. The site itself consists of cleared fields, forested areas, a farm house and farm out-buildings, and a cell tower. Nearby parcels include a rock quarry site to the northeast, three apartment buildings

along the western edge, and commercial properties off a freeway exit to the southwest. Portions of the Project Site are visible from Rodgers Road to the south and Gordonsville Highway, Baker Lane, and Bentley-Harris Way to the west.

Visual impacts could occur from the presence of construction equipment and the removal of trees from the proposed tree clearing areas. Due to the topography of the site and trees that would not be cleared, many potential visual receptors would not have their views impacted by the tree clearing activities. Although Tree Clearing Area 1 is in close proximity to Baker Lane, three apartment buildings, and existing farm house, views of the tree clearing would largely be obscured. Views would primarily be impacted along Rodgers Road from the activities in Tree Clearing Area 2 and along Bentley-Harris Way from the activities in Tree Clearing Area 3. During tree removal activities, the presence of construction equipment may negatively impact the viewshed; however, the clearing period would last for only two weeks and it is anticipated that only two pieces of equipment would be used (an excavator and bulldozer). After tree clearing activities are completed, the overall visual character of the Project Site would be comparable with other nearby areas that include areas of open fields and wooded areas and the removal of trees may increase visibility and sight distances. Changes in visual quality resulting from implementation of the Action Alternative would be minor and mostly related to improved visibility of the Project Site from adjacent roads, which would be beneficial for future development of the industrial site.

Under the No Action Alternative tree clearing would not occur and it is anticipated that the existing site conditions would be maintained resulting in no impact to visual resources.

Noise

Noise impacts may occur in the area of the Project Site if tree clearing activities increase noise levels over the existing background level. Existing sources of noise in the area are primarily associated with traffic along Gordonsville Highway and Rogers Road and surrounding industries including the Gordonsville Quarry and agricultural activities. Tree clearing activities would involve operation of an excavator and bulldozer for approximately two weeks. The primary sensitive noise receptors in the area include residents of three apartment buildings and farm house near Tree Clearing Area 1 and businesses along Bentley-Harris Way near Tree Clearing Area 3. The proposed tree clearing activities would generate increased noise, mainly from the tree clearing equipment. However, noise levels are not anticipated to be excessive, and work would be conducted during normal daytime working hours over a two week period. The anticipated noise levels from the tree clearing equipment to be used would not differ significantly from equipment that is in regular use in the surrounding area from agricultural and quarry activities. Thus, noise-related impacts resulting from implementation of the Action Alternative are anticipated to be minor and temporary.

Under the No Action Alternative tree clearing would not occur and it is anticipated that the existing site conditions would be maintained resulting in no change in noise levels in the area of the Project Site.

Socioeconomic Conditions and Environmental Justice

According to estimates from the United States Census Bureau (2016), the population of Gordonsville is 1,534 and the population of Smith County, Tennessee is 19,176 (see Table 5-4). The residents of Gordonsville are white (97.1 percent), black or African American (1.8 percent), people of mixed race (0.5 percent), and people of Hispanic or Latino ethnicity (0.5

percent). Smith County as a whole has a similar demographic makeup and is 93.3 percent white, 2.5 percent black or African American, 1.0 percent mixed race, and 2.5 percent Hispanic or Latino. Additionally Smith County has small populations of American Indian or Alaska Native people (0.6 percent) and race classified by the United States Census Bureau as some other race (1.0 percent). Gordonsville has lower levels of minority populations than Smith County and both Smith County and Gordonsville have lower levels of minority populations than the State of Tennessee as a whole.

Table 5-4: Project Region Race and Ethnicity

	Tennessee	Smith County	Gordonsville
Population	6,548,009	19,176	1,534
White Alone	74.5%	93.3%	97.1%
Black or African American Alone	16.7%	2.5%	1.8%
American Indian and Alaska Native Alone	0.2%	0.6%	0.0%
Asian Alone	1.6%	0.0%	0.0%
Native Hawaiian and Other Pacific Islander Alone	0.0%	0.0%	0.0%
Some Other Race Alone	0.1%	0.1%	0.0%
Two or More Races	1.8%	1.0%	0.5%
Hispanic or Latino (of any race)	5.0%	2.5%	0.5%
Source: United States Census Bureau (2016)			

Table 5-5 provides summary information on population, income, and employment in the project region. The population in Smith County remained fairly stable between 2010 and 2016, increasing one tenth of a percent while the population of Gordonsville increased 26.5 percent. Within Gordonsville, the median and mean household incomes are $54,063 and $61,425, respectively and the per capita income is $25,560. All these levels are greater than that of Smith County where the median household income is $44,272, the mean household income is $61,425, and the per capita income is $23,108. The percentage of people whose income is less than the poverty line is 16.2 percent in both Gordonsville and Smith County, which is less than the statewide level of 17.2 percent.

Table 5-5: Population, Income, and Employment in the Project Region

	Tennessee	Smith County	Gordonsville
Population			
Population 2010[1]	6,346,105	19,166	1,213
Population 2016[2]	6,548,009	19,176	1,534
Percentage Change	3.2%	0.1%	26.5%
People / Square Mile[1,2]	158.8	61.0	216.1

Table 5-5: Population, Income, and Employment in the Project Region

	Tennessee	Smith County	Gordonsville
Income			
Median Household Income[2]	$46,574	$44,272	$54,063
Mean Household Income[2]	$65,368	$58,750	$61,425
Per Capita Income[2]	$26,019	$23,108	$25,560
Percent of People Whose Income is Less Than the Poverty Level[2]	17.20%	16.20%	16.20%
Employment (October 2017)[3]			
Labor Force	3,208,049	9,115	N/A
Employed	3,113,103	8,878	N/A
Unemployed	94,946	237	N/A
Unemployment Rate (%)	3.0	2.6	N/A

1 – Source: United States Census Bureau (2010), 2010 Census

2 – Source: United States Census Bureau (2016), 2012 – 2016 American Community Survey

3 – Employment data sources:

- Tennessee Statewide data for October 2017: Bureau of Labor Statistics (2017a)
- Smith County data for October 2017: Bureau of Labor Statistics (2017b)
- Gordonsville town data: N/A (Bureau of Labor Statistics employment data are not available for Gordonsville)

The unemployment rate for Smith County was estimated to be 2.6 percent by the Bureau of Labor Statistics (2017b). This is slightly less than the statewide level of 3.0 percent (Bureau of Labor Statistics (2017a).

Proposed tree clearing activities would require a workforce of two operators and would last for approximately two weeks. Implementation of the Action Alternative is not anticipated to have direct, indirect or cumulative impacts to the local economy or workforce. The project region does not consist of greater proportions of disadvantaged populations (those less than the poverty line or minorities) than the surrounding county levels or the statewide levels. No disproportionate impacts are anticipated to minority or economically disadvantaged populations as a result of the Action Alternative.

Similar to the Action Alternative the No Action Alternative would result in no impact to socioeconomic conditions and environmental justice in the project region.

Transportation

During tree clearing activities, the Project Site would be accessed from two local roads, Rogers Road to the south and the existing Baker Lane site entrance. The primary site entrance would be on the southern side of the Project Site, and would require installation of a new entrance from Rogers Road. Rogers Road is a local road providing access to the Nyrstar zinc mine to the northeast and undeveloped land and the Rogers Group Gordonsville Quarry to the east. Rogers Road is paved and unmarked along its length and is sufficiently wide for a single lane of traffic in each direction. Based on preliminary review

of Google streetview images (recorded August 2013), the road is in good condition and has wide, well maintained verges. The site entrance location and configuration should consider safe sight distances and other safety concerns for the traffic that would enter Rogers Road from the property.

Bakers Lane is paved and unmarked along its entire length. There are two sections of Baker Lane, the western section is a shared access road with three residential buildings which are located to the west of the property. This shared access portion is wide enough for a single lane of traffic in each direction, however, based on preliminary review of Google streetview images (recorded August 2013), the verge is narrow and heavily vegetated, which may impact visibility and road safety. The eastern portion of Bakers Lane provides access to the Baker Parcel and currently is a single lane road with narrow verges that may result in safety concerns during mobilization and de-mobilization of the tree clearing equipment to the Project Site. Necessary precautions would be taken for Bakers Lane during mobilization and de-mobilization such as reduced speed in areas of poor visibility or poor road condition, with other precautions such as a flagman or traffic control to be considered if required.

There are no traffic count stations located on Rogers Road or Bakers Lane. It is anticipated that existing traffic volumes for these local roads would be minor as they provide access to a limited number of other sites. Because of the anticipated limited volume of workers on the site required for tree clearing activities, and the short timeframe of the proposed work, direct or indirect impacts to local traffic are anticipated to be temporary and minor.

Rogers Road and Bakers Lane intersect with Highway 53 (Gordonsville Highway) to the west with stop signs currently used for both intersections. Normal care would be taken by workers entering Highway 53 with regards to traffic safety.

Based on a review of Tennessee Department of Transportation (TDOT) historical traffic data (2018) the nearest traffic count station on Highway 53 is located approximately 0.33 miles north of the Bakers Lane intersection (Station 000073 on Route SR053). The 2016 annual average daily traffic count (AADT) for this station is 11,005. The Project Site is located approximately 0.6 miles north of the intersection of Highway 53 and Interstate 40. The nearest traffic station for Interstate 40 is located 0.9 miles west of the intersection with Highway 53 (Station 000061 of Route I0040) and has an AADT for 2016 of 37,935. In the context of the existing AADT volumes of these highways the anticipated traffic generated by the proposed tree clearing activities is negligible. It is anticipated that implementation of the Action Alternative would have negligible impact on overall traffic volumes and level of service of either Highway 53 (Gordonsville Highway) or Interstate 40.

Under the No Action Alternative tree clearing related traffic would not occur and there would be no impact to traffic in the area of the Project Site.

Safety

Aside from the road safety risks discussed in the previous section, other hazards associated with tree clearing activities include working near underground utilities and above ground electrical connections, use of heavy machinery, felling of large trees, burning of woody debris, and working around surface water features.

Hazards associated with tree clearing activities would be suitably addressed using standard safety precautions. Prior to ground disturbance at the Project Site, the location of

underground utilities would be identified and necessary precautions would be taken to avoid damage or disturbance of underground utilities. Similarly, above ground electrical connections would be avoided where they are near areas of tree clearing or access roads.

Other safety precautions include the safe use of heavy machinery associated with clearing activities and safe felling of large trees. Particular care would be taken with regards to burning of woody debris on site and applicable fire safety precautions would be undertaken to manage fires at all times. On-site burning would be conducted in accordance with a local burn permit, to be obtained by Smith County or its contractors.

Natural hazards would also be acknowledged, and although flood risk is minor for the site, safe practices around the existing surface water features would be administered. Risks posed by existing livestock or wildlife would be considered in work practices where relevant.

Under the No Action Alternative tree clearing would not occur and there would be no safety related impacts or hazards.

5.0 CUMULATIVE AND REASONABLY FORESEEABLE IMPACTS

An industrial park, to be developed by Smith County, Tennessee, is proposed for future development on the Project Site. The park would accommodate at least three distinct sites, and would target automotive suppliers and light manufacturers. While it is unlikely that future industrial development would disturb (grading, vegetation removal, etc.) the entire site, TVA assumes that entire site would be disturbed in the future as a conservative approach for purposes of assessing cumulative impacts.

Aside from the proposed industrial park, a review of available information from the TDOT, Smith County Chamber of Commerce, and Middle Tennessee Industrial Development Association revealed no additional planned, under construction, or recently completed projects in the immediate vicinity of the Project Site (TDOT 2018, Smith County Chamber of Commerce 2018, and Middle Tennessee Industrial Development Association 2018). Several sites are available for commercial development in the area, though none of these sites were proposed for development in the reasonably foreseeable future.

Resources that could be cumulatively impacted by development of the industrial park and subsequent construction are water resources, biological resources, visual resources, transportation, noise, socioeconomics, and air quality.

Water Resources

Site preparation associated with future development of the industrial park over the long-term, including filling and leveling, could cause minor changes in onsite drainage patterns. Likewise, the placement of buildings and associated hard surfaces on the site would likely increase the amount of impermeable surface and possibly lead to faster runoff of onsite precipitation. Activities that could impact surface water and groundwater resources are subject to state and federal regulations. Water and sewer service at the site would likely be supplied by the local utility company; thus, extraction of groundwater for future water supplies is unlikely. Foreseeable long-term impacts to water resources and floodplains are anticipated to be minor.

Biological Resources

Implementing the Action Alternative would result in the loss of approximately 8.25 acres of mixed-deciduous forest habitat. Eventual development of the property as an industrial park would further result in the loss of some of the available wildlife habitat on the site. This cumulative loss of wildlife habitat would be minor, as the mixed-deciduous forest habitat is common and well represented throughout the region, therefore, it is anticipated that displaced mobile wildlife would likely relocate to nearby areas. Likewise, the vegetative cover on the site would change from a mixture of scattered woodlands and brush to an industrial or commercial setting. Nevertheless, populations of terrestrial species common to the area are not likely to be impacted adversely to a noticeable extent, as abundant similar habitat exists in the surrounding landscape.

Tree clearing associated with the Action Alternative would involve clearing 42 potential roost trees for bats representing 3.78 acres of potential summer roosting habitat. Future development of the property has the potential to involve the removal of additional acres of potential bat habitat, including clearing of forested areas and demolition of existing site structures. All three bat species potentially present within the Project Site are known to use human structures as roosts. Adverse effects may occur when demolition to a building takes place while bats are occupying the structure. Bats are more likely to be found in buildings, structures or sites that are close to suitable foraging habitat (e.g., woodlands, mature trees and hedgerows, water features). Bats may respond to the stress of structural alteration or demolition by flushing during alteration or demolition, falling to the ground or floor during structure modification or demolition activities, or being crushed during the activity. In the event that clearing of forested areas and demolition of existing site structures is necessary for future development, TVA therefore recommends the following avoidance and minimization measures:

- TVA recommends implementation of avoidance and minimization measures associated with future activities that may affect federally listed bats as described in Attachment 2.

- TVA recommends coordination with the USFWS prior to future removal of any potentially suitable bat roost trees if removal needs to occur when bats may be present on the landscape.

- Prior to any future structural modification or demolition of buildings, TVA recommends an assessment to determine if structures have characteristics that make them potentially suitable bat roosts. If evidence of bat use warrants seasonal modification or removal, TVA recommends seasonal modification or removal. Risk to human safety, however, should take priority. If seasonal modification or removal is not feasible, and federally listed bat species are present, TVA advises consulting with the USFWS to determine the best approach. This may include establishment of artificial roosts before demolition of structures with bats present.

Visual Resources

Eventual development of the industrial park could cause localized visual changes as the site is converted from a predominantly agricultural setting with scattered wooded areas to a commercial or industrial area. Construction activities associated with future development of the site would be visible to motorists on nearby roadways, adjacent apartment buildings, and the farm house located on the site; however, these activities would be temporary. If the

existing trees located adjacent to nearby residences are maintained, eventual development of the site would not impact the views due to the topography of the site. The development of the site for industrial or commercial use would be consistent with the visual character of nearby commercial and industrial properties, such as the rock quarry site, and would constitute a minor cumulative long-term impact to the visual character of the area.

Transportation, Noise, and Socioeconomic Conditions

Transportation, noise, and socioeconomics would continue to be impacted by general population increases, industrial use, and development growth in the area. Increases in construction traffic and noise during future development of the industrial park would be temporary, occur during normal working hours, and impacts would not differ significantly from the agricultural and industrial equipment currently used in the surrounding area. If site developers choose to use Baker Lane as an access point to the industrial park, improvements would likely need to be made to the road to increase its width to accommodate two lanes of traffic and to address potential safety concerns associated with increased vehicle use. Because the site is close to Highway 53 (Gordonsville Highway) and because AADT levels are relatively low, foreseeable long-term impacts to local vehicular traffic and the level of service provided by local roadways are anticipated to be minor. Socioeconomics would be beneficially impacted by direct job growth and indirectly by associated services. The eventual development of the site for commercial purposes would create additional jobs and would likely have long-term beneficial impacts to the local economy. In the near term and for the foreseeable future, no disproportionate impacts are anticipated to minority or economically disadvantaged populations.

Air Quality

Future activities that produce air pollutants, including additional site preparation and the siting of industrial or commercial tenants in the proposed industrial park, would be subject to various applicable air quality regulations including Prevention of Significant Deterioration permits under the CAA. The future clearing and demolition activities would generate some air pollution in the form of fugitive dust and particulate matter in equipment exhaust. Additionally, carbon monoxide and sulfur dioxide would be generated by equipment exhaust. Because of the short time period required to complete this work, negative impacts to local air quality would be temporary and localized. These impacts are anticipated to be minor and would not have a major influence on the air quality of Smith County. With regulatory measures in place, reasonably foreseeable long-term and cumulative impacts to local air quality are anticipated to be minor.

Although it would have a somewhat greater impact than the No Action Alternative, the Action Alternative would result in a minimal impact on the environment and improve local economy when the proposal was completed. Therefore, TVA has determined that cumulative impacts of the Action Alternative would be insignificant.

6.0 PERMITS, LICENSES, AND APPROVALS

As noted in Section 4 above, TVA is consulting with the USFWS, TWRA, and Tennessee SHPO regarding potential impacts associated with the Action Alternative. Tree clearing would result in greater than one acre of earth disturbing activities, therefore it would be necessary to obtain coverage under the 2016 General NPDES Permit for Storm Water Discharges Associated with Construction Activity (TNR100000). Coverage would require submittal of a Notice of Intent (NOI) and development of a site-specific Stormwater Pollution

Prevention Plan. Smith County or its contractors would be responsible for obtaining local, state, or federal permits necessary for the project.

Future development of the industrial park would also require additional environmental permits, reviews, and consultations. Smith County would be responsible for additional required environmental permits, reviews, and consultations necessary for future development of the industrial park.

7.0 MITIGATION MEASURES

To minimize or reduce the environmental effects of tree clearing activities associated with the Proposed Action, Smith County or its contractors will ensure all clearing and grading activities conducted are in compliance with storm water permitting requirements and will utilize applicable BMPs to minimize and control erosion and fugitive dust during these actions.

Operations involving chemical or fuel storage or resupply and vehicle servicing would be handled outside of riparian areas and in such a manner as to prevent these items from reaching a watercourse. Earthen berms or other effective means would be installed to protect stream channels from direct surface runoff. Servicing of equipment and vehicles would be done with care to avoid leakage, spillage, and subsequent surface or ground water contamination. Oil waste, filters, and other litter would be collected and disposed of properly.

Project-specific avoidance and minimization measures will be implemented to reduce effects to Indiana bat and northern long-eared bat species and will include the following:

- If burning of wood piles needs to occur between April 1 and November 14, burns will only be conducted if the air temperature is 55° Fahrenheit or greater, and preferably 60° Fahrenheit or greater.

- Removal of potentially suitable summer roost trees will occur in winter months (between November 15 and March 30) and not exceed the acreage estimates as quantified in this EA.

Further detail of these mitigation, avoidance, and minimization measures are described in Section 4 and Attachment 2.

8.0 LIST OF PREPARERS

Table 9-1 summarizes the expertise and contribution made to the EA by the Project Team.

Table 9-1: Environmental Assessment Project Team

Name/Education	Experience	Project Role
TVA		
Michaelyn Harle Ph.D., Anthropology; M.A. Anthropology; B.A. Anthropology	15 years in cultural resource management	Cultural resources, NHPA Section 106 compliance

Table 9-1: Environmental Assessment Project Team

Name/Education	Experience	Project Role
Holly LeGrand *M. S. Wildlife, B.S. Biology*	17 years in biological and environmental studies and analysis 10 years in natural resources planning, NEPA compliance and project management.	Implementation of ESA Section 7 Programmatic Consultation for federally listed bats and routine actions
Ashley A. Pilakowski B.S., Environmental Management	6 years in environmental planning and policy and NEPA compliance.	NEPA Compliance
Dana M. Vaughn *M.S. Education, B.A. Biology*	12 years in natural resources and environmental compliance	Environmental resources coordination, document preparation
Jesse Troxler	9 years in natural resources research and management and 2 years in natural resources compliance.	Terrestrial Zoology Compliance
Cardno		
Rachel Bell, PMP *B.S., Environmental Science*	12 years in natural resources planning and NEPA compliance, including project management and biological and environmental studies and analysis.	EA Project Manager
Darren Bishop *M.S., Soil and Water Science* *B.S., Environmental Science* *B.A., English*	15 years in natural resources planning and NEPA compliance, including project management and biological and environmental studies and analysis.	EA QA/QC Reviewer
Martin Griffin, P.E. *B.E., Civil Engineering*	7 years in civil engineering including stormwater analysis and design, hydrology and hydraulic modelling, water quality modelling, geomorphic assessments, planning and transportation projects, and engineering policy formulation	Transportation and Safety
Lesley Hamilton *B.A., Chemistry*	30 years in environmental consulting, including air quality analysis, environmental compliance, environmental management, permitting, site investigations, and industrial hygiene.	Air Quality and Climate Change

Table 9-1: Environmental Assessment Project Team

Name/Education	Experience	Project Role
Allen Jacks *M.S., Coastal Zone Studies* *B.S., Biology*	15 years in natural resources planning and NEPA compliance, including project management and biological and environmental studies and analysis.	Wildlife, Aquatic Ecology, and Threatened and Endangered Species
Jason Sean Lancaster PWS, CEP, CE, TN-QHP *M.P.H., Epidemiology* *B.S., Environmental Science and Policy*	20 years in environmental consulting, including NEPA compliance, federal and state permitting, project management, biological and environmental studies and analysis.	Wetlands, Wildlife, Vegetation, Water Resources, and Land Use
Oliver Pahl *B.S., Environmental Economics, Policy and Management*	7 years in environmental consulting, natural resources planning, and NEPA compliance, including project management and economic and environmental studies and analysis.	Visual, Noise, and Socioeconomics and Environmental Justice
Jennifer Wallace B*.S., Oceanography and Environmental Science* *M.S., Marine Policy*	18 years in regulatory/policy research, evaluation, and development, specializing in NEPA, QA/QC, and permit support for federal, state, and local natural resource management programs.	Cumulative Impacts

9.0 AGENCIES AND OTHERS CONSULTED

The following federal and state agencies and federally recognized Indian Tribes were consulted.

- Tennessee Department of Environment and Conservation, Division of Natural Areas
- Tennessee Historical Commission
- Tennessee Division of Archaeology
- Tennessee Wildlife Resources Agency
- United States Fish and Wildlife Service
- Eastern Band of Cherokee Indians
- Eastern Shawnee Tribe of Oklahoma
- The Chickasaw Nation
- Muscogee (Creek) Nation
- Thlopthlocco Tribal Town
- Kialegee Tribal Town
- Coushatta Tribe of Louisiana
- United Keetoowah Band of Cherokee Indians in Oklahoma

- Absentee-Shawnee Tribe of Oklahoma
- Shawnee Tribe
- Cherokee Nation

10.0 REFERENCES

Bureau of Labor Statistics. 2017a. Databases, Tables and Calculators by Subject: Tennessee Statewide. Local Area Unemployment Statistics. Available online: https://data.bls.gov/timeseries/LASST470000000000003. Accessed January 29, 2018.

Bureau of Labor Statistics. 2017b. Labor force data by county. Local Area Unemployment Statistics. Available online: https://www.bls.gov/lau/. Accessed January 29, 2018.

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

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

ECS Southeast, LLP. 2017a. *Phase I Environmental Site Assessment Report, Baker Property, Rogers Road, Gordonsville, Smith, Tennessee 38563.* ECS Southeast, LLP. December 6, 2017. Unpublished report.

ECS Southeast, LLP. 2017b. *Phase I Environmental Site Assessment Report, 15-Acre Parcel, Rogers Road, Gordonsville, Smith, Tennessee 38563.* ECS Southeast, LLP. December 7, 2017. Unpublished report.

Federal Emergency Management Agency. 2010. Flood Insurance Rate Map, Smith County, Tennessee and Incorporated Areas. Panels 204 and 215 of 305. Map Numbers 47159C0204D and 47159C0215D. Effective Date September 29, 2010. Available online: https://msc.fema.gov/portal. Accessed January 11, 2018.

Jackson Group. 2018. *Bat Habitat Assessment Report.* January 2018. Unpublished report.

Kays, R, and D E. Wilson. 2002. Mammals of North America. Princeton University Press, Princeton, New Jersey.

Middle Tennessee Industrial Development Association. 2018. Buildings and Sites – Gordonsville, TN. Available online: http://mtida.org/buildings-and-sites. Accessed January 25, 2018.

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

Natural Resources Conservation Service (NRCS). 2018. Web Soil Survey. Available online: https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm. Accessed January 31, 2018.

Scott, A. F. and W. H. Redmond. 217. Atlas of Reptiles in Tennessee. The Center for Field Biology, Austin Peay University. Available online: http://www.apsubiology.org/tnreptileatlas/. Accessed January 31, 2018.

Simpson et al. 2018. *Phase I Cultural Resources Investigation. Tennessee Valley Authority, Smith County Industrial Park Project, Smith County, Tennessee*. February 2018. Unpublished report.

Smith County Chamber of Commerce. 2018. Available Properties – Gordonsville, TN. Accessed online: http://www.smithcountychamber.org/available-properties/. Accessed January 25, 2018.

Tennessee Department of Environment and Conservation (TDEC). 2011. Guidance for Making Hydrologic Determinations. Version 1.4. May 2011.

TDEC. 2018. Rare Species Database Review Letter dated January 19, 2018.

TDEC. 2018. Draft 2018 List of Impaired and Threatened Waters. Available online: https://www.tn.gov/content/dam/tn/environment/water/documents/wr_wq_303d_2018-draft.xlsx. Accessed January 31, 2018.

Tennessee Department of Transportation (TDOT). 2018. Projects in Region 3. Available online: https://www.tn.gov/tdot/projects/region-3.html. Accessed January 25, 2018.

Tennessee Valley Authority (TVA). 2017. Programmatic Biological Assessment for Evaluation of the Impacts of Tennessee Valley Authority's Routine Actions on Federally Listed Bats. Project Number 2017-21. Knoxville, TN.

U.S. Census Bureau. 2010. 2010 Demographic Profile Data, 2010 Census. American Fact Finder. Available online: https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml#. Accessed January 29, 2018.

U.S. Census Bureau. 2016. 2016 American Community Survey. American Fact Finder, Community Facts. Available online: https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml#. Accessed January 29, 2018.

United States Environmental Protection Agency (USEPA). 2017. Tennessee Nonattainment/Maintenance Status for Each County by Year for All Criteria Pollutants. Available online: https://www3.epa.gov/airquality/greenbook/anayo_tn.html. Accessed January 18, 2018.

USEPA. 2018. Surf Your Watershed. Available online: https://cfpub.epa.gov/surf/locate/index.cfm. Accessed January 31, 2018.

United States Fish and Wildlife Service (USFWS). 2018a. Official Species List Letter dated January 3, 2018.

USFWS. 2018b. Biological Opinion on TVA's Evaluation of the Impacts of Tennessee Valley Authority's Routine Actions on Federally Listed Bats. Tennessee Field Office. Cookeville, TN.

United States National Park Service (USNPS) 2018. Nationwide Rivers Inventory. Available online: https://www.nps.gov/subjects/rivers/nationwide-rivers-inventory.htm. Accessed January 31, 2018.

Wild & Scenic Rivers (WSR). 2018. National Wild and Scenic Rivers System. Available online: https://www.rivers.gov/. Accessed January 31, 2018.

11.0 ATTACHMENTS

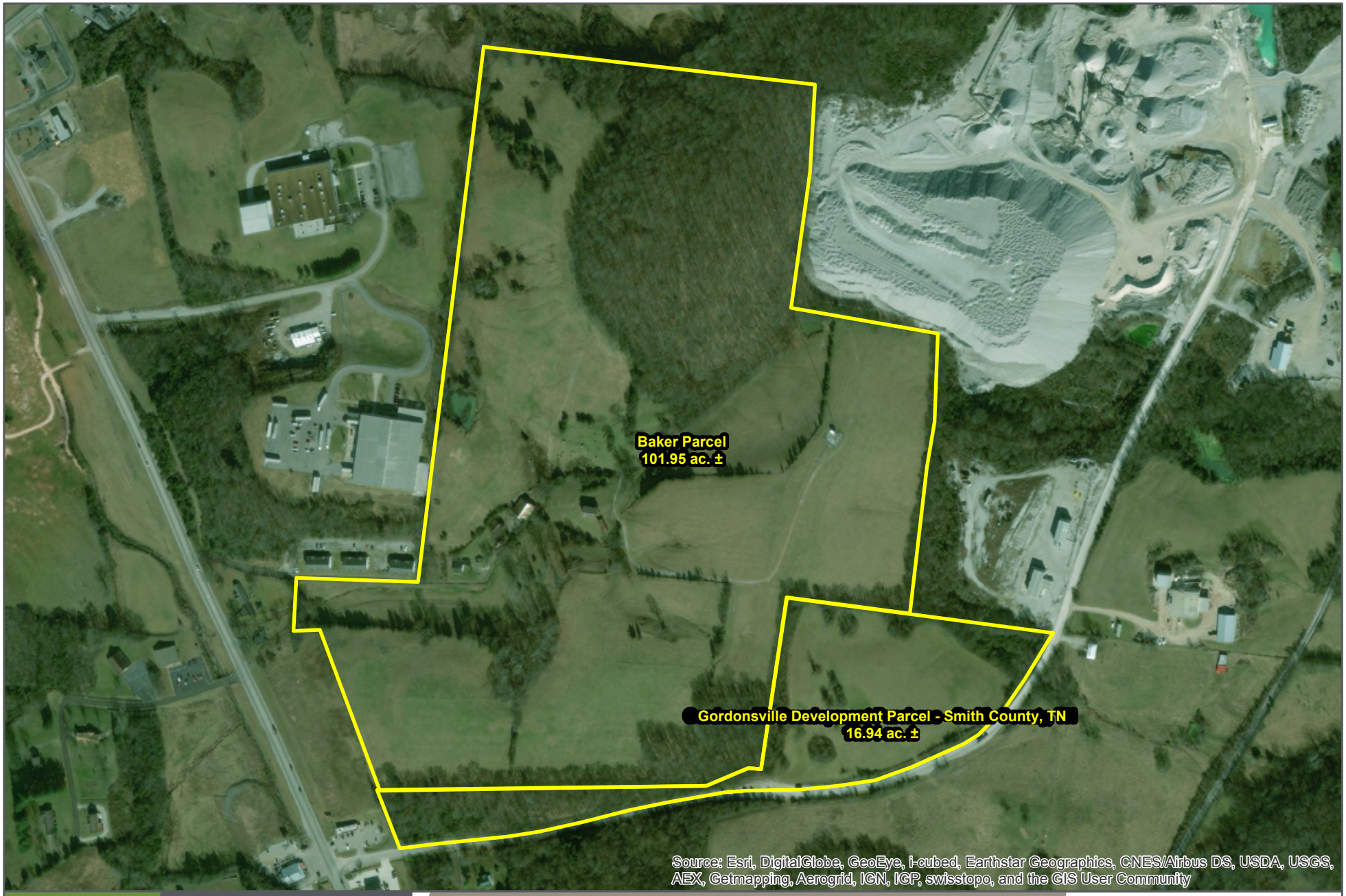
- Attachment 1 – Project Figures
- Attachment 2 – Bat Conservation Measures
- Attachment 3 – Agency Correspondence

ATTACHMENT 1

PROJECT FIGURES

Figure 1-A

Aerial



Aerial

Smith Co Industrial Park EA
Smith County, Tennessee

0 500 1,000 Feet
0 152 304 Meters

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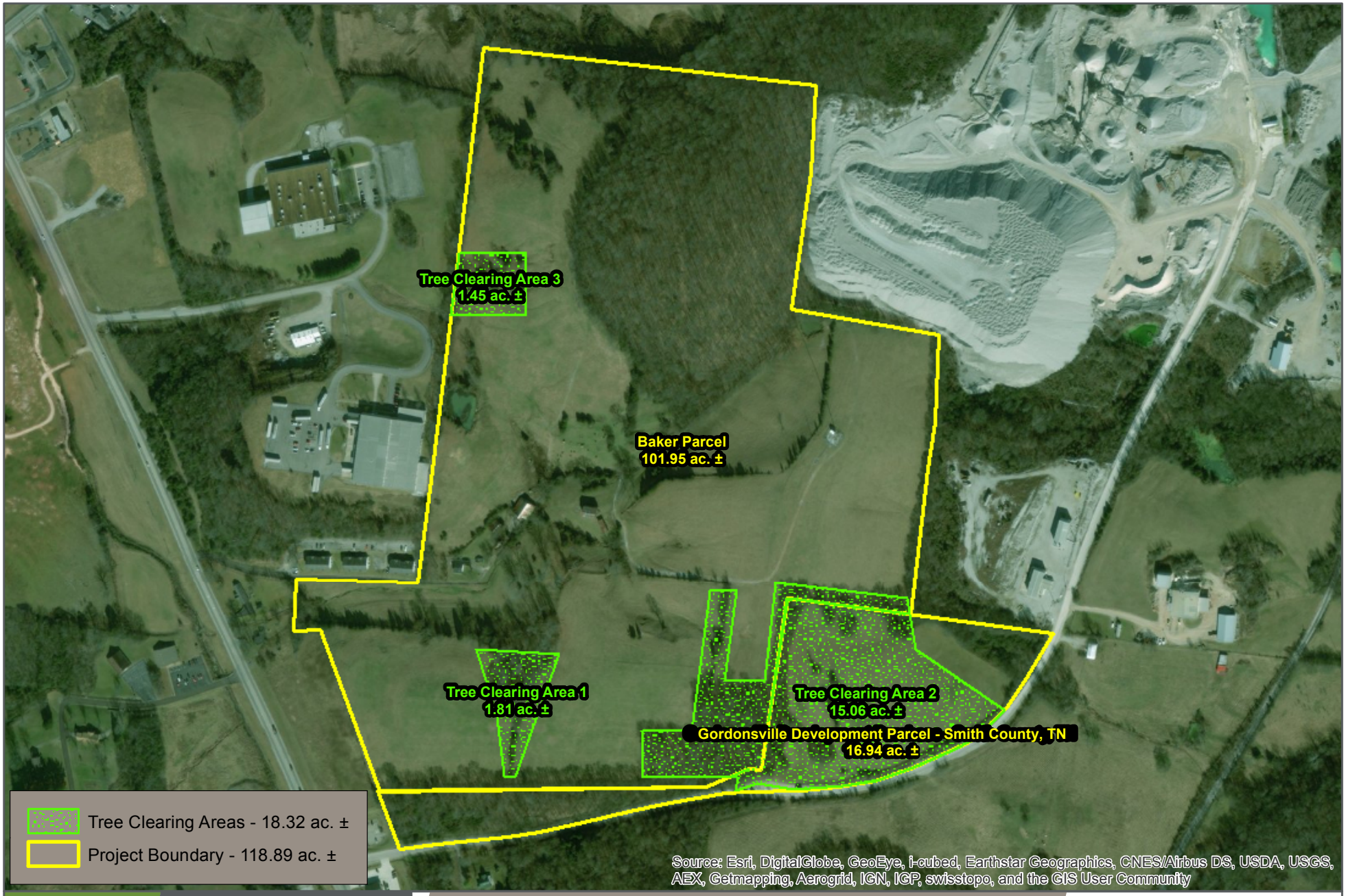
Date Created: 1/26/2018 Date Revised: 1/26/2018 File Path: Q:\UnitedStates\Florida\Tampa\Tennessee Valley Authority\Smith County Industrial Park EA\working\arcmap\SmithCoIndustrialEA_Aerial_20180126.mxd
GIS Analyst: Lauren.Federsel

Figure 1-B

Tree Clearing Areas



Tree Clearing Areas

Smith Co Industrial Park EA
Smith County, Tennessee

0 500 1,000 Feet
0 152 304 Meters

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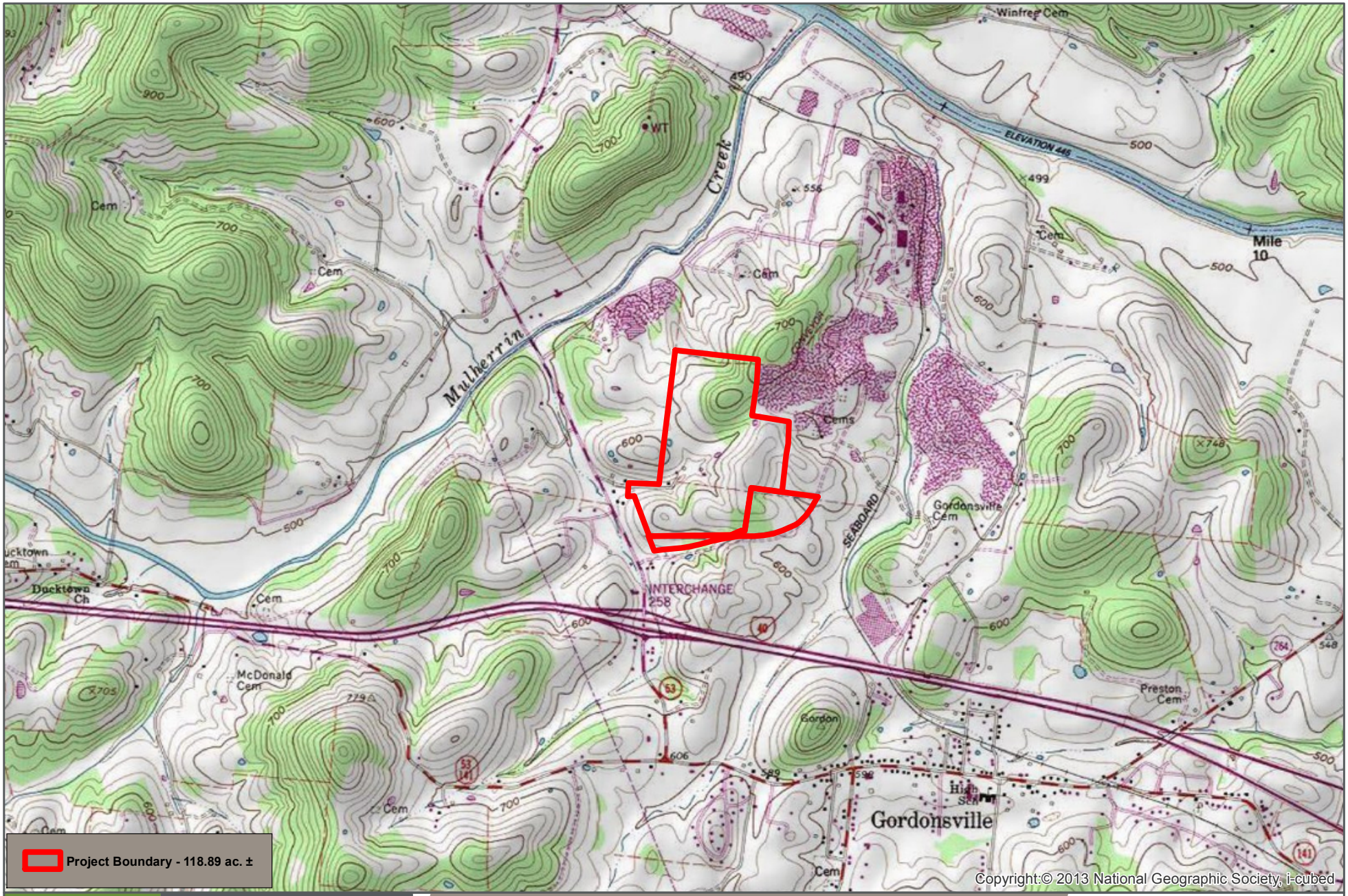
GIS Analyst: Lauren.Federsel

Figure 1-C

USGS Quadrangle



USGS QUAD

Smith Co Industrial Park EA
Smith County, Tennessee

0 2,000 4,000 Feet
0 610 1,220 Meters

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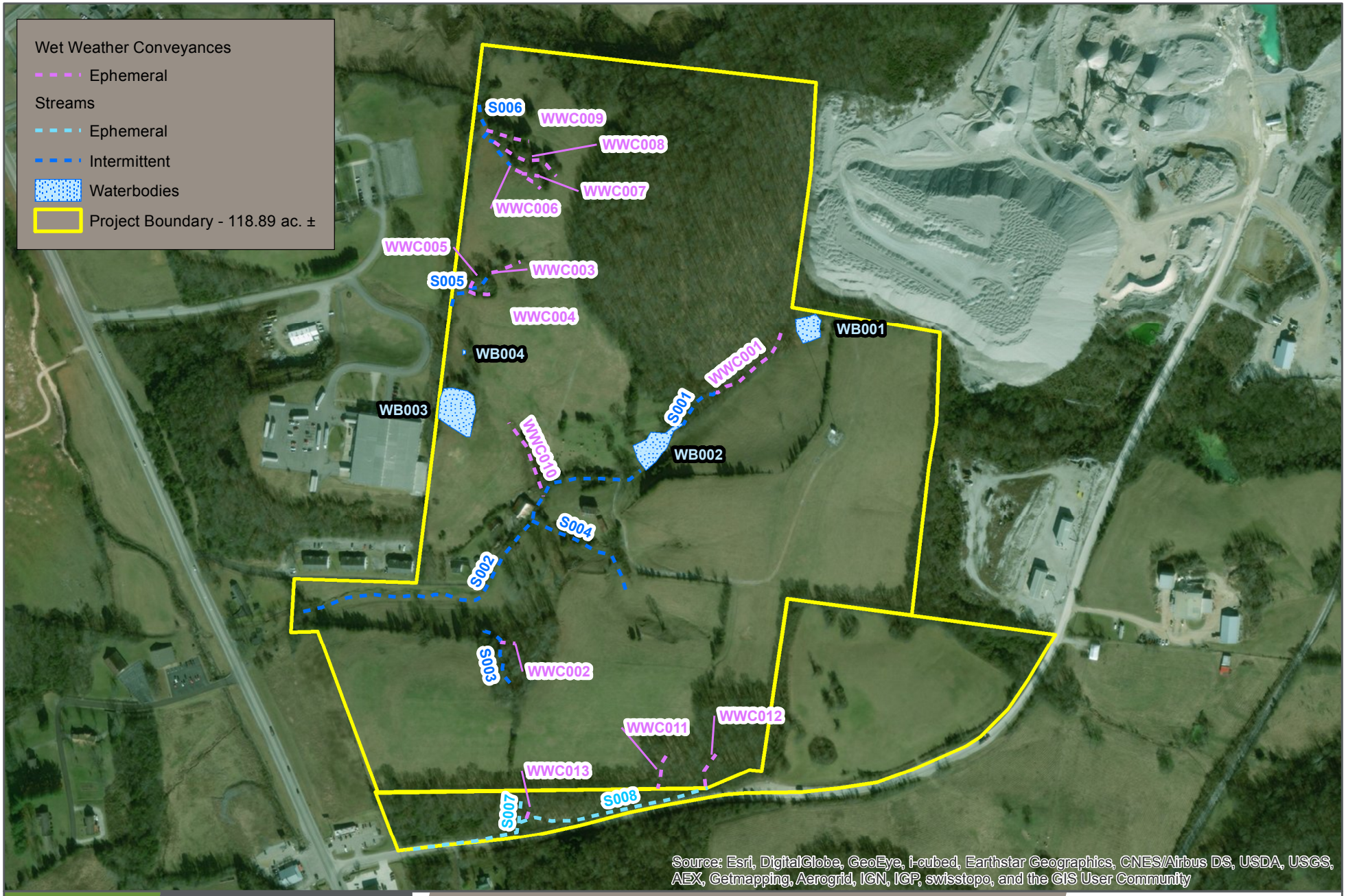
Figure 1-D

Jurisdictional Waters of the United States and the State of Tennessee



Potential Jurisdictional Waters of the United States

Smith Co Industrial Park EA

Smith County, Tennessee

0 500 1,000 Feet

0 152 304 Meters

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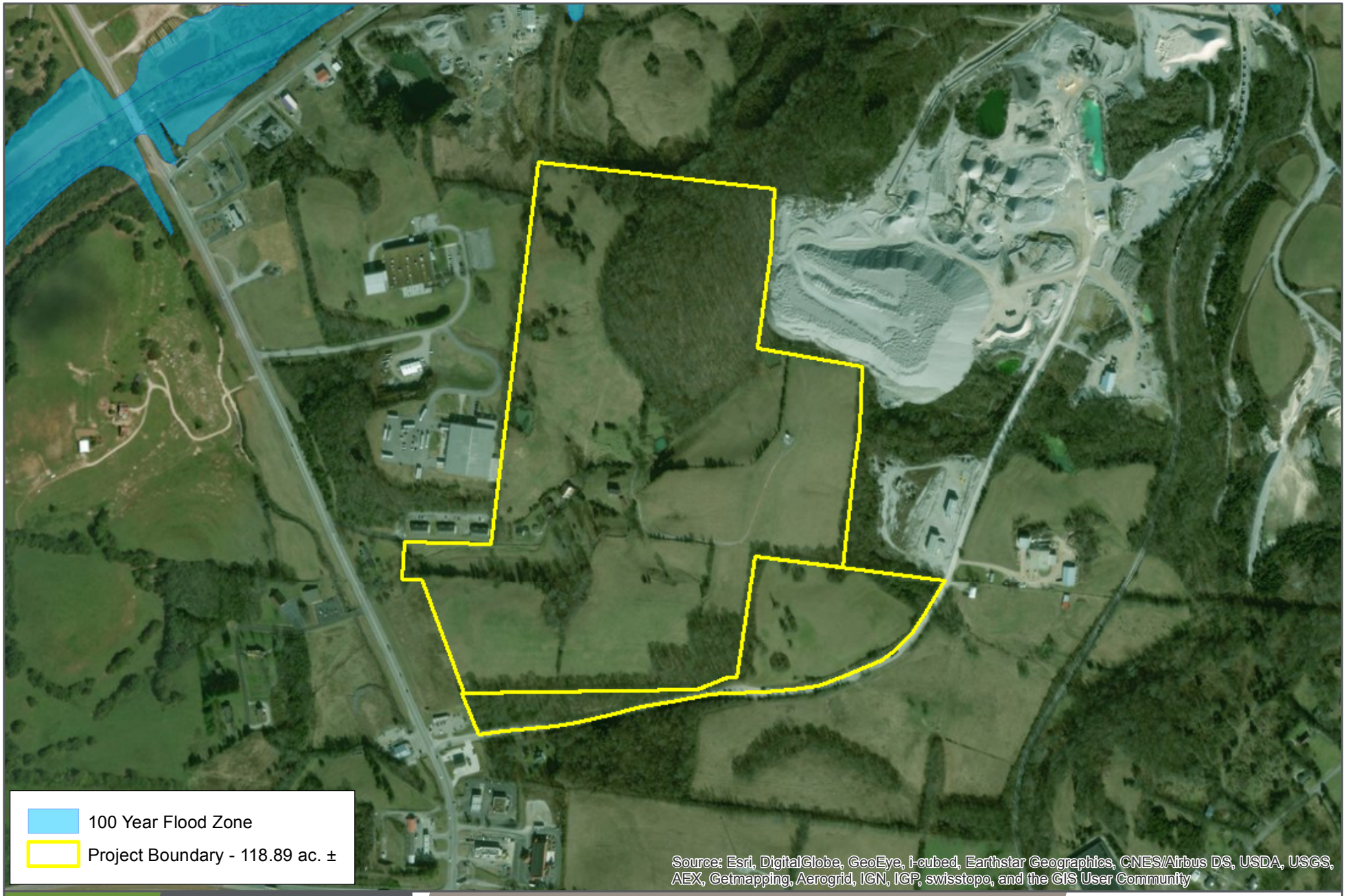
GIS Analyst: Lauren.Federsel

Figure 1-E

FEMA Floodplain



FEMA 100 Year Floodplain

Smith Co Industrial Park EA
Smith County, Tennessee

0 700 1,400 Feet
0 213 426 Meters

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GIS Analyst: Lauren.Federsel

Figure 1-F

NRCS Soils

NRCS Soils

Smith Co Industrial Park EA
Smith County, Tennessee

0 500 1,000 Feet
0 152 304 Meters

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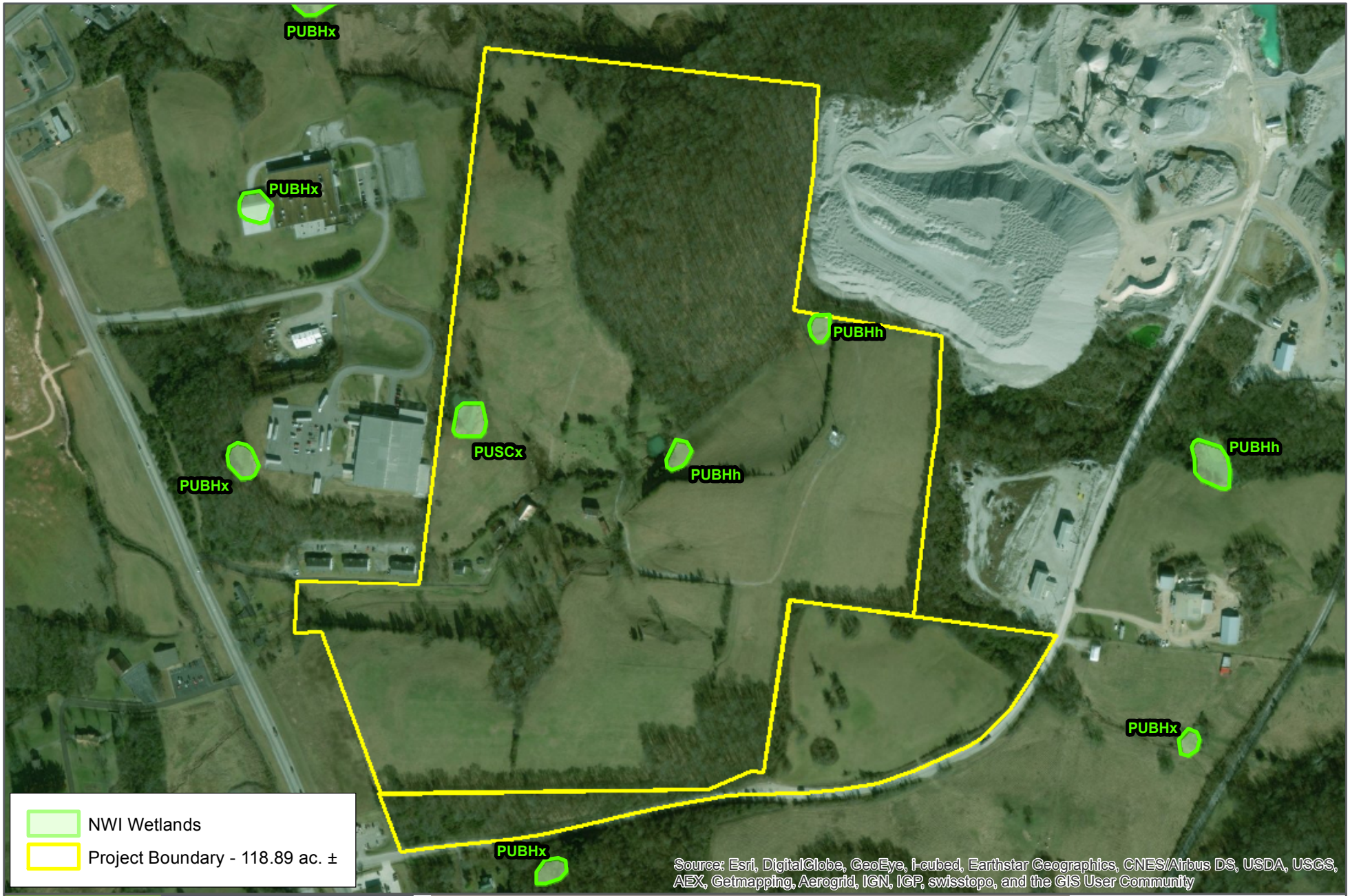
Figure 1-G

USFWS NWI



NWI Wetlands

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0 152 304 Meters

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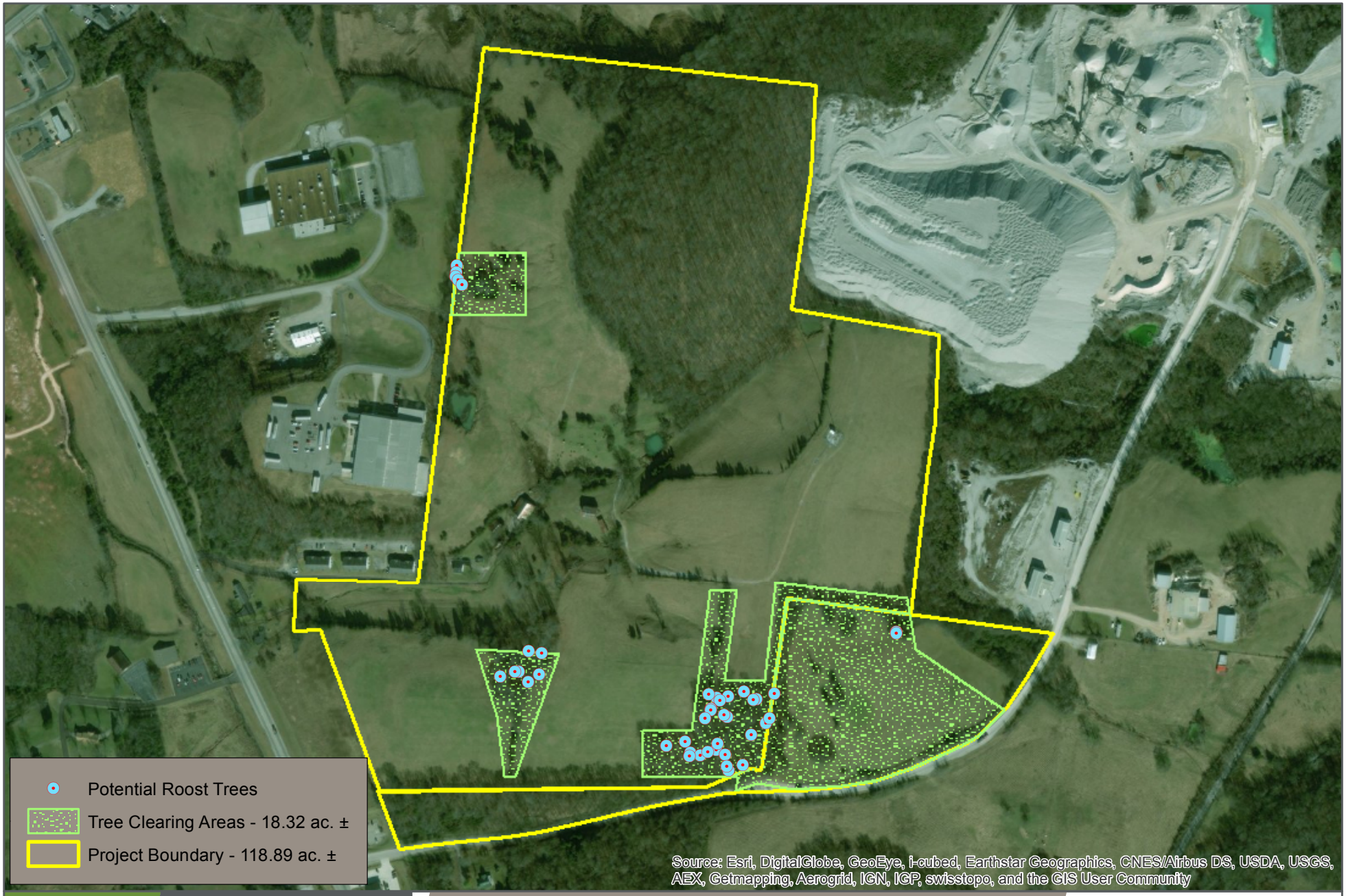
GIS Analyst: Lauren.Federsel

Figure 1-H

Potential Bat Roost Trees



Potential Bat Roost Trees

Smith Co Industrial Park EA

Smith County, Tennessee

0 500 1,000 Feet

0 152 304 Meters

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GIS Analyst: Lauren.Federsel

ATTACHMENT 2

BAT CONSERVATION MEASURES

CHAPTER 5 – EFFECTS OF PROPOSED ACTIONS AND IMPLEMENTATION OF CONSERVATION MEASURES

5.1 Effects Analysis Overview

This chapter includes analysis of direct and indirect effects of proposed actions on listed species, as well as on interrelated and interdependent activities. Direct effects occur to an individual during implementation of an action. Effects that result from an action and occur later in time are indirect effects. Both direct and indirect effects must be caused by the action and be reasonably certain to occur. The only difference between direct and indirect effects is timeframe. An interrelated activity is part of, is associated with, or depends on the proposed action for its justification. An interdependent activity has no independent utility apart from the proposed action under consultation or is being carried out because of the proposed action.

By virtue of TVA's multifaceted mission, the 96 routine activities are a mix of interrelated and interdependent activities that serve to carry out the ten overarching routine actions. There is potential for unforeseen adverse impacts to occur as a result of some interrelated and interdependent activities. Attempting to identify these programmatically would be too speculative. Project-specific environmental reviews will allow for identification of potential adverse effects that may result from interrelated and interdependent activities (e.g., transfer of land from TVA to another landowner). If necessary, additional project-specific consultation would be carried out. The effects analysis focuses on the 96 activities defined in Section 3.2 (versus the ten overarching routine actions in Sections 3-3 through 3-12).

Stressors that could result from implementation of each activity are described in Section 5.2, along with the method of potential exposure (e.g., life stage, activity intensity, duration) of each bat species to stressors and possible bat response (e.g., startling, altered behavior, death). For each stressor, avoidance and minimization measures that TVA would implement are listed, followed by an overall determination of effect for each stressor. An analysis of effects for each of the 96 activities is detailed in Table 5-1 and includes a reference to the conservation measures applicable to each activity. The effects determination is based on implementation of conservation measures and resulting avoidance or minimization of exposure to stressors associated with each activity.

Section 5.3 describes additional conservation measures that TVA will continue to carry out, based on conservation goals and objectives that are broader than project-specific avoidance and minimization measures, and that are in intended to provide benefits to listed bats at the population or regional level.

Section 5.4 summarizes effects determinations by each bat species. Section 5.6 summarizes cumulative effects.

5.2 Stressors with Potential Direct or Indirect Effects to Bats and Minimization or Avoidance Conservation Measures

5.2.1 Noise/Vibration

Exposure of any of the four bat species to noise and vibration has potential to occur when machinery or heavy equipment is in use as part of an activity and the activity is taking place near an occupied roost during the day or near a foraging area or travel

corridor occupied by bats in flight at night (the latter is less likely due to the diurnal time frame of the majority of activities). Bats may respond to the stress of noise or vibration by altering their normal behavior patterns (e.g., frequency of arousal, sudden flushing from roost). This may result in potentially depleted energy stores, predation, or mortality. Any activity that occurs outside, involves human presence and/or use of some type of equipment has the potential to generate noise. Many of the proposed activities occur outside and thus have the potential to generate noise. A couple of activities, in particular, blasting and drilling, have the potential to also create vibration.

TVA would implement the following measures associated with noise/vibration:

- NV1 = Noise is expected to 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; bats thus are unlikely to be disturbed.

- 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, recognizing that certain caves or other roosts are used year-round by bats.

- 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. The likelihood of this is highly infrequent.

While magnitude and duration of noise varies by activity, the majority of noise and vibration that occurs as a result of proposed activities is expected to be short-term and not significantly different from urban interface or natural events that bats are frequently exposed to when present on the landscape (e.g., boats, barges, trains, storms). Bats are unlikely to be adversely disturbed by additional but similar noise from TVA activities. With TVA's implementation of the above measures, adapted from NiSource (2013), noise or vibration associated with proposed activities are NLAA any of the bat species addressed in this BA.

5.2.2 Human Presence

Exposure of any of the four bat species to human presence has potential to occur when humans come in close proximity to an occupied roost site. Bats may respond to the stress of human presence (detected by smell, movement and/or noise) by altering their normal behavior patterns (e.g., frequency of arousal, sudden flushing from roost, avoidance of a flight path or foraging area). This may result in potentially depleted energy stores, predation, or mortality.

TVA would implement the following measures associated with human presence:

- 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.

While the magnitude (i.e., number of people) and duration (i.e., length of time) of human presence will vary, the majority of human presence is expected to be short-term. Bats therefore are unlikely to be adversely disturbed. With TVA's implementation of HP1 and HP2, human presence associated with proposed activities is NLAA any of the bat species addressed in this BA.

5.2.3 Smoke/Heat/Fire

Exposure of any of the four bat species to smoke inhalation, heat, or fire while roosting in caves or trees has potential to occur when prescribed burns are conducted in close proximity to a roost site. Bats may respond to smoke, heat or fire by having difficulty breathing, flushing from roost sites, or sustaining burns. This may result in increased energy expenditure, harm or death. Use of fire and preparation of fire breaks may damage or destroy roost trees, which may result in increased energy use to locate new roost trees. Sediment generated by plowing of fire breaks may migrate to water sources, which may result in degrading water quality, and subsequent degraded drinking water and prey availability.

Conducting controlled burns on the landscape also has potential to create snags and forest openings, resulting in additional roost sites, improved foraging opportunities and overall increased habitat availability for Indiana bat or northern long-eared bat.

TVA would implement the following avoidance and minimization measures associated with smoke, fire or heat:

- SHF1 = Fire breaks are used to define and limit burn scope.
- SHF2 = Site-specific conditions (e.g., acres burned, transport wind speed, mixing heights) are 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 is divided into smaller units to keep the amount of smoke at any one time or location to a minimum and reduce risk for smoke to enter caves.
- SHF4 = Planned timing for prescribed burns minimally overlaps with time of potential occupancy by bats (See Table 3-3).). 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 are plowed immediately prior to burning, are plowed as shallow as possible and are kept to minimum to minimize sediment.

- SHF6 = Tractor-constructed fire lines are established greater than 200 ft from cave entrances. Existing logging roads and skid trails are 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. Undisturbed forest is important for gray bats to regulate temperatures at the mouth of the cave, and provide cover for bats as they emerge from the cave. 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).

Smoke, heat, and fire associated with prescribed burns are NLAA any of the bats species addressed in this BA when these bats are roosting in caves. While implementation of the above measures will significantly reduce this, there is some potential that prescribed burns may adversely affect bats that may be roosting in trees at the time of the prescribed burn (i.e., a few burn plans span into March-April or September-October time frames, when there is potential for bats to be roosting in trees).

5.2.4 Tree Removal

Indiana bats and northern long-eared bats roost in trees outside of the winter season. Exposure of these two species to the effects of tree removal has the potential to occur when bats are roosting in trees during time of removal, or when bats return to a previously occupied tree (i.e., previously occupied either earlier in the same season or during a previous year) to find that the tree is no longer present. Bats may respond to the stress of roost tree removal by flushing during tree removal, falling out of the tree during tree removal (if startled or unable to fly at the time the tree is removed), being crushed during tree removal, or selecting a different tree if previously used tree is no longer present. This may result in depleted energy stores, possible mortality from injury or inability to fly, and additional use of energy to locate other roost trees.

Tree removal is a common, necessary and often unavoidable activity for actions addressed in this BA. Flexibility in tree removal across season and landscape varies across proposed actions due to other regulations, safety, and inclement weather conditions, as well as the large amount of acreage that needs to be managed over a short period of time (e.g., annual or 3-year cycle). For many activities, removal of suitable roost trees can occur during winter season (when Indiana bats or northern long-eared bats likely are not present on the landscape). For safety and liability reasons, hazard trees typically have to be addressed immediately, regardless of season. Removal of (or granting approval to remove) hazard trees is limited to trees with a defined target (e.g., threat to a TL, adjacent private property,

or human safety in a public use area). The need to remove trees during time of occupancy by Indiana bat and northern long-eared bat, including when non-volant juveniles are present on the landscape, has been minimized to the extent possible within the constraints of proposed actions over the course of the 20-year term (see Table 3-2).

TVA would implement the following avoidance and minimization measures for tree removal:

- 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 potentially suitable summer roost trees for Indiana bat and northern long-eared bat.
- 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 Norris Dam Cave, Campbell County, TN).
- TR3 = Removal of suitable summer roosting habitat within documented 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.
- TR4 = Removal of suitable summer roosting habitat within potential habitat for Indiana bat or northern long-eared bat hibernacula will be tracked, documented, and included in annual reporting.
- TR5 = Removal of any trees within 150 ft 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. This may include establishment of artificial roosts before loss 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 the USFWS to determine how to minimize impacts to pups to the extent possible. This may include establishment of artificial roosts before loss of roost tree(s).
- TR7 = Tree removal within 100 ft of existing transmission ROWs will be limited to hazard trees as defined in Section 3-2.

- TR8 = Requests for removal of hazard trees on or adjacent to TVA reservoir land are inspected by staff knowledgeable in identifying hazard trees per International Society of Arboriculture and TVA's checklist for hazard trees. Approval is limited to trees with a defined target.
- TR9 = Internal controls will be in place to further reduce potential for site-specific direct adverse effects to Indiana bat and northern long-eared bat associated with tree removal. This includes promoting presence/absence surveys (mist netting or emergence counts) that allows for positive detections but without resulting in increased constraints in cost and project schedule. Internal controls are intended to facilitate willingness and financial feasibility to conduct surveys amidst increasing budget constraints without the risk for increased financial penalty if Indiana bat or northern long-eared bat individuals are caught. This enables TVA to contribute to increased knowledge of bat presence on the landscape while continuing to carry out TVA's broad mission and responsibilities.

Implementation of the above measures will avoid or minimize direct adverse effects to Indiana bat and northern long-eared bat in most cases. There will be instances, however, when presence/ absence surveys cannot be conducted, tree removal needs to occur outside of winter (i.e., bats present on the landscape) and bats potentially are roosting in trees identified for removal. Tree removal therefore has potential to adversely affect Indiana bat and northern long-eared bat.

5.2.5 Alteration or removal of unconventional roosts (Bridges or Human Structures)

All four bat species are known to use unconventional roosts. Indiana bats and gray bats have been documented in bridges with suitable roost characteristics and Virginia big-eared bat and northern long-eared bat have been observed in old buildings with suitable roost characteristics. Exposure of these species to alteration of unconventional roost sites may occur when modification or demolition to a building or bridge occurs while bats are occupying the structure. Bats are more likely to be found in buildings, structures or sites that are close to suitable foraging habitat (e.g., woodlands, mature trees and hedgerows, water features).

Bats may respond to the stress of structural alteration or demolition by flushing during alteration or demolition, falling to the ground or floor during structure modification or demolition activities (if startled or unable to fly at the time of activity), or being crushed during the activity. This may result in depleted energy stores, possible mortality from injury or inability to fly, and additional use of energy to locate another roost site.

TVA will implement the following avoidance and minimization measures associated with alteration or removal of unconventional bat roosts:

- 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:
    - 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.

  - 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.
  - Features with high-medium likelihood of harboring bats but cannot be checked visually include soffits, cavity walls, space between roof covering and roof lining.
  - 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 and 10 feet (1.5 and 3 meters) tall and 300 feet (100 meters) 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
  - 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).
  - Bat surveys usually are NOT needed in the following circumstances:
    - Domestic garages and 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 (per Appendix D in USFWS 2016c) will be implemented, either by permittee (e.g., state DOT biologists) or qualified personnel. If a bridge is being used 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 November 16 and March 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 strive to (and in most cases anticipates being able to) accommodate seasonal modification or removal. Risk to human safety, however, will take priority. For project-specific cases in which TVA is unable to accommodate seasonal modification or removal, and federally listed bat species are present, TVA will consult 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.

Potential impacts from alteration or removal of unconventional roost structures associated with proposed activities are avoided or reduced with implementation of the above measures. Alteration or removal of unconventional roost structures is NLAA bats addressed in this BA.

5.2.6 Sedimentation/Spills/Pollutants/Contaminants

All four bat species rely on water sources for drinking water and (to some extent) prey availability. Inputs of sediment or other pollutants into water sources resulting from adjacent land use activities has the potential to alter water quality, which may in turn degrade drinking water and abundance or quality of available prey sources that require water for a portion of their life cycle (e.g., larval hatching and development in water bodies). Bats may be exposed to the adverse impacts of sedimentation and pollutants when activities with ground disturbance or use of chemicals (or fuels) are conducted near to or adjacent to water sources that these bats use for foraging and drinking. Bats also may be exposed to sediment or pollutants if either of these enter subterranean aquifers and alter the quality of cave roost sites in a way that renders the roost site less inhabitable. Bats may respond to these stressors by experiencing reduced health, reduced feeding success, death, or by seeking alternate sources for drinking, foraging and roosting, which may result in increased energy expenditures.

TVA would implement a variety of BMPs to avoid or reduce inputs of sediment into waterways and cave/cave-like entrances:

- 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 (Appendix O). This focuses on control of sediment and pollutants, including herbicides. The following are key measures:
    - 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.
    - 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 specific guidelines to follow for impact minimization or avoidance. During pre-job briefings, the ROW Forester will review the location of these 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.
    - 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 or fuel storage or resupply and vehicle servicing will be handled outside of SMZs and in such a manner as to prevent these

items from reaching a watercourse. Earthen berms or other effective means are installed to protect the 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, and other litter will be collected and disposed of properly. Equipment servicing and chemical or 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:
    - BMPs in accordance with regulations:
    - 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
    - SWPP Control Strategies
        - Minimize storm water contact with disturbed soils at construction site
        - Protect disturbed soil areas from erosion
        - Minimize sediment in storm water before discharge
        - Prevent storm water contact with other pollutants
        - A storm water permit may be required at construction sites (>1 ac)
    - Each site has a Spill Prevention and Control Countermeasures (SPCC) Plan. Several hundred pieces of equipment often are 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.

Potential impacts from sedimentation or other contaminants (chemicals, fuels) to the four bat species are avoided or reduced by implementation of the above measures. Sediment and contaminants are NLAA bats species addressed in this BA.

5.2.7 Lighting

Bat behavior may be affected by artificial lighting when traveling between roosting and foraging areas. Foraging in lighted areas may increase risk of predation or it may deter bats from flying in those areas. Bats that significantly alter their foraging patterns may increase their energy expenditures that result in reduced reproductive rates. This depends on the context (e.g., duration, location, extent, type) of the lighting (USFWS 2016c).

Artificial light attracts insects that are phototactic (drawn to light). Some insectivorous bats may be able to identify and exploit insect accumulations and insect clusters at artificial lights and thus may benefit from artificial lighting because resource predictability and high insect densities increase foraging efficiency. Insectivorous bats that hunt in open spaces above the canopy (open-space foragers) or along vegetation edges such as forest edges, tree lines or hedgerows (edge foragers) appear to be those most tolerant of artificial lighting. When foraging at street lights, open-space foragers typically fly above the lamps, diving into the light cone to catch insects, whereas edge foragers generally use echolocation calls (Rowse et al. 2016).

Studies suggest that bat response to artificial lighting is highly variable across species, and attributed to physiology (e.g., wing morphology, size, flight speed), foraging habitat (e.g., open, forest edge, dense vegetation), use of echolocation, and type, duration, and intensity of lighting (Rowse et al. 2016, USFWS 2016c).

TVA would implement a variety of BMPs to avoid or reduce inputs of sediment into waterways and cave/cave-like entrances:

TVA would implement a variety of BMPs to avoid or reduce impacts from artificial lighting:

- 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).

Potential impacts from artificial lighting to the four bat species are avoided or reduced by implementation of the above measures. Artificial lighting is NLAA bats species addressed in this BA.

5.2.8 Additional Avoidance and Minimization Measures

TVA would implement the following measures to avoid or minimize the stressors listed above.

- ED1 = Continue to implement a siting process for proposed actions by prospective economic development applicants. This includes the following measures:
    - Landscape-level review on front end to determine existing land use, property ownership, and presence of natural and cultural resources to site an action in a location that results in impact avoidance or minimization
    - Targeted use of sites that have been previously disturbed for use as economic development sites, laydown areas, substations, ROWs.
    - Screening of prospective economic development applicants that targets sites for which environmental due diligence has been completed
    - If potential impacts are identified, actions are modified to avoid impacts to the extent possible.
    - Project-specific habitat assessments are conducted as needed.
- SUR1 = When feasible for a site-specific project, conduct presence/absence summer bat surveys based on the following criteria:
    - Appropriate for projects not located in areas with documented bat occurrence
    - Implement current species-specific USFWS survey guidelines
    - Negative survey results valid for a minimum of two years, subject to new information on habitat suitability; bat-specific conservation measures not mandatory if negative survey results.
- SUR2 = Conduct habitat surveys of suitable cave, karst, or structure (e.g., building, bridge) within project boundaries based on the following criteria:
    - Survey can be conducted any time of year; results are valid for two years if a bridge or other non-natural structure.
    - Survey can include on-site visits and/or review of aerial photos, maps, mining records, forest inventories, or previous surveys.
    - Applies to caves, sinkholes, karst fissures, quarries, mine portals, bridges
    - Applies to ground openings greater than one ft in diameter (and where feasible and where human safety is not at risk).
    - Applies to underground passages that continue beyond dark zone and do not end within 40 ft of entrance.
    - Entrances that are flooded or prone to flooding (i.e., debris on ceiling), collapsed, or otherwise inaccessible to bats are excluded.
    - Ground openings that have occurred recently (i.e., within the past 12 months) or suddenly appear (e.g., sinkholes) due to creation or subsidence are excluded. However, document site with written description and photographs of opening for reporting purposes.

- SUR3 = Conduct seasonal bat presence/absence surveys in suitable cave/ karst/ structural habitat located within project boundaries based on the following criteria:
    - Implement species-specific or habitat-specific survey protocol based on the most current guidance provided by the USFWS.
    - If surveys fail to detect bats, conservation measures for this habitat type are not required.

5.3 Additional Conservation Measures

In addition to implementation of site-specific avoidance and minimization measures to avoid or minimize harm to individual gray, Indiana, northern long-eared, or Virginia big-eared bats, TVA would continue to carry out conservation measures at larger scales. These include population-level initiatives that promote recovery of one or more bat species (e.g., land acquisition, habitat improvement and protection) as well as mission-level holistic and strategic steps that strive to keep environmental stewardship in check with operational and economic goals (e.g., managing lands specifically for sensitive resources).

5.3.1 Population-level Conservation Measures for Recovery and Enhancement

- TVA will continue annual gray bat population census counts at select caves across the TVA region in coordination with other state, federal and non-governmental partners. TVA will continue to provide data annually to the USFWS.

Table 5-1. Monitoring Schedule for Gray Bat Caves on TVA-Managed Lands

Cave	State	Monitoring Frequency			
		Annual	Every Two Years	Every Three Years	To Be Determined
Hambrick's	AL	X			
Nickajack	TN	X			
Featherfoot	TN	X			
Norris Dam	TN	X			
Collier	AL	X			
Quarry	AL		X		
Gross-Skelton	AL			X	
Marble Bluff	TN			X	
Blythe Ferry	TN		X		
Crompton Creek	TN				X[1]
Pennington Cave	TN				X[1]

[1]Establishment of monitoring frequency is pending determination of roost type (i.e., maternity vs bachelor).

- TVA will continue to collaborate with partners to survey bridges as requested by partners with known or potential summer use (e.g., maternity colonies) by federally listed partners.
- TVA will develop and continue local/regional cooperative partnerships and support monitoring efforts to learn more about how bats are utilizing communities within the TVA region (e.g., spring migration radio tagging and tracking, location and assessment of roost trees).
- TVA will conduct bat monitoring following bat habitat enhancement projects and establishment of artificial roosts on TVA-managed lands to assess use of habitat and roosts by bats.
- TVA will monitor and maintain gates and signage at caves inhabited by protected bat species and determine the need for establishment of new gates, fences, or signage at other caves important to federally listed bats on TVA lands.
- Continue to serve as a member of state WNS planning committees (e.g., AL, TN). WNS planning efforts will continue to be supported by TVA staff. As information available about WNS is ever changing, current planning and management efforts will be reviewed and revised as appropriate.
- Continue to maintain a database of known locations (i.e., mist net captures, cave, bridge, and tree roosts, etc.) of gray bat, northern long-eared bat, Indiana bat and Virginia big-eared bat within the TVA region. This database will continue to be updated as new information becomes available and used to inform project-specific environmental reviews and BAs.
- Continue to manage invasive plants, including those protect high priority sites where plant invasions threaten rare species habitats (e.g., cave entrances):
    - Identify and prioritize distributions, rates and modes of population expansions, sources of introduction, and ecological significance of invasive species;
    - Identify and prioritize areas requiring invasive species control;
    - Eradicate known substantial seed sources of invasive plants;
    - Develop management alternatives, using native species, to prevent further introduction of non-native species;
    - Employ prescribed burning, manual removal, and chemical control as appropriate for managing invasive species.
- Bat habitat identification workshops will continue to be offered to TVA staff interested in assisting with conducting habitat assessments. TVA bat biologists will continue to maintain oversight in identification and determination of suitable habitat.

5.3.2 Mission-Driven Conservation Measures as part of Policies, Plans and Processes

TVA will continue to carry out its three-pronged mission (Section 1.2.1) of providing low-cost electricity, robust economic development and proactive environmental stewardship, striving to meet environmental standards (including conservation of federally listed species) across the board. TVA will continue to abide by its Environmental Policy (Section 1.2.2), enhancing land and water resources to provide multiple benefits in the TVA region and operating as a steward of the region's natural resources. TVA's IRP (Section 1.2.3) will

continue to direct TVA's generation of electricity to meet long-term energy needs of the TVA region while supporting TVA's mandates for environmental stewardship and minimizing environmental impacts from its operations. TVA will continue to work within the framework of its NRP (Section 1.2.4) to balance land use, human activity and conservation of resources to achieve the greatest public benefit. Seventy-eight percent (228,540 ac) of TVA-managed land is allocated for natural and sensitive resource management. Cave gating and protection, habitat improvement and enhancement, and management of Natural Areas important to rare species are focal areas within the NRP framework.

TVA will continue to implement its Land Policy (Section 1.2.5) which spells out exactly how TVA manages the reservoir system and surrounding lands to maximize and balance multipurpose objectives. Reservoir lands remaining under TVA's control are preserved in public ownership except in rare instances where public benefits would be so significant that transferring lands from TVA control to private ownership or another public entity is justified. TVA will continue to implement its SMP (Section 1.2.6) to protect shoreline and aquatic resources while allowing reasonable access to the water by adjacent residents or property owners. Residential development is limited to 38 percent of reservoir shoreline. TVA will continue to carry out a rigorous environmental review process (Section 1.2.7) at multiple levels to ensure compliance with the NEPA, ESA, and other environmental regulations.

While, these plans and policies do get revised from time to time, the underlying mission of environmental stewardship will remain.

ATTACHMENT 3

AGENCY CORRESPONDENCE

3-A

Tennessee Historical Commission

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

February 13, 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) INVESTPREP GRANT, SMITH COUNTY INDUSTRIAL PARK PROJECT, SMITH COUNTY, TENNESSEE

TVA proposes to provide an economic development grant to Smith County, Tennessee for a percentage of funds needed to purchase a 119-acre tract of land for future industrial development along with designated tree clearing in Gordonsville, Smith County, Tennessee. TVA determined that the Area of Potential Effects (APE) to be the parcels that would be purchased using TVA funds and the locations of all tree clearing activities and the architectural/visual APE to be the 0.5 mile radius surrounding the project area with unobstructed views to the project area.

TVA contracted with Cardno to conduct a Phase I Cultural Resources survey. Please find the resulting report titled *Tennessee Valley Authority Smith County Industrial Park Project, Smith County, Tennessee* enclosed.

The architectural survey resulted in the identification of four previously unrecorded historic structures (IS-1- IS-4) and two previously identified historic structures (SH-796 and SH-1421). SH-796 (Baker Farmstead) is a one-and-a-half story Plain/Traditional residence. The property also contains several outbuildings including two tobacco barns and a multipurpose barn. While the property is located outside the proposed area of tree clearing, it lies within the parcels to be purchased for potential development. Cardno recommends SH-796 ineligible for the National Register of Historic Places (NRHP) based on lack of integrity due to modern alterations. SH-1421 (Elizabeth Gibb Moss House) is a circa 1910 rectangular plan house. Cardno recommends SH-1421 ineligible for the NRHP. Cardno also recommends IS-1- IS-4 ineligible for the NRHP based on lack of integrity and/or lack of architectural significance and the inability to relate the structures to significant historical events or individuals.

The archaeological survey resulted in the identification of two previously unrecorded archaeological sites (40SM239 and 40SM240) and a series of four stone wall remnants within the archaeological APE. Site 40SM239 consists of a small prehistoric scatter and site 40SM240 consists of a small historic scatter. The four stone wall sections noted within or along the

property edges of the project area do not appear to be associated with any important events or people in Smith County history and lack direct association with any known historic structures. Cardno recommends the two archaeological sites and four stone walls ineligible for the NRHP.

TVA has read the enclosed report and agrees with the recommendations of the authors. TVA finds that no historic properties would be affected by the proposed undertaking. Pursuant to 36 CFR § 800 (4)(b), we are seeking your concurrence with TVA's finding that no historic properties listed or eligible for listing in the NRHP would be affected by the proposed undertaking.

Pursuant to §800.3(f)(2), TVA is consulting with federally recognized Indian tribes regarding historic properties within the APE that may be of religious and cultural significance to the tribes.

If you have any questions or comments, please contact Michaelyn Harle by email, mharle@tva.gov or by phone, (865) 632-2248.

Sincerely,

Clinton E. Jones
Manager
Cultural Compliance

MSH:ABM
Enclosures
cc (Enclosures):
Ms. Jennifer Barnett
Tennessee Division of Archaeology
1216 Foster Avenue, Cole Bldg. #3
Nashville, Tennessee 3721

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

A. Michelle Cagley, KFP 1T-KST
Marty M. Gamble, WT 11C-K
Michaelyn S. Harle, WT 11D-K
Bess R. Hubbard, OCP 6D-NST
Susan R. Jacks, WT 11C-K
Ashley Anne Pilakowski, WT 11D-K
M. Susan Smelley, BR 4A-C
Dana M. Vaughn, WT 11D-K
ECM, WT CA-K

Phase I Cultural Resources Investigation

Tennessee Valley Authority
Smith County Industrial Park
Project, Smith County, Tennessee

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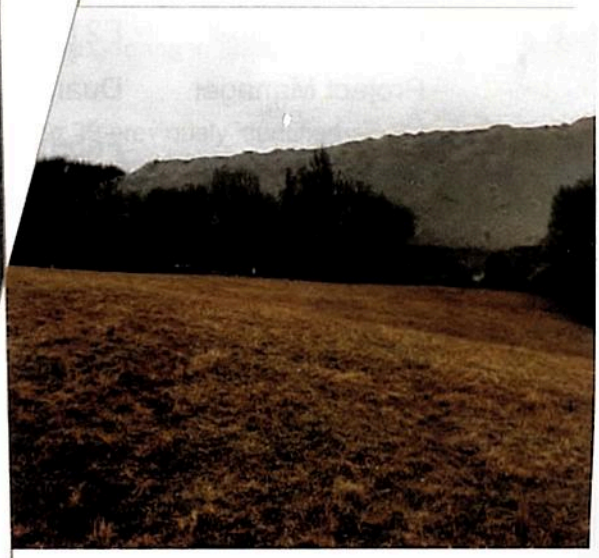

Cardno
Shaping the Future

TENNESSEE HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICE
2941 LEBANON PIKE
NASHVILLE, TENNESSEE 37243-0442
OFFICE: (615) 532-1550
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February 26, 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, Investprep Grant, Smith County Industrial Park, Gordonsville, Smith County, TN

Dear Mr. Jones:

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

Considering the information provided, we concur that no historic properties eligible for listing in the National Register of Historic Places will be affected by this undertaking. If project plans are changed or archaeological remains are discovered during project construction, please contact this office to determine what further action, if any, will be necessary to comply with Section 106 of the National Historic Preservation Act. Questions or comments may be directed to Jennifer Barnett (615) 687-4780.

Your cooperation is appreciated.

Sincerely,

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

EPM/jmb

3-B

Federally Recognized Indian Tribes

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

February 13, 2018

TO THOSE LISTED:

TENNESSEE VALLEY AUTHORITY (TVA) INVESTPREP GRANT, SMITH COUNTY INDUSTRIAL PARK PROJECT, SMITH COUNTY, TENNESSEE (36.1838000 - 36° 11' 1.68'')

TVA proposes to provide an economic development grant to Smith County for a percentage of funds needed to purchase a 119-acre tract of land for future industrial development in Gordonsville, Smith County, Tennessee. TVA is also providing funding for designated tree clearing. TVA determined that the Area of Potential Effects (APE) to be the parcels that would be purchased using TVA finds and the locations of all tree clearing activities and the architectural/visual APE to be the 0.5 mile radius surrounding the project area with unobstructed views to the project area.

TVA contracted with Cardno to conduct a Phase I Cultural Resources survey. The report titled *Tennessee Valley Authority Smith County Industrial Park Project, Smith County, Tennessee* can be downloaded at TVA accellion link provided in the email.

The architectural survey resulted in the identification of four previously unrecorded historic structures (IS-1- IS-4) and two previously identified historic structures (SH-796 and SH-1421). SH-796 (Baker Farmstead) is a one-and-a-half story Plain/Traditional residence. The property also contains several outbuildings including two tobacco barns and a multipurpose barn. While the property is located outside the area the proposed area of tree clearing, it lies within the parcels to be purchased for potential development. Cardno recommends SH-796 ineligible for the National Register of Historic Places (NRHP) based on lack of integrity due to modern alterations. SH-1421 (Elizabeth Gibb Moss House) is a circa 1910 rectangular plan house. Cardno recommends SH-1421 ineligible for the NRHP. Cardno also recommends IS-1- IS-4 ineligible for the NRHP based on lack of integrity and/or lack of architectural significance and the inability to relate the structures to significant historical events or individuals.

The archaeological survey resulted in the identification of two previously unrecorded archaeological sites (40SM239 and 40SM240) and a series of four stone wall remnants within the archaeological APE. Site 40SM239 consists of a small prehistoric scatter and site 40SM240 consists of a small historic scatter. The four stone wall sections noted within or along the property edges of the project area do not appear to be associated with any important events or people in Smith County history and lack direct association with any known historic structures. Cardno recommends the two archaeological sites and four stone walls ineligible for the NRHP.

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

Band of Cherokee Indians, United Keetoowah Band of Cherokee Indians, Chickasaw Nation, Coushatta Tribe of Louisiana, Muscogee (Creek) Nation, Kialegee Tribal Town, Thlopthlocco Tribal Town, Absentee Shawnee Tribe of Oklahoma, Eastern Shawnee Tribe of Oklahoma, and the Shawnee Tribe.

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

Please respond by March 15, 2018 if you have any comments on the proposed undertaking. If you have any questions, please contact me by phone, (865)632-6461 or by email, pbezzell@tva.gov.

Sincerely,

Pat Bernard Ezzell

Patricia Bernard Ezzell
Tribal Relations and Corporate Historian
Communications

MSH:ABM
Enclosures
cc (Enclosures):

IDENTICAL LETTER MAILED TO THE FOLLOWING ON FEBRUARY 13, 2018:

Ms. Holly Austin (NHPA)
Federal Cultural Resource Law Liaison
Tribal Historic Preservation Office
Eastern Band of Cherokee Indians
Post Office Box 455
Cherokee, North Carolina 28719

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

Mr. Brett Barnes
Tribal Historic Preservation Officer
Eastern Shawnee Tribe of Oklahoma
127 West Oneida
Seneca, Missouri 64865

Ms. Karen Brunso
Tribal Historic Preservation Officer
Division of Historic Preservation
Department of Culture & Humanities
The Chickasaw Nation
Post Office Box 1548
Ada, Oklahoma 74821-1548

Ms. RaeLynn Butler
Manager
Historic & Cultural Preservation Department
Muscogee (Creek) Nation
Post Office Box 580
Okmulgee, Oklahoma 74447

cc: Ms. Corain Lowe-Zepeda
Tribal Historic Preservation Officer
Historic & Cultural Preservation Department
Muscogee (Creek) Nation
Post Office Box 580
Okmulgee, Oklahoma 74447

Mr. Terry Clouthier
Thlopthlocco Tribal Town
Tribal Historic Preservation Officer
Post Office Box 188
Okemah, Oklahoma 74859

Mr. David Cook
Tribal Administrator
Kialegee Tribal Town
Post Office Box 332
Wetumka, Oklahoma 74883

Dr. Linda Langley
Tribal Historic Preservation Officer
Coushatta Tribe of Louisiana
Post Office Box 10
Elton, Louisiana 70532

cc: Mr. Jonas John
Director, Heritage Department
Coushatta Tribe of Louisiana
Post Office Box 10
Elton, LA 70532

Mr. Michael Tarpley
Coushatta Tribe of Louisiana
Post Office Box 10
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Ms. Karen Pritchett
Tribal Historic Preservation Officer
United Keetoowah Band of Cherokee Indians in Oklahoma
Post Office Box 1245
Tahlequah, Oklahoma 74465

Ms. Erin Thompson
Tribal Historic Preservation Officer
Absentee-Shawnee Tribe of Oklahoma
2025 S. Gordon Cooper Drive
Shawnee, Oklahoma 74801

Ms. Tonya Tipton
Shawnee Tribe
Post Office Box 189
Miami, Oklahoma 74355

Ms. Elizabeth Toombs
Cherokee Nation
Post Office Box 948
Tahlequah, Oklahoma 74465

From:	Ezzell, Patricia Bernard
To:	"tonya@shawnee-tribe.com"
Cc:	Shuler, Marianne M; McCampbell, Amy Boardman; Harle, Michaelyn S
Subject:	RE: TVA Investprep Grant, SMith County Industrial Park Project, Smith County, Tennessee (36.1838000-36° 11" 1.68")
Date:	Thursday, February 22, 2018 4:46:59 PM

Thanks, Tonya, for your comments.--Pat

From: tonya@shawnee-tribe.com [mailto:tonya@shawnee-tribe.com]
Sent: Thursday, February 22, 2018 11:45 AM
To: Ezzell, Patricia Bernard
Subject: TVA Investprep Grant, SMith County Industrial Park Project, Smith County, Tennessee (36.1838000-36° 11' 1.68")

TVA External Message. Please use caution when opening.

This letter is in response to the above referenced project.

The Shawnee Tribe's Tribal Historic Preservation Department concurs that no known historic properties will be negatively impacted by this project.

We have no issues or concerns at this time, but in the event that archaeological materials are encountered during construction, use, or maintenance of this location, please re-notify us at that time as we would like to resume immediate consultation under such a circumstance.

If you have any questions, you may contact me via email at tonya@shawnee-tribe.com

Thank you for giving us the opportunity to comment on this project.

Sincerely,
Tonya Tipton THPO
Shawnee Tribe

Absentee Shawnee Tribe of Oklahoma
Cultural/Tribal Historic Preservation Department
2025 S. Gordon Cooper Dr.
Shawnee, Oklahoma 74801
Phone: (405) 275-4030 ext 6340

2/26/18

RE: INVESTPREP GRANT, SMITH COUNTY INDUSTRIAL PARK PROJECT, SMITH COUNTY, TENNESSEE

To Whom It May Concern:

This response is regarding the request from your office for a review of the project listed above. We have reviewed the information provided in your letter of February 13, 2018. We find after review of this information that we concur with your findings of no adverse affects.

We remain interested in further communications regarding this project due to the location. The Shawnee people have a documented historical presence in Tennessee. While there are no documented eligible sites within the project site or within a close proximity outside the project site, the existence of ineligible archaeological materials alludes to the potential of finding more unknown sites in and surrounding the project location. Due we would request archaeological monitoring during the project activities.

It is further advised that if the area of potential effect changes or in the event of an inadvertent discovery of human remains or other cultural resources that we receive notification within 48 hours. As well, any advertent discovery of human remains or other cultural resources should remain in situ until consultation with interested tribes and agencies is undertaken.

Thank you for your time and patience in communications regarding section 106 and NAGPRA issues. We appreciate your continued efforts in such matters. Please do not hesitate to contact me at the information below if you have any questions or concerns.

Best Regards,

Erin Thompson
Tribal Historic Preservation Officer
Absentee Shawnee Tribe of Oklahoma
2025 Gordon Cooper Drive
Shawnee, OK 74801
(P) 405.275.4030 Ext. 6340
ethompson@astribe.com